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Corporate SDG adoption in discretionary goods: Evidence from industry segments and regions

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Abstract: The Sustainable Development Goals (SDGs) have become a central reference in corporate sustainability reporting; however, firms do not engage with all 17 goals uniformly. This disparity is particularly pronounced in the discretionary goods sector, where industries exhibit substantial variation in production systems, supply chain structures, labor conditions, and sustainability pressures. This study investigates patterns of SDG adoption among discretionary goods firms, focusing on overall adoption, temporal trends, industry segment differences, regional variation, and the interaction between industry segment and region. Drawing on Refinitiv/Datastream firm-level data, the analysis covers 3,798 firm-year observations from 2019 to 2024. The study employs descriptive statistics, Kruskal–Wallis tests with epsilon-squared effect sizes, chi-square tests with Cramér's V, linear probability trend models, and two-way ANOVA. The findings indicate that SDG adoption is selective rather than uniformly distributed across the 17 goals. SDG 12 (35.0%), SDG 8 (34.0%), and SDG 13 (33.6%) are most frequently adopted, whereas SDG 2 (7.2%), SDG 14 (9.5%), and SDG 1 (11.4%) exhibit the lowest adoption rates. Adoption rates increase over time for all 17 goals, with the most pronounced temporal trends for SDG 12, SDG 13, and SDG 8. The analysis reveals statistically significant differences across industry segments and regions, as well as significant interaction effects for all SDGs. These results demonstrate that SDG adoption in the discretionary goods sector is dynamic yet uneven, offering valuable evidence for managers, investors, and regulators interpreting corporate SDG engagement within sectoral and regional contexts.

Keywords: *Industry and regional differences, SDG adoption, Discretionary goods sector, Sustainability reporting, Sustainable Development Goals (SDGs).*

1. Introduction

Since the adoption of the 2030 Agenda, the Sustainable Development Goals (SDGs) have become a prominent reference point in corporate sustainability reporting. Firms use the SDGs to communicate environmental and social priorities, structure non-financial disclosures, and demonstrate alignment with stakeholder expectations. However, research indicates that corporate engagement with the SDGs remains uneven and continues to evolve. Although business and management research has expanded rapidly, the field is fragmented across themes such as strategy, innovation, supply chains, and performance (Agrawal, Majumdar, Majumdar, Raut, & Narkhede, 2022; Domingo-Posada, González-Torre, & Vidal-Suárez, 2024; Pizzi, Caputo, Corvino, & Venturelli, 2020). This study addresses key research questions: (1) Do companies reference the SDGs? (2) Which SDGs are prioritized? (3) How do priorities shift over time? (4) Do patterns vary across sectors and institutional contexts?

These questions are especially pertinent in the discretionary goods sector, which encompasses industries such as automobiles, automobile components, household durables, leisure products, textiles, apparel, and luxury goods. Although these industries are grouped under a common market

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classification, they differ significantly in production systems, supply chain structures, labor intensity, product characteristics, and exposure to environmental and social scrutiny. For instance, automobiles and components are closely linked to industrial transformation, climate challenges, and technological innovation, while textiles and apparel are associated with labor conditions, sourcing, and responsible production. Household durables and leisure products encounter distinct combinations of resource use, consumer expectations, and product-related sustainability concerns. These differences position discretionary goods as a suitable context for investigating whether SDG adoption follows a uniform sector-wide pattern or varies systematically across industry segments.

The discretionary goods sector is significant because it operates at the intersection of production, consumption, and sustainability transition. Studies indicate firms tend to prioritize SDGs closely related to their operations and stakeholder pressures, rather than engaging with the entire agenda (Agrawal et al., 2022; Bonfanti, Mion, Brunetti, & Vargas-Sánchez, 2023; Lenort, Wicher, & Zapletal, 2023; Nylund, Agarwal, Probst, & Brem, 2022). There are ongoing concerns that SDG disclosure may be more symbolic than substantive, especially when firms reference the goals without integrating them into strategy or performance indicators (Ferrero-Ferrero, Muñoz-Torres, Rivera-Lirio, Escrig-Olmedo, & Fernández-Izquierdo, 2023; Heras-Saizarbitoria, Urbieta, & Boiral, 2022; Lodhia, Kaur, & Kuruppu, 2023; Manes-Rossi & Nicolo, 2022). Mapping actual SDG adoption across firms, industry segments, and regions is a necessary first step for understanding their incorporation into reporting practices.

A further consideration is that SDG adoption depends on sectoral factors as well as institutional conditions, regulations, and reporting environments (Bose & Khan, 2022; García-Sánchez, Aibar-Guzmán, Aibar-Guzmán, & Somohano-Rodríguez, 2022; Rosati & Faria, 2019). Firms within the same sector may differ across regions. The literature also shows that SDG reporting has generally increased over time, suggesting that corporate use of the framework is becoming more normalized, if not always more substantive (Bose & Khan, 2022; Botchway & Bradley, 2023; Manes-Rossi & Nicolo, 2022). These findings highlight the importance of analyses that address both temporal change and heterogeneity.

Despite the expanding literature, significant gaps persist. Much of the current evidence is based on broad cross-sector samples, single-country studies, or isolated industry analyses, leaving a lack of research that comprehensively tracks SDG adoption over time within a major consumer-oriented sector while examining both internal industry variation and regional differences. This gap is particularly important because discretionary goods span diverse industries, which are unlikely to display uniform sustainability profiles. Therefore, sector-specific analysis is needed to clarify which SDGs dominate reporting, whether adoption broadens over time, and how these patterns differ across industry segments and regions.

To address these gaps, this study examines SDG adoption in the discretionary goods sector from 2019 to 2024 using firm-level data from Refinitiv/Datastream. Specifically, it asks: (1) Which SDGs are most and least frequently adopted in the sector? (2) Does SDG adoption increase over the 2019–2024 period? (3) Does SDG adoption vary by industry segment and region? The study also explores how the interaction between industry segment and region shapes distinct SDG profiles. Its three contributions are: (1) providing sector-specific evidence on the hierarchy of SDG adoption within discretionary goods; (2) evaluating changes across all 17 SDGs over time, instead of only aggregate reporting levels; and (3) assessing cross-sectional heterogeneity by considering both industry segment and region, as well as their interaction.

The remainder of the paper is organized as follows. The next section reviews the relevant literature and develops the hypotheses. The subsequent section describes the data and methodology. Empirical results are then presented and discussed with respect to overall adoption patterns, temporal trends, industry-segment differences, regional variation, and industry-by-region interactions. The final section concludes by outlining the study's implications and discussing its limitations.

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2. Literature Review and Hypotheses Development

2.1. Corporate SDG reporting as a Selective and Evolving Practice

Research on business engagement with the Sustainable Development Goals has grown rapidly since the adoption of the 2030 Agenda. Review studies indicate an increase in publication volume but emphasize that the field remains fragmented across topics such as sustainability reporting, supply chains, innovation, and corporate strategy (Agrawal et al., 2022; Domingo-Posada et al., 2024; Pizzi et al., 2020). This fragmentation hinders the development of a cumulative understanding of firm-level SDG engagement. A consistent finding is that corporate SDG adoption is rarely comprehensive.

Multiple studies show that firms typically prioritize a limited subset of goals rather than engaging with all 17 SDGs equally. Agrawal et al. (2022) found that SDG 12, SDG 8, and SDG 11 were most frequently addressed in supply-chain research, with the others receiving less attention. Bonfanti et al. (2023) similarly noted Italian manufacturing firms mainly contributed to SDG 12, SDG 8, SDG 3, SDG 9, and SDG 17. In the automotive sector, Lenort et al. (2023) observed priority on SDG 8, SDG 12, and SDG 17, with SDG 7 being relatively neglected. Nylund et al. (2022) reported that large innovative firms focused on a limited number of goals, particularly SDG 12, SDG 8, and SDG 17. These studies agree that firms emphasize goals closely aligned with their operations, stakeholder pressures, and communication objectives rather than the entire SDG agenda.

The literature questions the substantive nature of such engagement. Research contends that SDG reporting is often more symbolic and legitimacy-driven than deeply integrated into strategy, targets, and performance systems. Heras-Saizarbitoria et al. (2022) found only a small minority linked SDGs to strategic objectives, KPIs, or operational tools. Manes-Rossi and Nicolo' (2022) noted that, despite increased SDG disclosure in the European energy sector, such disclosure remained largely symbolic. Lodhia et al. (2023) drew a similar conclusion for Australian firms, which prioritized identifying SDGs over measuring performance. Ferrero-Ferrero et al. (2023) found weak SDG integration even among sustainability leaders. (Costa, Tiburzi, Morales-Alonso, Calabrese, & Rosati, 2025) reported firms may combine extensive disclosure with low commitment, reinforcing concerns about symbolic reporting or "SDG-washing." Diaz-Sarachaga (2021) identified inconsistencies between GRI-linked SDG disclosures and reported actions.

These findings align with legitimacy-based interpretations of corporate reporting, suggesting that firms may use SDG language to signal responsibility and maintain reputational approval even when operational integration is limited (Lodhia et al., 2023; Manes-Rossi & Nicolo, 2022; Silva, 2021). Simultaneously, this pattern is consistent with sector materiality logic, as firms are more likely to adopt goals that are readily linked to production systems, labor relations, responsible consumption, innovation, or climate-related responsibilities. In sectors such as discretionary goods, where value chains, product responsibility, labor conditions, and transition pressures are central, SDG adoption is expected to be selective rather than evenly distributed across all goals.

Based on the above studies, the following hypothesis is formulated:

H_1: SDG adoption in discretionary goods is selective across the 17 goals.

2.2. Temporal Diffusion of SDG Adoption

The literature also suggests that corporate use of the SDG framework has expanded over time. Bose and Khan (2022), using Refinitiv ESG data, found that SDG reporting increased between 2016 and 2019, even though overall levels remained modest. Botchway and Bradley (2023) similarly reported a gradual increase in SDG disclosure in FTSE 350 firms between 2018 and 2020, especially in materiality-oriented references. Manes-Rossi and Nicolo (2022) observed a comparable rise in the energy sector over 2017–2019. More broadly, review studies characterize corporate SDG reporting as an evolving field in which awareness, experimentation, and disclosure practices continue to develop (Domingo-Posada et al., 2024; Pizzi et al., 2020).

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This temporal growth can be interpreted through both institutional and organizational perspectives. As the SDGs become more familiar to investors, regulators, and reporting organizations, firms face stronger incentives to integrate SDG language into their communications. Concurrently, the normalization of ESG reporting practices facilitates the incorporation of SDGs into existing disclosure systems. However, the literature indicates that this diffusion is uneven. Goals that expand more rapidly are typically those that can be more readily connected to established sustainability routines and stakeholder concerns.

For firms in the discretionary goods sector, this suggests that SDG adoption is likely to follow an overall upward trajectory over time. However, some goals may expand more rapidly than others.

Collectively, these studies indicate that SDG adoption has increased over time; accordingly, the following hypothesis is proposed:

H_2. SDG adoption in discretionary goods increases over time.

2.3. Industry Segment Differences in SDG Adoption

Industry characteristics represent a key determinant of SDG adoption. Previous studies demonstrate that sustainability priorities vary considerably across sectors due to differences in material impacts, operational structures, and stakeholder expectations. Agrawal et al. (2022) found that SDG relevance varies across supply-chain stages, while Bonfanti et al. (2023) emphasized the influence of specific manufacturing practices on firm-level SDG contributions. Lenort et al. (2023) identified distinct SDG priority patterns in the automotive industry, and Costa et al. (2025) reported significant sectoral heterogeneity, including instances in which sectors combine broad SDG coverage with low commitment.

This perspective is further supported by broader conceptual research. Van Zanten and Van Tulder (2021) argue that firms differ in the extent to which their economic activities align with SDG targets, resulting in distinct industry contribution profiles. Lozano and Barreiro-Gen (2023) similarly emphasize that organizations do not contribute equally to all SDGs and often address them in compartmentalized ways. These arguments suggest that sector differences are inherent to the relationship between business activities and sustainable development.

This reasoning is particularly relevant to the discretionary goods sector, which comprises industries grouped for market classification purposes but that differ widely in their sectoral attributes. For instance, the sector includes segments such as automobiles and automobile components that are heavily exposed to decarbonization initiatives and transformations in manufacturing technology. Meanwhile, industries such as textiles, apparel, and luxury goods are frequently scrutinized for transparency in their supply chains, labor practices, and sustainable sourcing, given their significant social and environmental footprints. Household durables face issues regarding resource use and product lifecycle impacts. These unique sectoral characteristics shape SDG priorities and responses, leading to considerable variation within the discretionary goods category rather than a shared approach to sustainability.

Based on the above arguments, differences across industry segments are expected; accordingly, the following hypothesis is formulated:

H_3. SDG adoption differs significantly across industry segments within the discretionary goods sector.

2.4. Regional Influences on SDG Adoption

The literature strongly highlights the importance of institutional and geographic context. SDG reporting is shaped not only by firm-level decisions but also by the regulatory, cultural, and sustainability environment. Bose and Khan (2022) found higher SDG reporting in countries with stronger sustainability regulation and national SDG performance. Rosati and Faria (2019) showed that organizations addressing the SDGs were more common in countries with specific institutional characteristics, such as stronger CSR traditions. García-Sánchez et al. (2022) noted that country-level institutional pressures were among the strongest drivers of SDG integration into non-financial information systems.

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Regional comparisons within industries also support this view. Lenort et al. (2023) identified regional variation in automotive SDG priorities, showing that even firms within a single industry do not exhibit the same SDG profile across contexts. Van der Waal and Thijssens (2020) also found that corporate SDG involvement varied across national settings and was associated with broader sustainability-related commitments. More generally, the literature suggests that firms operating in different environments face distinct reporting incentives, stakeholder demands, and accountability pressures.

For firms in the discretionary goods sector, the regional context is expected to influence both the intensity and composition of SDG adoption. Firms operating in environments with stronger sustainability-reporting requirements may be more likely to adopt a broader SDG profile. In contrast, those in other settings may focus on narrower or differently prioritized goals.

In light of these studies, regional variation in SDG adoption is anticipated; thus, the following hypothesis is advanced:

H_4. SDG Adoption Differs Significantly Across Regions.

2.5. Joint Influence of Industry Segment and Region

Although industry and region are often examined separately, the literature indicates that they should not be treated as independent influences. Industry priorities are embedded within institutional settings, and the same sector may encounter different expectations and incentives across regions. Lenort et al. (2023) highlight regional differentiation within the automotive sector, while institutional studies demonstrate that national and regional contexts shape both the extent and form of SDG disclosure (Bose & Khan, 2022; García-Sánchez et al., 2022; Rosati & Faria, 2019).

This suggests that the effect of industry segment is likely to vary across regional environments rather than remain constant. For instance, an industry segment with significant climate-related exposure may demonstrate a more expansive SDG profile in regions with robust sustainability regulation compared to regions with weaker disclosure incentives. Similarly, labor- or supply-chain-related SDGs may become more prominent in certain regional contexts, even within the same segment. Thus, the combination of sectoral materiality and institutional context is expected to shape SDG adoption jointly.

Despite the significance of this issue, relatively few studies have examined the interaction between industry structure and regional context within broad consumer-facing sectors. Investigating this interaction is important because it shifts the focus from whether firms differ across sectors or regions to whether sectoral priorities are conditioned by regional context.

Based on this reasoning, the joint effect of industry segment and region should also be examined; therefore, the following hypothesis is formulated:

H_5. Industry segment and region interact significantly in shaping SDG adoption patterns.

3. Materials and Methods

3.1. Research Design and Data Source

This study adopts a longitudinal quantitative design. It examines patterns of SDG adoption in the discretionary goods sector from 2019 to 2024. The unit of analysis is the firm-year observation. The dataset comes from Refinitiv Datastream, which provides firm-level ESG and sustainability information on publicly listed companies. The final sample includes 3,798 firm-year observations.

The analysis focuses on five discretionary goods industry segments: Automobile Components, Automobiles, Household Durables, Leisure Products, and Textiles, Apparel & Luxury Goods. Industry classification was based on the corresponding GICS industry grouping available in the database. Firms were also assigned to one of five geographic regions: North America, Europe, Asia-Pacific, Latin America, and the Middle East and Africa. These regional categories were derived from the dataset's regional dummy variables and used to assess cross-regional differences in SDG adoption.

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The study aims to identify the overall profile of SDG adoption in the discretionary goods sector, evaluate temporal changes in adoption, and assess differences across industry segments and regions.

3.2. Variables and Measurement

The dependent variables are 17 binary indicators, one for each Sustainable Development Goal. For each firm-year observation, each SDG variable equals 1 if the firm adopts or discloses the goal, and 0 otherwise. Because the SDG indicators are binary, their means can be interpreted directly as adoption rates. For example, a mean of 0.35 for a given SDG indicates that 35% of the relevant firm-year observations adopted that goal.

The main explanatory dimensions in the study are year, industry segment, and region. The year includes six categories, covering 2019 to 2024. Industry segment covers the five GICS-based categories listed above. The region includes North America, Europe, Asia-Pacific, Latin America, the Middle East, and Africa.

3.3. Analytical Procedure

The empirical analysis proceeded in several stages. All analyses were conducted using R, and statistical significance was evaluated at the conventional 5% level. Given the large sample size and the prevalence of highly significant results, interpretation relied on p-values, effect sizes, association strength, and the consistency of findings across analytical procedures.

First, descriptive statistics were used to summarize overall SDG adoption across the full sample. For each of the 17 goals, frequencies, proportions, and mean values were calculated. Additional descriptive tables were then produced by industry segment and region. In these tables, the mean values represent the percentage of firm-year observations that adopt each SDG within the relevant group.

Second, differences in SDG adoption across years, industry segments, and regions were examined using the Kruskal–Wallis test. This non-parametric procedure was chosen because the dependent variables are binary and do not meet the assumptions of conventional parametric tests. The Kruskal–Wallis test shows whether adoption patterns differ significantly across the categories of each grouping variable. To complement these significance tests, epsilon-squared (ε^2) effect sizes were calculated for each Kruskal–Wallis result. These statistics assess the substantive magnitude of the observed differences. This step is important in large samples, where statistically significant findings may relate to minor practical variation.

Third, chi-square tests of independence were performed for each SDG and each grouping variable (year, industry segment, and region). These tests were paired with Cramér's V as a measure of association strength. The Kruskal–Wallis test provides a rank-based comparison across groups. The chi-square analysis offers a complementary categorical assessment of whether SDG adoption is systematically associated with the main grouping variables.

Fourth, temporal change was examined more directly through trend analysis. For each SDG, a separate linear probability model was estimated, regressing the binary SDG indicator on year dummies. The reference year was 2019. The coefficients show how adoption in each later year differs from 2019. The 2024 coefficient served as a compact indicator of cumulative change over the study period. R-squared values compare the explanatory power of time across the 17 goals.

Fifth, the joint influence of industry segment and region was examined using two-way analysis of variance (ANOVA) with interaction terms. For each SDG, the model included industry segment, region, and their interaction. This step was used to assess both main effects and whether the effect of industry segment differs across regions. The dependent variables are binary, so ANOVA findings serve as a descriptive complement to the non-parametric and chi-square results. The main inferential emphasis remains on the non-parametric procedures. The factorial ANOVA clarifies the structure of mean differences and interaction patterns.

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4. Results

4.1. Overall SDG Adoption Profile

Table 1 reports the overall frequency of SDG adoption across the full sample of 3,798 firm-year observations. The results show a clear ranking of adoption rates across the 17 goals. The highest adoption rates are observed for SDG 12 (Responsible Consumption and Production), SDG 8 (Decent Work and Economic Growth), and SDG 13 (Climate Action), at 35.0%, 34.0%, and 33.6%, respectively. These are followed by SDG 3 (Good Health and Well-Being) and SDG 5 (Gender Equality). At the lower end of the distribution, the least frequently adopted goals are SDG 2 (Zero Hunger), SDG 14 (Life Below Water), and SDG 1 (No Poverty), with adoption rates of 7.2%, 9.5%, and 11.4%, respectively.

Table 1.
Overall SDG adoption frequencies in discretionary goods firms.

Rank	SDG	Full SDG name	n	Adopted (n1)	Not adopted (n0)	Adoption rate (%)	Mean
1	SDG 12	Responsible Consumption and Production	3798	1328	2470	35.0	0.350
2	SDG 8	Decent Work and Economic Growth	3798	1293	2505	34.0	0.340
3	SDG 13	Climate Action	3798	1277	2521	33.6	0.336
4	SDG 3	Good Health and Well-Being	3798	1071	2727	28.2	0.282
5	SDG 5	Gender Equality	3798	1064	2734	28.0	0.280
6	SDG 7	Affordable and Clean Energy	3798	977	2821	25.7	0.257
7	SDG 9	Industry, Innovation and Infrastructure	3798	942	2856	24.8	0.248
8	SDG 4	Quality Education	3798	872	2926	23.0	0.230
9	SDG 11	Sustainable Cities and Communities	3798	807	2991	21.2	0.212
10	SDG 6	Clean Water and Sanitation	3798	775	3023	20.4	0.204
11	SDG 10	Reduced Inequalities	3798	768	3030	20.2	0.202
12	SDG 17	Partnerships for the Goals	3798	693	3105	18.2	0.182
13	SDG 16	Peace, Justice and Strong Institutions	3798	659	3139	17.4	0.174
14	SDG 15	Life on Land	3798	616	3182	16.2	0.162
15	SDG 1	No Poverty	3798	434	3364	11.4	0.114
16	SDG 14	Life Below Water	3798	362	3436	9.5	0.095
17	SDG 2	Zero Hunger	3798	273	3525	7.2	0.072

Note: Values are based on 3,798 firm-year observations. Adoption rate is the percentage of firm-year observations in which the corresponding SDG indicator equals 1.

In summary, the key finding is that SDG adoption is not uniform across the 17 goals; instead, firms focus on a small number of goals with much lower adoption rates for the others.

4.2. Differences Across Industry Segments

Table 2 presents mean SDG adoption rates by industry segment. The results show substantial variation across the five segments. Automobiles record the highest adoption rates for most SDGs, including SDG 3, SDG 5, SDG 7, SDG 8, SDG 9, SDG 11, SDG 12, SDG 13, SDG 15, SDG 16, and SDG 17. Automobile components also display relatively high adoption rates across a broad range of goals. By contrast, leisure products show the lowest adoption rates for most SDGs, while household durables remain below the sector leaders on nearly all dimensions. Textiles, apparel, and luxury goods occupy an intermediate position, with relatively strong adoption of SDG 12, SDG 13, and SDG 8.

Table 2.
Mean SDG adoption rates by industry segment (%)

SDG	Automobile Components (n=1032)	Automobiles (n=486)	Household Durables (n=1080)	Leisure Products (n=258)	Textiles, Apparel & Luxury Goods (n=942)
SDG1	13.1	20.0	7.41	2.71	12.2
SDG2	8.43	13.6	3.43	1.55	8.39
SDG3	34.7	41.8	20.6	14.0	26.6
SDG4	29.2	36.0	15.6	12.4	20.8
SDG5	30.3	39.3	22.8	17.1	28.7
SDG6	23.0	30.2	13.0	5.04	25.3
SDG7	30.8	38.3	19.0	15.5	24.2
SDG8	36.7	43.0	30.0	19.0	35.2
SDG9	32.3	40.9	20.5	10.1	17.3
SDG10	22.4	29.4	15.4	13.6	20.5
SDG11	24.9	35.6	20.3	9.69	14.1
SDG12	37.1	43.8	29.4	21.7	38.1
SDG13	35.9	44.2	29.3	17.4	35.1
SDG14	8.43	13.0	7.04	9.30	11.9
SDG15	15.1	23.9	15.2	10.9	16.1
SDG16	20.9	28.2	11.8	11.6	15.8
SDG17	18.6	31.5	12.4	5.81	21.1

Note: Values represent the percentage of firm-year observations within each industry segment that adopted the respective SDG.

These results clearly show that SDG adoption varies substantially across industry segments within the discretionary goods sector.

4.3. Differences Across Regions

Table 3 reports mean SDG adoption rates by region. The results show clear regional variation. Europe, the Middle East, and Africa record the highest adoption rates across many goals, especially SDG 8, SDG 12, and SDG 13. The Middle East and Africa also show comparatively high values for SDG 4, SDG 5, SDG 6, SDG 7, SDG 9, and SDG 17. By contrast, North America records the lowest adoption rates across much of the SDG profile. Asia-Pacific occupies an intermediate position, while Latin America remains below the leading regions on most indicators.

Table 3.
Mean SDG adoption rates by region (%).

SDG	North America (n=924)	Europe (n=864)	Asia-Pacific (n=1758)	Latin America (n=138)	Middle East and Africa (n=114)
SDG1	4.98	10.6	15.9	4.35	8.77
SDG2	3.14	6.71	9.90	4.35	5.26
SDG3	16.2	36.5	30.8	17.4	35.1
SDG4	13.9	26.9	24.8	21.0	41.2
SDG5	18.8	39.4	26.6	20.3	47.4
SDG6	13.0	24.0	21.6	15.2	41.2
SDG7	16.0	31.2	27.2	19.6	46.5
SDG8	21.4	50.6	31.9	26.1	53.5
SDG9	14.5	30.3	26.1	23.9	48.2
SDG10	14.8	22.0	21.8	13.8	33.3
SDG11	11.4	28.5	23.3	15.9	21.9
SDG12	23.2	52.4	32.0	26.8	53.5
SDG13	21.8	50.8	31.2	22.5	50.9
SDG14	6.60	12.8	9.10	6.52	18.4
SDG15	10.3	22.2	16.4	10.9	21.9
SDG16	8.23	16.4	22.2	16.7	23.7
SDG17	7.03	23.4	20.3	13.0	45.6

Note: Values represent the percentage of firm-year observations within each region that adopted the respective SDG.

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In summary, these results highlight that the intensity of SDG adoption varies across regions.

4.4. Non-Parametric Differences by Year, Industry Segment, And Region

Table 4 summarizes the non-parametric results. Across all 17 SDGs, the Kruskal–Wallis tests show statistically significant differences across years, industry segments, and regions. The biggest differences are temporal. The largest year effects are observed for SDG 12, SDG 13, and SDG 8, with Kruskal–Wallis statistics of 463.0, 462.0, and 443.0, respectively. The corresponding epsilon-squared (ε^2) values fall in the moderate range. By contrast, the effect sizes for industry segment and region are consistently smaller and remain in the small range. At the industry segment level, the greatest variation is observed for SDG 9, followed by SDG 3, SDG 4, and SDG 6. At the regional level, the largest differences are again observed for SDG 12, SDG 13, and SDG 8. Detailed Kruskal–Wallis results and the corresponding epsilon-squared effect sizes are presented in Appendix Tables A1 and A2.

Table 4.
Summary of non-parametric differences in SDG adoption by year, industry segment, and region.

Grouping variable	Strongest SDGs	Largest test statistics	Effect size pattern	Interpretation
Year	SDG 12, SDG 13, SDG 8	χ^2 = 463.0, 462.0, 443.0	Moderate for leading SDGs	Temporal change is the strongest source of variation
Industry segment	SDG 9, SDG 3, SDG 4/6	χ^2 = 168.0, 123.0, 121.0	Small	Industry segment shapes SDG priorities, especially innovation and operational goals.
Region	SDG 12, SDG 13, SDG 8	χ^2 = 200.0, 200.0, 197.0	Small	Regional context influences the intensity of adoption, especially for climate- and production-related goals.

4.5. Association Patterns: Chi-Square and Cramér's V

The chi-square results reported in Appendix Table A3 confirm the same general pattern. Associations between SDG adoption and year are strongest for SDGs 12, 13, and 8, as indicated by the largest Cramér's V values. Associations with industry segments are strongest for SDG 9, SDG 3, and SDGs 4/6, while associations with regions are strongest for SDGs 12, 13, 8, and 17. These results confirm that year-to-year variation in SDG adoption is the strongest association, surpassing differences across industry segments or regions.

4.6. Temporal trends in SDG adoption

Table 5 reports the trend analysis results. SDG adoption increases over time for all 17 goals. The strongest temporal trends are observed for SDG 12, SDG 13, and SDG 8, which also display the highest explanatory power, with R^2 values of 0.1220, 0.1216, and 0.1167, respectively. The estimated 2024 coefficients relative to 2019 are also the largest for these three goals, indicating the greatest cumulative increase over the study period.

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Table 5.
Trend analysis summary for SDG adoption over time (2019–2024).

Rank	SDG	Full SDG name	R^2	β (2024 vs. 2019)	p-value
1	SDG 12	Responsible Consumption and Production	0.1220	0.4803	<0.0001
2	SDG 13	Climate Action	0.1216	0.4787	<0.0001
3	SDG 8	Decent Work and Economic Growth	0.1167	0.4755	<0.0001
4	SDG 5	Gender Equality	0.0998	0.4107	<0.0001
5	SDG 3	Good Health and Well-Being	0.0903	0.3965	<0.0001
6	SDG 7	Affordable and Clean Energy	0.0884	0.3728	<0.0001
7	SDG 9	Industry, Innovation and Infrastructure	0.0841	0.3665	<0.0001
8	SDG 10	Reduced Inequalities	0.0769	0.3207	<0.0001
9	SDG 16	Peace, Justice and Strong Institutions	0.0730	0.2970	<0.0001
10	SDG 6	Clean Water and Sanitation	0.0700	0.3065	<0.0001
11	SDG 4	Quality Education	0.0671	0.3239	<0.0001
12	SDG 17	Partnerships for the Goals	0.0618	0.2812	<0.0001
13	SDG 11	Sustainable Cities and Communities	0.0581	0.2875	<0.0001
14	SDG 15	Life on Land	0.0482	0.2354	<0.0001
15	SDG 1	No Poverty	0.0346	0.1769	<0.0001
16	SDG 14	Life Below Water	0.0238	0.1327	<0.0001
17	SDG 2	Zero Hunger	0.0188	0.0964	<0.0001

Note: Linear probability models estimate yearly changes in SDG adoption relative to 2019. All 2024 coefficients are positive and statistically significant, indicating rising adoption over time across all 17 SDGs.

Other goals also show positive upward movement, including SDG 5, SDG 3, SDG 7, and SDG 9, although their explanatory power is lower. The weakest temporal trends are observed for SDG 2 and SDG 14, but both still show positive, statistically significant increases by 2024. The full year-by-year coefficients are presented in Appendix Table A4. In summary, the main finding is that SDG adoption increased for all goals during 2019–2024, with the greatest growth in SDG 12, SDG 13, and SDG 8.

4.7. Joint Effects of Industry Segment and Region

Table 6 presents the results of the two-way ANOVA for industry segment, region, and their interaction. All industry-segment and region main effects are statistically significant across the 17 SDGs. The strongest industry-segment main effect appears for SDG 9, while the strongest regional main effects appear for SDG 12, SDG 13, and SDG 8.

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Table 6.
Two-way ANOVA results for SDG adoption by industry segment and region.

SDG	Full SDG name	F (Industry)	p-value	F (Region)	p-value	F (Industry × Region)	p-value
SDG 1	No Poverty	19.413	<0.0001	14.461	<0.0001	1.978	0.0189
SDG 2	Zero Hunger	17.874	<0.0001	7.192	<0.0001	2.860	0.0004
SDG 3	Good Health and Well-Being	32.860	<0.0001	23.100	<0.0001	4.320	<0.0001
SDG 4	Quality Education	32.190	<0.0001	15.780	<0.0001	4.470	<0.0001
SDG 5	Gender Equality	16.953	<0.0001	30.418	<0.0001	6.035	<0.0001
SDG 6	Clean Water and Sanitation	32.144	<0.0001	13.920	<0.0001	5.333	<0.0001
SDG 7	Affordable and Clean Energy	25.037	<0.0001	19.334	<0.0001	3.934	<0.0001
SDG 8	Decent Work and Economic Growth	14.927	<0.0001	50.970	<0.0001	5.382	<0.0001
SDG 9	Industry, Innovation and Infrastructure	45.860	<0.0001	22.909	<0.0001	7.294	<0.0001
SDG 10	Reduced Inequalities	13.306	<0.0001	6.674	<0.0001	5.998	<0.0001
SDG 11	Sustainable Cities and Communities	31.291	<0.0001	20.053	<0.0001	4.022	<0.0001
SDG 12	Responsible Consumption and Production	15.681	<0.0001	52.890	<0.0001	4.997	<0.0001
SDG 13	Climate Action	18.256	<0.0001	52.134	<0.0001	4.923	<0.0001
SDG 14	Life Below Water	5.680	0.0001	8.055	<0.0001	7.393	<0.0001
SDG 15	Life on Land	7.391	<0.0001	12.885	<0.0001	9.900	<0.0001
SDG 16	Peace, Justice and Strong Institutions	20.858	<0.0001	16.865	<0.0001	2.567	0.0016
SDG 17	Partnerships for the Goals	30.856	<0.0001	34.897	<0.0001	6.139	<0.0001

Note: All industry and region main effects are statistically significant across the 17 SDGs. Interaction effects are also significant for all SDGs, with the strongest interaction observed for SDG 15, followed by SDG 14 and SDG 9.

The interaction term between industry segment and region is also statistically significant for all 17 SDGs. The strongest interaction effects are observed for SDG 15, followed by SDG 14 and SDG 9. The full ANOVA results are reported in Appendix Table A5. These results establish that both industry segment and region affect SDG adoption, and that the impact of industry segment varies across regions.

5. Discussion

The purpose of this study was to examine SDG adoption in the discretionary goods sector over the period 2019–2024 and to assess whether adoption differed across goals, time, industry segments, and regions. The findings indicate that SDG adoption in this sector is selective, increases over time, varies across industry segments and regions, and is further conditioned by interactions between sectoral and regional contexts. Overall, the empirical evidence supports all five hypotheses.

5.1. Selective Adoption Across the SDGs

The first hypothesis proposed that SDG adoption in discretionary goods would be selective across the 17 goals. The descriptive results support this expectation. Adoption is concentrated in SDG 12, SDG 8, and SDG 13, while goals such as SDG 2, SDG 14, and SDG 1 remain relatively marginal. H1 is therefore supported. This finding is consistent with prior studies showing that firms tend to prioritize a limited subset of goals rather than engage evenly with the entire SDG framework (Agrawal et al., 2022; Bonfanti et al., 2023; Lenort et al., 2023; Nylund et al., 2022). It also aligns with the broader argument that firms emphasize goals that are more easily linked to operational priorities, stakeholder visibility, and established sustainability reporting routines. In the case of discretionary goods, the prominence of responsible production, work, growth, and climate action is consistent with the sector's exposure to manufacturing, labor, supply chain, and transition-related pressures.

Overall, the results do not support balanced adoption across the SDG agenda. This supports the view that corporate SDG engagement remains structured and selective, even in sectors with high sustainability visibility.

5.2. Temporal Expansion of SDG Adoption

The second hypothesis proposed that SDG adoption in discretionary goods would increase over time. The non-parametric and trend analysis results strongly support this hypothesis. All 17 SDGs show statistically significant increases over the study period, with the strongest temporal growth concentrated in SDGs 12, 13, and 8. H2 is therefore supported.

This finding aligns with previous studies documenting the temporal expansion of SDG reporting (Bose & Khan, 2022; Botchway & Bradley, 2023; Manes-Rossi & Nicolo, 2022). It suggests that SDG adoption is becoming more normalized in corporate disclosure. The strongest time effects appear in the same goals that dominate the overall hierarchy, indicating that expansion is not random. Instead, the diffusion process reinforces the prominence of goals already linked to sector materiality.

The effect-size analysis indicates that while industry segment and regional differences are statistically significant, the largest effect is over time. This demonstrates that the increase in SDG adoption from 2019 to 2024 is the most substantial finding.

5.3. Industry-Segment Differences

The third hypothesis proposed that SDG adoption would differ significantly across industry segments. Both the descriptive results and the Kruskal–Wallis/ANOVA findings support this expectation. Automobiles and Automobile Components display broader and generally stronger adoption profiles, whereas Leisure Products show consistently lower adoption rates. H3 is therefore supported.

This finding is consistent with research showing that SDG priorities vary by industry because sectors differ in their material impacts, transition pressures, and stakeholder expectations (Agrawal et al., 2022; Costa et al., 2025; Van Zanten & Van Tulder, 2021). It also aligns with evidence from the automotive literature, which finds that SDG 8, SDG 12, and SDG 17 occupy central positions (Lenort et al., 2023). In the present study, the strongest industry-segment effect appears for SDG 9, suggesting that innovation-related adoption is particularly sensitive to sectoral structure. These findings reinforce the perspective that discretionary goods should not be regarded as a homogeneous sustainability field. Even within a broad market category, firms adopt SDGs differently depending on the characteristics of their industry segment.

5.4. Regional Differences

The fourth hypothesis proposed that SDG adoption would differ significantly across regions. The descriptive results, Kruskal–Wallis tests, and chi-square results all support this expectation. Europe, the Middle East, and Africa show the highest adoption rates across many goals, while North America records the lowest rates across much of the profile. H4 is therefore supported.

This finding is consistent with prior evidence that SDG reporting is shaped by regulation, institutional context, and national sustainability environments (Bose & Khan, 2022; García-Sánchez et al., 2022; Rosati & Faria, 2019). The strongest regional effects concern SDG 12, SDG 13, and SDG 8, again indicating that production-, climate-, and work-related goals are most sensitive to contextual variation. However, the effect sizes for the region remain smaller than those for the year. This suggests that regional context is relevant but does not surpass the broader temporal expansion of SDG adoption observed across the entire sample.

5.5. Joint Effect of Industry Segment and Region

The fifth hypothesis proposed that industry segment and region would interact significantly in shaping SDG adoption patterns. The two-way ANOVA results support this expectation. Interaction effects are statistically significant across all 17 SDGs, with the strongest interaction observed for SDG 15, followed by SDG 14 and SDG 9. H5 is therefore supported.

This finding adds an important layer to the analysis by showing that industry-segment patterns are not constant across regions. In other words, the sustainability profile of a given industry segment depends partly on the institutional environment in which firms operate. This is consistent with the

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argument that sectoral priorities are embedded in regional settings and that reporting incentives are jointly shaped by material issues and institutional conditions (Bose & Khan, 2022; García-Sánchez et al., 2022; Lenort et al., 2023; Rosati & Faria, 2019).

The interaction result is particularly significant because it extends the analysis beyond the separate effects of industry and region. It suggests that sector materiality and institutional context should be considered interdependent rather than isolated influences on SDG adoption.

5.6. Overall Interpretation

Collectively, the findings characterize SDG adoption in discretionary goods as a dynamic yet uneven process. The sector demonstrates a clear concentration in a limited set of goals, particularly those related to responsible production, work, growth, and climate action. Additionally, adoption has broadened significantly over time, indicating that SDG reporting has become more widespread during the studied period. Industry segment and regional differences remain important, but they are less pronounced than the temporal effect. Finally, the significant interaction between industry segment and region demonstrates that SDG adoption is shaped jointly by sectoral and institutional factors.

From a theoretical perspective, the results align with the literature, which characterizes corporate SDG reporting as selective, context-dependent, and increasingly institutionalized, but not necessarily uniform in depth or scope. The findings do not directly assess whether reporting is symbolic or substantive. However, they demonstrate that adoption is patterned rather than universal, and that the strongest adoption is concentrated in a subset of highly visible goals. This supports the broader literature, which emphasizes that corporate engagement with the SDGs is structured by materiality, reporting incentives, and external pressures rather than by equal commitment to the full agenda.

6. Conclusion

This study examined SDG adoption in the discretionary goods sector from 2019 to 2024 using firm-level data from Refinitiv/Datastream. It focused on the overall profile of SDG adoption, temporal change, differences across industry segments and regions, and the joint effect of industry segment and region. The findings show that SDG adoption in discretionary goods is selective, increases over time, varies significantly across industry segments and regions, and is further shaped by interactions between sectoral and regional contexts.

Four main conclusions emerge. First, SDG adoption is clearly uneven across the 17 goals. The strongest emphasis is placed on SDG 12 (Responsible Consumption and Production), SDG 8 (Decent Work and Economic Growth), and SDG 13 (Climate Action). In contrast, goals such as SDG 2 (Zero Hunger), SDG 14 (Life Below Water), and SDG 1 (No Poverty) receive much lower attention. Second, adoption increases significantly over time across all 17 SDGs, and temporal change constitutes the strongest source of variation in the data. Third, meaningful differences exist across industry segments and regions, confirming that discretionary goods should not be treated as a homogeneous sustainability field. Fourth, the significant interaction between industry segment and region indicates that sectoral priorities are not expressed uniformly across contexts but are conditioned by the institutional environment in which firms operate.

The study contributes to the literature in three ways. First, it provides sector-specific evidence on the hierarchy of SDG adoption within discretionary goods. Second, it documents temporal expansion across all 17 goals rather than focusing only on aggregate SDG reporting. Third, it shows that cross-sectional variation is shaped not only by industry segment and region separately but also by their interaction. In this way, the study adds more fine-grained empirical evidence to the literature on corporate SDG reporting and extends prior work that has often relied on broad cross-sector samples or single-country settings.

The findings also have practical implications. For managers, the results suggest that SDG adoption in discretionary goods is most strongly associated with goals linked to production systems, labor conditions, innovation, and climate-related responsibilities. This indicates the importance of prioritizing

material goals while also avoiding overly narrow forms of SDG engagement. For investors, analysts, and regulators, the findings show that SDG adoption varies significantly across industry segments and regions, meaning that comparisons of corporate SDG engagement should be interpreted in light of sectoral and institutional contexts rather than as universally comparable signals. More broadly, the results suggest that the continued expansion of SDG reporting should be accompanied by stronger attention to consistency, comparability, and depth of integration.

The study is not without limitations. First, it examines SDG adoption in disclosure rather than firms' verified social or environmental impact on each goal. The Refinitiv/Datastream indicators, therefore, capture whether firms are associated with or report on specific SDGs, not whether they demonstrably achieve measurable progress toward SDG targets. Second, although the study identifies significant differences over time, across industry segments, and across regions, it does not directly assess the organizational processes by which firms select, prioritize, and communicate the SDGs. Third, the analysis is limited to a single broad sector and to publicly listed firms covered by the database, which may limit generalizability to privately held firms or other sectors.

These limitations point to several directions for future research. Subsequent studies could examine whether adopting specific SDGs is associated with measurable environmental, social, or financial outcomes, thereby helping to distinguish symbolic from more substantive forms of engagement. Future work could also explore the governance, strategic, and reporting mechanisms through which firms operationalize SDG commitments or compare the discretionary goods sector with other sectors to identify broader sectoral patterns. Finally, more research is needed on the interaction between sectoral materiality and institutional context, particularly to understand why similar industries exhibit different SDG profiles across regions.

Overall, the findings suggest that SDG adoption in discretionary goods is best understood as a dynamic but uneven reporting process. Although firms are broadening their engagement with the SDG framework over time, they continue to prioritize a limited subset of goals and do so in ways that vary across industry segments and regional settings. In this sense, the study highlights both the growing relevance of the SDGs in corporate reporting and the continuing importance of sectoral and institutional contexts in shaping how that relevance is expressed.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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Appendix

Table A1.
Kruskal–Wallis results for SDG adoption by year, industry segment, and region.

SDG	Year χ^2	df	p-value	Industry χ^2	df	p-value	Region χ^2	df	p-value
SDG 1	131.0	5	<0.0001	74.9	4	<0.0001	81.3	4	<0.0001
SDG 2	71.5	5	<0.0001	69.4	4	<0.0001	44.6	4	<0.0001
SDG 3	343.0	5	<0.0001	123.0	4	<0.0001	111.0	4	<0.0001
SDG 4	255.0	5	<0.0001	121.0	4	<0.0001	75.9	4	<0.0001
SDG 5	379.0	5	<0.0001	63.7	4	<0.0001	121.0	4	<0.0001
SDG 6	266.0	5	<0.0001	121.0	4	<0.0001	72.3	4	<0.0001
SDG 7	336.0	5	<0.0001	95.0	4	<0.0001	90.0	4	<0.0001
SDG 8	443.0	5	<0.0001	55.2	4	<0.0001	197.0	4	<0.0001
SDG 9	319.0	5	<0.0001	168.0	4	<0.0001	102.0	4	<0.0001
SDG 10	292.0	5	<0.0001	51.4	4	<0.0001	36.9	4	<0.0001

SDG 11	221.0	5	<0.0001	118.0	4	<0.0001	87.5	4	<0.0001
SDG 12	463.0	5	<0.0001	57.9	4	<0.0001	200.0	4	<0.0001
SDG 13	462.0	5	<0.0001	67.3	4	<0.0001	200.0	4	<0.0001
SDG 14	90.4	5	<0.0001	22.0	4	0.0002	32.5	4	<0.0001
SDG 15	183.0	5	<0.0001	28.2	4	<0.0001	52.6	4	<0.0001
SDG 16	277.0	5	<0.0001	80.0	4	<0.0001	86.7	4	<0.0001
SDG 17	235.0	5	<0.0001	114.0	4	<0.0001	158.0	4	<0.0001

Note: All Kruskal–Wallis tests are statistically significant. Temporal differences are strongest for SDG 12, SDG 13, and SDG 8; industry-segment differences are biggest for SDG 9, SDG 3, SDG 4, and SDG 6; regional differences are strongest for SDG 12, SDG 13, SDG 8, and SDG 17.

Table A2.
Effect sizes for SDG adoption by year, industry segment, and region.

SDG	Year ε^2	Magnitude	Industry ε^2	Magnitude	Region ε^2	Magnitude
SDG 1	0.0333	Small	0.0187	Small	0.0204	Small
SDG 2	0.0175	Small	0.0172	Small	0.0107	Small
SDG 3	0.0891	Moderate	0.0314	Small	0.0282	Small
SDG 4	0.0659	Moderate	0.0310	Small	0.0190	Small
SDG 5	0.0986	Moderate	0.0157	Small	0.0307	Small
SDG 6	0.0688	Moderate	0.0309	Small	0.0180	Small
SDG 7	0.0872	Moderate	0.0240	Small	0.0227	Small
SDG 8	0.1160	Moderate	0.0135	Small	0.0510	Small
SDG 9	0.0828	Moderate	0.0432	Small	0.0258	Small
SDG 10	0.0757	Moderate	0.0125	Small	0.0087	Small
SDG 11	0.0569	Small	0.0300	Small	0.0220	Small
SDG 12	0.1210	Moderate	0.0142	Small	0.0518	Small
SDG 13	0.1200	Moderate	0.0167	Small	0.0517	Small
SDG 14	0.0225	Small	0.0047	Small	0.0075	Small
SDG 15	0.0469	Small	0.0064	Small	0.0128	Small
SDG 16	0.0718	Moderate	0.0200	Small	0.0218	Small
SDG 17	0.0606	Moderate	0.0289	Small	0.0405	Small

Note: Effect sizes are reported as epsilon-squared (ε^2). Temporal effects are strongest for SDG 12, SDG 13, and SDG 8 and are the only effects in the moderate range at the top of the distribution. Industry-segment and regional effects are consistently smaller and remain in a small range across all SDGs.

Table A3.
Chi-square and Cramér's V results for SDG adoption by year, industry segment, and region.

SDG	Year χ^2	Year V	p-value	Industry χ^2	Industry V	p-value	Region χ^2	Region V	p-value
SDG 1	131.0	0.186	<0.0001	74.9	0.140	<0.0001	81.3	0.146	<0.0001
SDG 2	71.5	0.137	<0.0001	69.4	0.135	<0.0001	44.7	0.108	<0.0001
SDG 3	343.0	0.301	<0.0001	123.0	0.180	<0.0001	111.0	0.171	<0.0001
SDG 4	255.0	0.259	<0.0001	121.0	0.179	<0.0001	75.9	0.141	<0.0001
SDG 5	379.0	0.316	<0.0001	63.7	0.129	<0.0001	121.0	0.178	<0.0001
SDG 6	266.0	0.265	<0.0001	121.0	0.179	<0.0001	72.3	0.138	<0.0001
SDG 7	336.0	0.297	<0.0001	95.0	0.158	<0.0001	90.0	0.154	<0.0001
SDG 8	443.0	0.342	<0.0001	55.2	0.121	<0.0001	197.0	0.228	<0.0001
SDG 9	319.0	0.290	<0.0001	168.0	0.210	<0.0001	102.0	0.164	<0.0001
SDG 10	292.0	0.277	<0.0001	51.4	0.116	<0.0001	36.9	0.099	<0.0001
SDG 11	221.0	0.241	<0.0001	118.0	0.176	<0.0001	87.5	0.152	<0.0001
SDG 12	463.0	0.349	<0.0001	57.9	0.123	<0.0001	200.0	0.230	<0.0001
SDG 13	462.0	0.349	<0.0001	67.3	0.133	<0.0001	200.0	0.230	<0.0001
SDG 14	90.4	0.154	<0.0001	22.0	0.076	0.0002	32.5	0.093	<0.0001
SDG 15	183.0	0.220	<0.0001	28.2	0.086	<0.0001	52.6	0.118	<0.0001
SDG 16	277.0	0.270	<0.0001	80.0	0.145	<0.0001	86.7	0.151	<0.0001
SDG 17	235.0	0.249	<0.0001	114.0	0.173	<0.0001	158.0	0.204	<0.0001

Note: Cramér's V is reported as an effect-size measure for the chi-square tests. The strongest associations by year appear for SDG 12, SDG 13, and SDG 8; by industry segment for SDG 9, SDG 3, and SDG 4/6; and by region for SDG 12, SDG 13, SDG 8, and SDG 17.

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Table A4.
Trend analysis coefficients for SDG adoption by year.

SDG	β (2020)	β (2021)	β (2022)	β (2023)	β (2024)	R^2
SDG 1	0.0458	0.0727	0.1043	0.1438	0.1769	0.0346
SDG 2	0.0253	0.0537	0.0774	0.0932	0.0964	0.0188
SDG 3	0.1122	0.1943	0.2796	0.3397	0.3965	0.0903
SDG 4	0.0979	0.1643	0.2196	0.2780	0.3239	0.0671
SDG 5	0.1216	0.2180	0.2970	0.3681	0.4107	0.0998
SDG 6	0.0790	0.1548	0.2133	0.2717	0.3065	0.0700
SDG 7	0.0979	0.1833	0.2654	0.3302	0.3728	0.0884
SDG 8	0.1453	0.2322	0.3428	0.4107	0.4755	0.1167
SDG 9	0.1011	0.1738	0.2622	0.3096	0.3665	0.0841
SDG 10	0.0727	0.1406	0.2196	0.2701	0.3207	0.0769
SDG 11	0.0837	0.1532	0.2022	0.2543	0.2875	0.0581
SDG 12	0.1374	0.2385	0.3523	0.4250	0.4803	0.1220
SDG 13	0.1359	0.2354	0.3412	0.4186	0.4787	0.1216
SDG 14	0.0395	0.0806	0.1043	0.1106	0.1327	0.0238
SDG 15	0.0569	0.1201	0.1627	0.1991	0.2354	0.0482
SDG 16	0.0585	0.1232	0.1754	0.2449	0.2970	0.0730
SDG 17	0.0632	0.1201	0.1690	0.2338	0.2812	0.0618

Note: Coefficients are from linear probability models with 2019 as the reference year. Positive coefficients indicate higher adoption relative to 2019. All 2024 coefficients are positive and statistically significant at the $p < 0.0001$ level. With one exception, all coefficients from 2021 onward are statistically significant; the 2020 coefficient for SDG 2 is not significant at conventional levels.

Table A5.
Two-way ANOVA results for SDG adoption by industry segment and region.

SDG	F (Industry)	p-value	F (Region)	p-value	F (Industry × Region)	p-value
SDG 1	19.413	<0.0001	14.461	<0.0001	1.978	0.0189
SDG 2	17.874	<0.0001	7.192	<0.0001	2.860	0.0004
SDG 3	32.860	<0.0001	23.100	<0.0001	4.320	<0.0001
SDG 4	32.190	<0.0001	15.780	<0.0001	4.470	<0.0001
SDG 5	16.953	<0.0001	30.418	<0.0001	6.035	<0.0001
SDG 6	32.144	<0.0001	13.920	<0.0001	5.333	<0.0001
SDG 7	25.037	<0.0001	19.334	<0.0001	3.934	<0.0001
SDG 8	14.927	<0.0001	50.970	<0.0001	5.382	<0.0001
SDG 9	45.860	<0.0001	22.909	<0.0001	7.294	<0.0001
SDG 10	13.306	<0.0001	6.674	<0.0001	5.998	<0.0001
SDG 11	31.291	<0.0001	20.053	<0.0001	4.022	<0.0001
SDG 12	15.681	<0.0001	52.890	<0.0001	4.997	<0.0001
SDG 13	18.256	<0.0001	52.134	<0.0001	4.923	<0.0001
SDG 14	5.680	0.0001	8.055	<0.0001	7.393	<0.0001
SDG 15	7.391	<0.0001	12.885	<0.0001	9.900	<0.0001
SDG 16	20.858	<0.0001	16.865	<0.0001	2.567	0.0016
SDG 17	30.856	<0.0001	34.897	<0.0001	6.139	<0.0001

Note: Two-way ANOVA models were estimated as *SDG ~ industry segment × region*. Degrees of freedom are constant across models: industry = 4, region = 4, industry × region = 13, residual = 3776. All industry and region main effects are statistically significant. Interaction effects are also significant for all 17 SDGs, with the strongest interaction observed for SDG 15, followed by SDG 14 and SDG 9.

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