



SDG adoption in the global transport sector: Evidence from Asia-pacific

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Abstract

This study examines the adoption of Sustainable Development Goals (SDGs) within the global transport sector, with a particular emphasis on the Asia-Pacific region. Using firm-level Refinitiv Datastream data for 377 publicly listed transport firms from 2019 to 2024, the analysis examines regional disparities, temporal dynamics, industry-specific variations, and the financial determinants of SDG adoption. SDG adoption is assessed using 17 binary SDG indicators and an aggregate SDG index that captures the breadth of adoption at the firm-year level. The empirical methodology integrates descriptive statistics, matched-firm and regional comparisons, nonparametric industry tests, and multivariate modeling. Results indicate that Asia-Pacific transport firms exhibit broader SDG adoption than their counterparts in other regions across all 17 goals. Within the Asia-Pacific, adoption rates are highest for SDGs 8, 13, 12, 3, 5, and 9, and lowest for SDGs 2, 1, and 6. The increase in adoption from 2019 to 2024 is primarily attributable to within-firm expansion rather than changes in the sample composition. Notable industry differences emerge: Passenger Airlines and Transportation Infrastructure demonstrate the most comprehensive adoption profiles, while Marine Transportation is distinguished by its focus on SDG 14. Firm size consistently predicts broader SDG adoption. These results underscore the distinction between the breadth of SDG adoption and its substantive integration.

Keywords: Asia-Pacific, Corporate sustainability, SDG adoption, Sustainable development goals, Sustainable transport, Transport sector.

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Contribution of this paper to the literature

This research analyzes the adoption of the Sustainable Development Goals (SDGs) within the global transport sector, with a particular focus on the Asia-Pacific region. It offers comparative insights across regions, industries, and temporal trends, examines the relationship between adoption breadth and firm characteristics, and differentiates between visible and substantive integration.

1. Introduction

The Sustainable Development Goals (SDGs) have become a central reference point for firms in communicating, organizing, and legitimizing their sustainability agendas. Since the adoption of the 2030 Agenda, the SDGs have extended beyond public policy and international development, becoming integral to corporate responsibility, non-financial reporting, and strategic orientation. However, corporate literature indicates that engagement with the SDGs remains inconsistent. Frequently, firms reference the goals at a symbolic level, while substantive integration of these goals into targets, performance indicators, governance systems, and decision-making processes is limited (Bose & Khan, 2022; Costa, Tiburzi, Morales-Alonso, Calabrese, & Rosati, 2025; Ferrero-Ferrero, Muñoz-Torres, Rivera-Lirio, Escrig-Olmedo, & Fernández-Izquierdo, 2023; Heras-Saizarbitoria, Urbieta, & Boiral, 2022). Given these challenges in corporate adoption, it is essential not only to determine whether firms mention the SDGs but also to analyze how adoption patterns differ across sectors, regions, and over time.

Within this broad context of inconsistent SDG engagement, the transport sector represents a particularly significant case for analysis. Transport is integral to sustainable development because it influences economic activity, infrastructure, accessibility, energy consumption, emissions, safety, and social inclusion. Recent research increasingly conceptualizes transport as a cross-cutting enabler of multiple SDGs, rather than as a narrowly defined operational function limited to mobility or logistics (Nitwal, Siddiqui, & Verma, 2022; Thilakshan & Bandara, 2019). Studies addressing rural transport, maritime transportation, road freight, and broader transport systems indicate that the sector simultaneously interacts with goals related to decent work, infrastructure, urban development, climate, responsible production, and partnerships, among others (Collaço et al., 2022; Cook, Huizenga, Petts, Visser, & Yiu, 2017; Mollaoglu, Yazar Okur, Gurturk, & Doganer Duman, 2024; Sousa, Brasão, Silva, & Tserashkovich, 2026). Nevertheless, much of the existing literature emphasizes policy frameworks, emissions, indicator design, or mode-specific sustainability challenges, with less attention to firm-level SDG adoption.

Building on this sectoral focus, it is important to situate the transport sector within the larger body of corporate SDG literature, which has expanded rapidly yet remains predominantly cross-sectoral. Existing studies address SDG disclosure, institutional drivers, reporting quality, symbolic versus substantive adoption, assurance, and governance influences, often without detailed consideration of sector-specific dynamics (Botchway & Bradley, 2023; García-Sánchez, Aibar-Guzmán, Aibar-Guzmán, & Somohano-Rodríguez, 2022; Krasodomska, Zarzycka, Street, & Grabowski, 2025; Van der Waal & Thijssens, 2020). Consequently, there is greater understanding of the general motivations for firm engagement with the SDGs than of the sectoral differences in SDG adoption profiles. This gap is particularly significant in the transport sector, where sustainability pressures are influenced by reporting incentives, infrastructure dependence, environmental externalities, workforce considerations, and diverse operational models.

A regional perspective is also essential. Previous research indicates that SDG-related corporate practices are influenced by institutional conditions, regulatory environments, stakeholder expectations, and developmental context (García-Sánchez et al., 2022; Rosati & Faria, 2019). This study pays particular attention to the Asia-Pacific region, which features significant transport growth, heightened exposure to sustainability pressures, and considerable diversity across national and industrial contexts. However, there is limited firm-level evidence on whether transport companies in the Asia-Pacific exhibit a distinct SDG adoption profile compared to firms in other regions, and whether these profiles are consistent across transport industries or vary by firm characteristics. This research directly addresses that gap by examining SDG adoption in the global transport sector, with a specific focus on the Asia-Pacific region. Using firm-level data for publicly listed transport companies from Refinitiv Datastream over 2019–2024, the analysis investigates five questions: What is the overall SDG adoption profile of transport firms in Asia-Pacific? How has that profile changed over time? Does Asia-Pacific differ from the rest of the world in aggregate and goal-specific SDG adoption? Are there important differences across transport industries within the Asia-Pacific? To what extent is broader SDG adoption associated with firm-level financial characteristics?

This study offers three primary contributions. First, it advances the transport-SDG literature by providing firm-level evidence in an area where prior research has predominantly emphasized conceptual mapping, policy analysis, or emissions-related performance rather than corporate adoption patterns. Second, it contributes to regional examination by specifically assessing whether the Asia-Pacific region presents a comparatively stronger context for SDG adoption in transport than other regions. Third, it adds nuance to the corporate SDG literature by demonstrating that adoption breadth varies not only by region but also by transport industry and organizational scale. More broadly, this paper shifts the discussion from the general relevance of transport to the SDGs toward a more detailed understanding of how transport firms, especially those in the Asia-Pacific region, adopt and prioritize these goals.

The remainder of the paper is structured as follows to reflect this integrated approach. Section 2 reviews the literature on transport and the SDGs, corporate SDG reporting and integration, and the distinction between symbolic and substantive SDG engagement. Section 3 outlines the data, measures, and analytical strategy. Section 4 presents the empirical results. Section 5 discusses the findings in relation to prior research and highlights their implications. Section 6 concludes.

2. Literature Review

2.1. Transport and the Sustainable Development Goals

Recent literature increasingly conceptualizes transport as a cross-cutting enabler of sustainable development, rather than limiting it to infrastructure or mobility functions. While there is no dedicated Sustainable Development Goal (SDG) for transport, it is linked to numerous goals, both directly and indirectly, through its influence on accessibility, safety, energy consumption, social inclusion, regional development, environmental quality, and trade. Reviews of transport-relevant SDG targets demonstrate that transport contributes to multiple goals simultaneously, with its significance extending well beyond climate action alone (Nitwal et al., 2022; Thilakshan & Bandara, 2019). This broader perspective is further supported by rural transport studies, which emphasize that access to transport is essential for poverty reduction, food security, health, education, employment, and climate resilience (Cook et al., 2017).

The cross-cutting nature of transport complicates the measurement of SDG progress, as simplistic indicators may fail to capture its full impact. For example, Brussel, Zuidgeest, Pfeffer, and van Maarseveen (2019) found that SDG indicator 11.2 primarily measures proximity to public transport rather than whether people can actually access the activities and opportunities they need. Their findings warn that this approach could lead to overstating progress on transport SDG indicators and hiding spatial and social inequalities. Building on this, Nitwal et al. (2022) argue that robust indicator systems are essential for transport policy to effectively monitor SDG progress and address these measurement shortcomings.

2.2. Evidence from Transport Sub-sectors and Regional Contexts

Empirical and sector-specific studies affirm the multidimensional nature of transport sustainability, yet they also reveal significant fragmentation within the literature. At the national level, Liu and Yuan (2023) evaluate China's progress on the transport dimension of the SDGs, finding that the sector performs relatively well in transport volume, traffic safety, and land-use control but continues to face notable weaknesses in clean-energy adoption and balanced public service provision. These findings underscore that interactions among transport-related SDG indicators are not uniformly positive; while synergies are present, substantial trade-offs persist.

In the European context, Khurshid, Khan, and Cifuentes-Faura (2023) assess whether current progress in the transport sector is sufficient to achieve carbon neutrality and the 2030 sustainable transport agenda. Their findings indicate that green transport, eco-innovation, and renewable energy contribute to emission reductions, while increased traffic intensity exacerbates emissions. Green taxes primarily yield short-term effects, whereas long-term progress relies more heavily on structural innovation, renewable energy, and research and development. Similarly, Bartosiewicz, Misztal, and Kucharski (2026) demonstrate that macroeconomic conditions in the transport and logistics sector influence SDG progress across Baltic Sea EU countries, with GDP positively correlated with environmental outcomes and unemployment negatively correlated with social sustainability. Collectively, these studies indicate that both sectoral policies and broader economic conditions shape transport-SDG performance.

Sector-specific studies further show that the transport literature is unevenly distributed across modes. In maritime transport, Sousa et al. (2026) identify SDGs 7, 9, 12, 13, and 14 as particularly relevant, highlighting the importance of clean energy, infrastructure modernization, resource efficiency, climate action, and marine ecosystem protection. Mollaoglu et al. (2024), in a comprehensive review of maritime transportation, similarly find that the literature clusters around themes such as ocean governance, maritime safety and security, the blue economy, training, and decarbonization, with strong associations with SDGs 17, 14, 13, 9, and 5. In the context of road freight transport, Collaço et al. (2022) observe that the SDGs are seldom explicitly addressed, with SDG 7 the only goal fully considered, despite clear connections to other goals, such as SDGs 3, 9, 11, 12, 13, and 17. In logistics and transport management, Darwisman (2025) introduces an organizational perspective, demonstrating that human resource management can facilitate SDG integration through Industry 4.0 training, circular-economy practices, and employee engagement, particularly in relation to SDGs 8, 9, and 12.

Overall, this literature shows that transport promotes the SDGs through several mechanisms, but it also highlights fragmentation. Most studies focus narrowly on a single mode, country, policy domain, or performance aspect. Few examine how transport firms adopt and prioritize SDGs across contexts. As a result, the organizational uptake of the SDGs in transport remains under-studied compared with the sector's policy, infrastructure, or emissions dimensions.

2.3. Corporate SDG Reporting, Integration, and Symbolic Adoption

A second major stream of literature investigates how companies engage with the SDGs through strategy, reporting, governance, and communication. This literature consistently finds a gap between visible SDG disclosures and substantive integration into organizational practices. Specifically, studies show SDG disclosures have increased over time, but from a low baseline and in uneven patterns. Bose and Khan (2022) report that SDG reporting rose between 2016 and 2019. Botchway and Bradley (2023) observe that references to materiality in disclosures have grown faster than the adoption of SMART objectives or performance disclosures. García-Sánchez et al. (2022) find that SDG integration into non-financial information systems depends on factors such as institutional pressures, firm size, stakeholder incentives, and board characteristics. Rosati and Faria (2019) and Krasodomska et al. (2025) underscore the influence of national institutions and external assurance environments in shaping SDG reporting and assurance decisions.

Concurrently, numerous studies caution that corporate engagement with the SDGs remains predominantly symbolic. Heras-Saizarbitoria et al. (2022) find that most firms engage with the SDGs superficially, with few linking them to strategic objectives, management tools, or key performance indicators. Lodhia, Kaur, and Kuruppu (2023), Manes-Rossi and Nicolo' (2022), and Van der Waal and Thijssens (2020) similarly contend that SDG reporting is frequently employed as a legitimacy tool rather than as evidence of substantive operational change. Ferrero-Ferrero et al. (2023) demonstrate that even sustainability leaders exhibit weak formal commitment and limited integration of SDGs into targets, actions, and KPIs. Costa et al. (2025) further distinguish between SDG coverage and SDG commitment, showing that some firms disclose broadly but commit weakly, a pattern

interpreted as symbolic reporting. García-Meca and Martínez-Ferrero (2021) add that SDG reporting does not enhance firm value overall, although it may be more significant in controversial or environmentally sensitive industries.

The distinction between symbolic and substantive SDG engagement is central to this study. High-level references to the SDGs should not be automatically interpreted as evidence of meaningful sustainability integration. Firms may reference or map SDGs extensively without embedding them in materiality analysis, targets, key performance indicators, governance systems, or business models. This distinction is especially relevant in sectors such as transport, where visible sustainability communication may coexist with complex environmental and social trade-offs.

2.4. Measurement, Assessment, and the Operationalization of SDG Contribution

In response to the limitations of broad goal-level disclosure, an expanding body of literature proposes more rigorous methods for assessing SDG contribution. Calabrese, Costa, Gastaldi, Ghiron, and Montalvan (2021) differentiate between SDG coverage and SDG commitment at the indicator level, linking SDG indicators to Global Reporting Initiative (GRI) disclosures. Costa et al. (2025) build on this approach to more precisely identify patterns of symbolic reporting. Diaz-Sarachaga (2021a) highlights inconsistencies between GRI-linked SDG disclosures and firms' reported actions, while Diaz-Sarachaga (2021b) introduces a monetized framework for assessing corporate contributions to the SDGs. Küçükgül, Cerin, and Liu (2022) develop an alignment approach to harmonize SDG guidance from GRI and the International Integrated Reporting Council (IIRC), and Lisowski, Bunsen, Berger, and Finkbeiner (2023) propose a top-down footprint method to quantify industry impacts across environmental SDG indicators and reduce selective "SDG-picking." Maia, Junior, Pessanha, and Garcia (2022) contribute a target-setting perspective by proposing a quantitative method to establish challenging yet realistic corporate sustainability targets aligned with the SDGs.

These measurement-focused studies are important because they go beyond merely tracking whether firms mention the SDGs. Instead, they clarify how actual SDG contributions are assessed, benchmarked, and embedded in company decision processes. This is especially relevant in transport, where outcomes depend on interconnected systems and cannot be captured by general claims alone.

2.5. Research Gap and Contribution of the Present Study

Collectively, the literature provides two robust yet only partially connected insights. First, transport research demonstrates that transport is closely linked to the SDGs, with different modes contributing to sustainable development in distinct ways. Second, the broader corporate SDG literature reveals that disclosure, reporting, and integration are often selective, shaped by institutional factors, and frequently symbolic rather than substantive. However, these two streams seldom intersect at the firm level within the transport sector.

Most transport studies focus on infrastructure, emissions, policy, rural access, or mode-specific sustainability challenges. In contrast, most corporate SDG studies are cross-sectoral, emphasizing disclosure, assurance, governance, and measurement. As a result, the literature offers more insight into why transport is important for the SDGs in principle than into how transport firms actually incorporate these goals into their organizational adoption profiles.

The present study addresses this gap by analyzing SDG adoption in the global transport sector from a comparative regional perspective, with a particular focus on the Asia-Pacific. Instead of limiting the analysis to a single transport mode or country, the study examines firm-level SDG adoption across transport industries and over time. This approach integrates the transport-SDG literature with the broader corporate literature on disclosure, prioritization, institutional drivers, and the symbolic-substantive distinction. As a result, the study identifies not only whether Asia-Pacific differs from other regions but also whether these differences vary across transport industries and firm characteristics. The following section explains the data, measures, and analytical strategy used to address these questions empirically.

3. Methods

3.1. Data Source and Sample

The empirical analysis was based on firm-level data from Refinitiv Datastream, focusing on publicly listed companies in the global transport sector from 2019 to 2024. Industry classification followed the Global Industry Classification Standard (GICS), covering Air Freight & Logistics, Ground Transportation, Marine Transportation, Passenger Airlines, and Transportation Infrastructure.

The final balanced panel comprises 2,262 firm-year observations from 377 firms tracked over six years. Of these, 1,140 firm-year observations pertain to the Asia-Pacific region, while 1,122 correspond to firms from other regions. This distribution reflects 190 Asia-Pacific firms and 187 firms from outside the region. Regional classification relied on the dataset's regional coding and was operationalized using an Asia-Pacific dummy variable. The Asia-Pacific region in this sample includes firms domiciled in Australia, Mainland China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, the Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam, the Marshall Islands, and Mongolia. The dataset contains seventeen indicators, each corresponding to a specific Sustainable Development Goal (SDG). It also includes firm-level financial characteristics and unique identifiers, enabling tracking of the same firms over time.

3.2. Measures

The primary outcome variable, firm-level SDG adoption, was defined as follows: For each firm-year, a separate binary variable was generated for each of the 17 Sustainable Development Goals (SDGs), coded as 1 if the firm reported any activity or disclosure corresponding to that SDG in the given year, and 0 otherwise. These binary variables captured the adoption status of each SDG. Additionally, an SDG index was constructed by summing the 17 binary SDG indicators for each firm-year, yielding an integer score from 0 (no SDGs adopted) to 17 (all SDGs adopted), with higher values indicating broader SDG adoption for that firm-year.

The principal regional variable, the Asia-Pacific dummy, was coded as 1 if a firm was located in the Asia-Pacific region and 0 otherwise. This variable defined the regional subsample and distinguished Asia-Pacific firms from other regions in comparative analyses. To assess links between broader SDG adoption and firm characteristics, the analysis used three financial variables: total assets, net income, and leverage. Leverage was measured as total debt divided by total equity. Total assets were transformed using the natural logarithm of one plus assets to reduce skewness. In multivariate models, continuous financial variables were standardized to facilitate comparison of coefficients. Industry heterogeneity was addressed by including the five GICS transport industries in the sample: Air Freight & Logistics, Ground Transportation, Marine Transportation, Passenger Airlines, and Transportation Infrastructure. Time was measured as a numeric year variable spanning 2019 to 2024, enabling estimation of temporal trends and year-by-region interaction effects.

3.3. Analytical Strategy

The analysis proceeded in five sequential stages to systematically address the research objectives. First, a descriptive profile of SDG adoption was developed for the Asia-Pacific subsample. Adoption frequencies were calculated for each SDG, and mean SDG indices were examined by year and transport industry. To assess temporal change, matched companies were compared using firm identifiers for 2019 and 2024. A paired Wilcoxon signed-rank test was applied to the SDG index, and McNemar tests were used on the 17 binary SDG indicators to assess whether firms expanded SDG adoption over time.

Second, the Asia-Pacific region was compared with the rest of the world. Differences in the SDG index were assessed using a Wilcoxon rank-sum test, while differences in individual SDGs were evaluated using chi-square tests. Effect sizes for SDG-by-SDG comparisons were summarized with Cramér's V. This stage aimed to determine whether Asia-Pacific firms demonstrated broader SDG adoption overall and whether any regional advantage was concentrated in specific goals or distributed across the SDG spectrum.

Third, the analysis investigated whether SDG adoption trends differed over time between Asia-Pacific and other regions by estimating models that included a year-by-Asia-Pacific interaction term. For the SDG index, two model specifications were employed: an ordinary least squares (OLS) model for interpretability and a quasi-Poisson model as a robustness check suitable for count data. Both models included GICS industry controls and standardized financial variables. For the 17 individual SDGs, separate logistic regression models were estimated, with the primary coefficient of interest being the interaction between year and the Asia-Pacific dummy. All multivariate models used cluster-robust standard errors at the firm level to account for repeated observations.

The fourth stage focused on industry differences within the Asia-Pacific. Because the SDG index was non-normally distributed and the SDG indicators were binary, the analysis relied on nonparametric tests. A Kruskal-Wallis test was used to compare the SDG index across the five transport industries. When significant differences were detected, Dunn's post hoc tests with Holm adjustment identified the specific industry pairs that differed. The same approach was then applied to the 17 individual SDGs. Effect sizes were reported using epsilon-squared where appropriate. This stage allowed assessment of whether the Asia-Pacific SDG profile was broadly shared across transport activities or driven by a more limited set of industries. The fifth and final analytical stage focused on firm-level financial determinants of SDG adoption in the Asia-Pacific region. The analysis began with Spearman rank correlations between the SDG index and financial variables, including total assets, net income, and leverage. Multivariate estimation followed, employing both OLS and quasi-Poisson models with the SDG index as the dependent variable and year and industry as controls. These models assessed whether broader SDG adoption in Asia-Pacific was primarily associated with firm size, financial position, capital structure, or temporal trends.

All analyses were conducted in R. Missing values were handled by listwise deletion within each model, ensuring analyses used all available observations for relevant variables. Given the multiple SDG-specific tests, Holm-adjusted p-values were applied where appropriate to mitigate Type I error. This adjustment was used in matched-company McNemar tests, SDG-by-SDG regional comparisons, industry-level SDG comparisons, and SDG-specific interaction models.

4. Results

Table 1 presents the sample structure. The final balanced panel includes 377 publicly listed transport firms observed from 2019 to 2024, totaling 2,262 firm-year observations. Of these, 1,140 are from Asia-Pacific firms, and 1,122 are from firms in the rest of the world. The yearly distribution remains consistent, with 190 Asia-Pacific and 187 rest-of-world firm-year observations each year.

Table 1. Sample structure by region and year.

Panel A. Regional composition of the sample				
Region	Firms		Firm-year observations	
Asia-Pacific	190		1,140	
Rest of the world	187		1,122	
Total	377		2,262	
Panel B. Distribution of firm-year observations by year				
Year	Asia-Pacific		Rest of the world	Total
2019	190		187	377
2020	190		187	377
2021	190		187	377
2022	190		187	377
2023	190		187	377
2024	190		187	377
Total	1,140		1,122	2,262

Note: The sample includes publicly listed transport firms drawn from Refinitiv Datastream over 2019–2024. Firms were classified according to the Global Industry Classification Standard (GICS). The panel is balanced.

4.1. *SDG Adoption Profile in the Asia-Pacific Region*

Table 2 summarizes the Sustainable Development Goal (SDG) adoption profile in the Asia-Pacific region. Among these, the most frequently adopted goals include SDG 8 (46.1%), SDG 13 (45.2%), SDG 12 (39.3%), SDG 3 (39.0%), SDG 5 (38.7%), and SDG 9 (37.8%). Conversely, SDG 2 (9.8%), SDG 1 (15.7%), and SDG 6 (18.1%) are the least adopted.

Taken together, these findings indicate that Asia-Pacific transport firms show the highest adoption rates for goals related to work, climate action, responsible production, health, gender equality, and innovation. In contrast, goals addressing poverty, hunger, and water issues receive comparatively less attention.

Table 2. SDG adoption profile in Asia-Pacific.

Rank	SDG	SDG name	Adoption rate (%)
1	SDG 8	Decent Work and Economic Growth	46.1
2	SDG 13	Climate Action	45.2
3	SDG 12	Responsible Consumption and Production	39.3
4	SDG 3	Good Health and Well-Being	39.0
5	SDG 5	Gender Equality	38.7
6	SDG 9	Industry, Innovation and Infrastructure	37.8
7	SDG 4	Quality Education	34.3
8	SDG 11	Sustainable Cities and Communities	33.1
9	SDG 17	Partnerships for the Goals	31.7
10	SDG 7	Affordable and Clean Energy	31.7
11	SDG 16	Peace, Justice and Strong Institutions	29.1
12	SDG 10	Reduced Inequalities	27.3
13	SDG 14	Life Below Water	24.4
14	SDG 15	Life on Land	23.4
15	SDG 6	Clean Water and Sanitation	18.1
16	SDG 1	No Poverty	15.7
17	SDG 2	Zero Hunger	9.8

Note: Adoption rates are the percentages of Asia-Pacific firm-year observations coded 1 for each SDG.

4.2. *Change in SDG Adoption in the Asia-Pacific Region*

Table 3 presents the change in SDG adoption among Asia-Pacific firms between 2019 and 2024. Panel A displays results from the matched-company analysis, revealing that for the 190 firms observed in both years, the mean SDG index increased from 0.86 in 2019 to 9.29 in 2024, representing a difference of 8.43 points. The paired Wilcoxon signed-rank test yields a highly significant result ($p < 0.001$), demonstrating a substantial increase in the breadth of SDG adoption over this period.

Table 3. Change in SDG adoption in Asia-Pacific, 2019–2024.

Panel A. Change in the SDG index among matched firms							
Measure	2019	2024	Change				
Mean SDG index	0.86	9.29	+8.43				
Test	Statistic		p-value				
Paired Wilcoxon signed-rank test	62.5		<0.001				
Panel B. Largest increases in SDG adoption among matched firms							
SDG	SDG name	2019 (%)	2024 (%)	Change (pp)	Gains (0→1)	Losses (1→0)	Holm-adjusted p-value
SDG 8	Decent Work and Economic Growth	8.4	77.4	+68.9	131	0	<0.001
SDG 13	Climate Action	7.9	76.3	+68.4	130	0	<0.001
SDG 5	Gender Equality	5.3	68.9	+63.7	121	0	<0.001
SDG 12	Responsible Consumption and Production	6.3	69.5	+63.2	120	0	<0.001
SDG 3	Good Health and Well-Being	5.3	67.9	+62.6	120	1	<0.001
SDG 9	Industry, Innovation and Infrastructure	6.3	65.8	+59.5	113	0	<0.001

Note: Matched-firm comparisons are based on 190 Asia-Pacific firms observed in both 2019 and 2024.

Panel B of Table 3 indicates that the largest gains occurred for SDG 8 (+68.9 percentage points), SDG 13 (+68.4), SDG 5 (+63.7), SDG 12 (+63.2), SDG 3 (+62.6), and SDG 9 (+59.5). These increases resulted primarily from transitions from non-adoption to adoption, with minimal reversals. Appendix Table A1 presents the year-by-year pattern, showing a consistent rise in the mean SDG index from 0.86 in 2019 to 9.29 in 2024, with no interruption in the upward trend. Appendix Table A3 provides the full McNemar results, indicating that all 17 SDGs increased significantly between 2019 and 2024 following Holm adjustment.

4.3. *Comparison of Asia-Pacific and Other Regions*

Table 4 presents a comparison between the Asia-Pacific and the rest of the world. Panel A indicates that the mean SDG index is 5.25 for Asia-Pacific and 3.76 for other regions. The Wilcoxon rank-sum test confirms this difference is statistically significant ($p < 0.001$). Despite median values being zero, Asia-Pacific shows greater dispersion, indicating a broader adoption profile.

Table 4. Comparison of Asia-Pacific and the rest of the world.

Panel A. Comparison of the SDG index						
Region	Firm-year observations	Mean SDG index	SD	Median		
Asia-Pacific	1,140	5.25	6.06	0		
Rest of the world	1,122	3.76	4.95	0		
Test				Statistic	p-value	
Wilcoxon rank-sum test				715,912	<0.001	
Panel B. Largest SDG-level differences						
SDG	SDG name	Asia-Pacific (%)	Rest of world (%)	Difference (pp)	Cramér's V	Holm-adjusted p-value
SDG 14	Life Below Water	24.4	10.0	+14.4	0.191	<0.001
SDG 11	Sustainable Cities and Communities	33.1	22.4	+10.7	0.119	<0.001
SDG 17	Partnerships for the Goals	31.7	21.3	+10.4	0.117	<0.001
SDG 4	Quality Education	34.3	23.9	+10.4	0.115	<0.001
SDG 12	Responsible Consumption and Production	39.3	29.1	+10.2	0.108	<0.001
SDG 15	Life on Land	23.4	13.3	+10.1	0.131	<0.001

Note: Asia-Pacific adoption rates exceed those of the rest of the world for all 17 SDGs. Panel B reports the six largest percentage-point differences.

Panel B of Table 4 indicates that the Asia-Pacific region exhibits higher adoption rates than the rest of the world across all 17 Sustainable Development Goals (SDGs). The most pronounced differences are observed in SDG 14 (+14.4 percentage points), SDG 11 (+10.7), SDG 17 (+10.4), SDG 4 (+10.4), SDG 12 (+10.2), and SDG 15 (+10.1). The corresponding Cramér's V values are generally small to modest, suggesting that the regional differences are systematic but not extreme. The complete set of SDG-by-SDG comparisons is presented in Appendix Table A4, where all differences remain significant following Holm adjustment.

These yearly comparisons show that the Asia-Pacific advantage persists throughout the period and widens over time. Specifically, the mean SDG index increases from 0.86 in Asia-Pacific and 0.35 in the rest of the world in 2019, to 9.29 and 5.81 in 2024, respectively.

4.4. Industry Differences Within the Asia-Pacific Region

Table 5 presents industry differences within the Asia-Pacific sample. Panel A indicates that the mean Sustainable Development Goals (SDG) index varies significantly across the five Global Industry Classification Standard (GICS) transport industries (Kruskal–Wallis $\chi^2 = 31.392$, $p < 0.001$). Passenger Airlines exhibit the highest mean SDG index (7.22), followed by Transportation Infrastructure (6.02). The other industries report lower mean SDG indices: Marine Transportation (4.68), Ground Transportation (4.57), and Air Freight & Logistics (4.02).

Table 5. Industry differences in SDG adoption within Asia-Pacific.

Panel A. SDG index by transport industry					
GICS transport industry	Firm-year observations	Mean SDG index	SD	Median SDG index	
Passenger Airlines	144	7.22	6.31	8	
Transportation Infrastructure	348	6.02	6.53	2	
Marine Transportation	174	4.68	5.34	0	
Ground Transportation	228	4.57	5.85	0	
Air Freight & Logistics	246	4.02	5.46	0	
Test			Statistic		p-value
Kruskal–Wallis test			31.392		<0.001
Panel B. Significant Dunn post-hoc contrasts for the SDG index.					
Contrast			Holm-adjusted p-value		
Air Freight & Logistics vs Passenger Airlines			<0.001		
Ground Transportation vs Passenger Airlines			<0.001		
Air Freight & Logistics vs Transportation Infrastructure			0.002		
Marine Transportation vs Passenger Airlines			0.003		
Panel C. SDGs showing the strongest industry heterogeneity					
SDG	SDG name	Kruskal–Wallis statistic	Effect size (ϵ^2)	Magnitude	Holm-adjusted p-value
SDG 14	Life Below Water	83.5	0.0700	Moderate	<0.001
SDG 1	No Poverty	83.2	0.0698	Moderate	<0.001
SDG 6	Clean Water and Sanitation	75.3	0.0628	Moderate	<0.001
SDG 15	Life on Land	59.4	0.0488	Small	<0.001
SDG 2	Zero Hunger	58.7	0.0482	Small	<0.001

Note: Industry differences were assessed only within the Asia-Pacific sample. Panel C reports the five SDGs with the largest between-industry effect sizes.

Panel B presents the Dunn post-hoc contrasts. Passenger Airlines record significantly higher SDG index values than Air Freight & Logistics, Ground Transportation, and Marine Transportation following the Holm adjustment. Transportation Infrastructure similarly outperforms Air Freight & Logistics. No other pairwise differences remain significant after adjustment.

Panel C highlights the Sustainable Development Goals (SDGs) exhibiting the greatest industry heterogeneity. The most pronounced between-industry differences are observed in SDG 14, SDG 1, and SDG 6, each showing moderate effect sizes, indicating that these differences are meaningful rather than trivial, though not the largest possible. Comprehensive industry-level results in Appendix Table A5 reveal further significant differences for most other SDGs, while SDG 16 does not vary significantly across industries.

Appendix Table A2 provides additional detail by reporting industry-specific adoption rates. Passenger Airlines have the highest rates for several widely implemented goals, including SDG 13 (62.5%), SDG 8 (61.1%), SDG 12 (59.0%), and SDG 5 (56.9%). Transportation Infrastructure records comparatively higher rates for SDG 8 (48.0%), SDG 13 (46.8%), SDG 9 (46.3%), and SDG 3 (45.7%). Marine Transportation stands out for its adoption of SDG 14 (44.3%), a rate substantially higher than that of other industries, consistent with the sector’s direct relationship with marine ecosystems.

4.5. Multivariate Results

Table 6 presents the results of the multivariate analysis. Panel A displays the year and Asia-Pacific interaction models for the SDG index. In the ordinary least squares (OLS) specification, the interaction term is positive and statistically significant ($b = 0.5553$, $p < 0.001$), indicating that, under the linear model, SDG adoption increases faster over time in the Asia-Pacific region than in other regions. In this specification, both log assets and leverage are positive and significant, whereas net income is not statistically significant. The quasi-Poisson model does not confirm the interaction effect; the year \times Asia-Pacific coefficient is positive but not significant. Year, log assets, and leverage are significant, while net income is not. Thus, evidence for a steeper adoption trajectory in Asia-Pacific is mixed, depending on model specification.

Table 6. Multivariate results.

Panel A. Year \times Asia-Pacific interaction models for the SDG index				
Variable	OLS coefficient	p-value	Quasi-Poisson coefficient	p-value
Year	1.0446	<0.001	0.3032	<0.001
Asia-Pacific	-1121.3	<0.001	-47.784	0.472
Year \times Asia-Pacific	0.5553	<0.001	0.0238	0.469
Log assets	1.5406	<0.001	0.4431	<0.001
Net income	-0.0635	0.647	-0.0503	0.090
Leverage (debt-to-equity ratio)	0.2228	<0.001	0.0277	<0.001
Panel B. SDG-specific interaction effects (selected results)				
SDG	SDG name	Odds ratio	Holm-adjusted p-value	
SDG 5	Gender Equality	1.22	0.046	
SDG 9	Industry, Innovation and Infrastructure	1.20	0.065	
SDG 11	Sustainable Cities and Communities	1.22	0.065	
SDG 12	Responsible Consumption and Production	1.19	0.087	
Panel C. Financial drivers of SDG adoption within Asia-Pacific				
Variable	OLS coefficient	p-value	Quasi-Poisson coefficient	p-value
Log assets	1.6427	<0.001	0.4040	<0.001
Net income	0.1353	0.583	-0.0092	0.816
Leverage (debt-to-equity ratio)	-0.4116	0.252	-0.0769	0.515
Year	1.5889	<0.001	0.3252	<0.001

Note: All multivariate models were estimated with firm-clustered robust standard errors. Panel C reports Asia-Pacific-only models for the SDG index.

Panel B of Table 6 shows that, after Holm adjustment, only the interaction effect for SDG 5 remains statistically significant (odds ratio = 1.22, adjusted $p = 0.046$). Interaction effects for SDGs 9, 11, and 12 are positive but not significant post-adjustment.

Panel C of Table 6 presents the financial-driver models estimated within the Asia-Pacific sample. In both the OLS and quasi-Poisson specifications, log assets and year are positive and highly significant, whereas net income and leverage are not statistically significant. The bivariate correlations in Appendix Table A6 support these findings: the SDG index is positively associated with log assets ($\rho = 0.313$, $p < 0.001$) and net income ($\rho = 0.198$, $p < 0.001$), whereas the association with leverage is weak and not significant after Holm adjustment. Overall, these results suggest that broader SDG adoption within Asia-Pacific is primarily associated with organizational scale and the general time trend, rather than with short-term financial position or capital structure.

5. Discussion

This study investigated the adoption of the Sustainable Development Goals (SDGs) in the global transport sector, with a focus on the Asia-Pacific region. Five principal findings emerged. First, Asia-Pacific firms exhibit a stronger overall SDG adoption profile than firms in other regions. Second, SDG adoption in Asia-Pacific rises sharply over time, at both the index and individual goal levels. Third, this regional advantage is broad, not limited to a few transport-related goals. Fourth, the regional patterns differ across transport industries. Fifth, broader SDG adoption in Asia-Pacific is tied mainly to firm size and time, rather than to short-term financial position. Collectively, these findings move beyond general claims about transport’s role in sustainable development and show how transport firms prioritize and adopt the SDGs over time, across industries and regions.

The first principal finding is that Asia-Pacific transport firms demonstrate a comparatively broad SDG profile, with particular emphasis on SDG 8, 13, 12, 3, 5, and 9. This pattern aligns with existing literature, which characterizes transport as a cross-cutting sector connected to employment, infrastructure, climate, production systems, and social well-being (Nitwal et al., 2022; Thilakshan & Bandara, 2019). While SDG 8 and SDG 9 reflect the sector’s traditional focus on economic activity and infrastructure, the strong positioning of SDG 12 and SDG 13 marks a shift towards decarbonization, resource efficiency, and environmental accountability (Khurshid et al., 2023; Sousa et al., 2026). Additionally, the inclusion of SDG 3 and SDG 5 signals renewed attention to social

dimensions such as well-being, working conditions, and equality. This approach contrasts with earlier transport research, which focused mainly on emissions, energy, and infrastructure, indicating a shift from narrower sustainability concerns to broader engagement with the SDGs.

The second major finding is the pronounced time trend in the Asia-Pacific region. The SDG index increases substantially from a low baseline in 2019 to a much broader profile by 2024. Matched-firm analyses indicate that this trend reflects genuine within-firm change rather than sample turnover. The breadth of this increase is particularly significant: all 17 SDGs show notable rises in the matched analysis, with the largest gains in SDGs 8, 13, 5, 12, 3, and 9. This broad-based expansion aligns with the wider corporate SDG literature, which documents the increasing prevalence of SDG disclosure and related communication over time (Bose & Khan, 2022; Botchway & Bradley, 2023). However, the present results extend this literature by demonstrating that, unlike the selective or symbolic adoption often reported (Heras-Saizarbitoria et al., 2022; Lodhia et al., 2023; Manes-Rossi & Nicolo', 2022; Van der Waal & Thijssens, 2020), SDG adoption in Asia-Pacific is not limited to a few prominent goals but reflects a more generalized broadening. Nevertheless, the current data do not permit direct assessment of the depth of integration into strategy, targets, or key performance indicators.

This distinction between breadth and depth remains important. Greater breadth does not necessarily equate to fully substantive engagement. Previous studies have shown that firms may cite many SDGs but lack materiality analysis, quantitative targets, commitment, or verified performance metrics (Calabrese et al., 2021; Costa et al., 2025; Ferrero-Ferrero et al., 2023). Therefore, these findings provide evidence of broader SDG uptake but stop short of confirming deep strategic embedding. While this breadth is a significant contribution to the transport context, it should be viewed cautiously in light of the symbolic–substantive debate.

A comparison with the rest of the world provides a third key insight, as Asia-Pacific demonstrates higher adoption rates across all 17 SDGs. Notably, large gaps exist between the Asia-Pacific and the rest of the world in SDG 14, SDG 11, SDG 17, SDG 4, SDG 12, and SDG 15. This contrast reveals that Asia-Pacific's advantage extends beyond traditional transport priorities, growth, infrastructure, and climate to encompass urban sustainability, partnerships, education, and nature-related goals. In this respect, the Asia-Pacific pattern is broader than is often depicted in the transport literature, which typically emphasizes energy transition, emissions, and infrastructure modernization (Collaço et al., 2022; Khurshid et al., 2023; Sousa et al., 2026). The substantial difference in SDG 14 is particularly significant, given the region's prominence in maritime activities and the importance of marine ecosystems in current debates on transport sustainability (Mollaoglu et al., 2024). Overall, these findings suggest that the Asia-Pacific offers a comparatively favorable context for SDG-related corporate engagement in transport, especially when contrasted with global trends.

At the same time, these regional insights reveal that the Asia-Pacific region is not internally homogeneous. Statistically significant and substantively meaningful industry differences are evident. Passenger Airlines and Transportation Infrastructure exhibit the strongest overall SDG profiles, whereas Marine Transportation stands out particularly for SDG 14. These findings support the view that transport should not be regarded as a single sustainability category. Instead, different transport industries engage with distinct sets of SDG pressures, opportunities, and stakeholder expectations. For example, maritime transport is closely linked to ocean governance, marine protection, and blue economy issues (Mollaoglu et al., 2024; Sousa et al., 2026), whereas road freight and logistics focus more narrowly on energy, efficiency, and operational concerns (Collaço et al., 2022; Darwisman, 2025). The strong position of Passenger Airlines may result from heightened visibility, international stakeholder pressure, and the necessity to align with broad sustainability agendas in a sector subject to significant public scrutiny. Transportation Infrastructure may benefit from its association with urban development, resilient systems, and long-term planning, which align with SDGs 8, 9, 11, 12, and 13.

A fifth key insight concerns the drivers of SDG adoption in Asia-Pacific. Both bivariate and multivariate analyses identify firm size as the most robust correlate of broader SDG adoption. Larger firms are associated with higher SDG index values, while net income and leverage lose significance in multivariate models. This pattern aligns with previous research indicating that larger firms are more likely to disclose or integrate SDGs due to increased stakeholder scrutiny and greater organizational capacity (Botchway & Bradley, 2023; García-Sánchez et al., 2022; Krasodomska et al., 2025; Van der Waal & Thijssens, 2020). In the Asia-Pacific transport sector, SDG adoption appears to be influenced more by scale-related capabilities than by short-term financial performance. Larger firms typically possess specialized reporting systems, dedicated sustainability personnel, formalized governance structures, and stronger incentives to align with global sustainability frameworks. Consequently, smaller listed transport firms may face structural disadvantages in achieving broader SDG adoption, even within the same regional context.

The interaction analysis adds an important cautionary note. While descriptive results suggest that Asia-Pacific is widening its lead over time, and the OLS interaction model supports this interpretation, the quasi-Poisson and SDG-specific logistic models provide only limited evidence that Asia-Pacific is improving faster than other regions. Following the Holm adjustment, only SDG 5 demonstrates a clearly significant interaction effect. Therefore, the most robust conclusion is that Asia-Pacific exhibits higher levels, broader coverage, and stronger temporal growth, but evidence for a uniquely higher rate of improvement remains inconclusive. This cautious interpretation is consistent with broader SDG adoption literature, which frequently reports uneven progress across sectors, regions, and disclosure dimensions (Bose & Khan, 2022; Costa et al., 2025; Ferrero-Ferrero et al., 2023).

From a theoretical standpoint, these results address the tension between institutional diffusion and substantive implementation. The broad increase in SDG adoption aligns with the concept that global frameworks spread through reporting norms, stakeholder expectations, and institutional pressures (García-Sánchez et al., 2022; Rosati & Faria, 2019). Conversely, the significant influence of firm size and the mixed evidence regarding dynamic superiority indicate that adoption is still shaped by organizational capacity, rather than representing a uniform regional process. Thus, the results support an interpretation of SDG uptake as both institutionally driven and organizationally selective. While Asia-Pacific firms generally exhibit stronger responses, variation persists across firms and industries, reinforcing the nuanced patterns described throughout the discussion.

The findings have several practical implications. For managers, the results indicate that SDG adoption in transport should not be treated as a uniform sector-wide benchmark. Industry-specific baselines are particularly

important in a region as diverse as the Asia-Pacific. Passenger Airlines, Transportation Infrastructure, Marine Transportation, Ground Transportation, and Air Freight & Logistics each face distinct sustainability expectations and engage with different subsets of the SDGs. For policymakers and regulators, the results demonstrate that broad regional progress can coexist with significant internal disparities. To further advance SDG-related corporate engagement, targeted support mechanisms may be necessary for smaller firms and industries with lower adoption profiles. Additionally, the findings suggest that regional policy discussions should extend beyond climate and energy to include education, partnerships, urban systems, and nature-related goals, all of which are critical components of the Asia-Pacific transport sustainability agenda.

In summary, this study contributes to the literature in three primary ways. First, it offers firm-level evidence on SDG adoption in the transport sector, addressing a gap: previous research has focused more on infrastructure, policy, emissions, and conceptual frameworks than on patterns of corporate adoption. Second, it establishes that the Asia-Pacific region represents a comparatively strong context for SDG adoption in transport. Third, it reveals that this regional strength varies by industry and is closely linked to organizational scale. Collectively, these contributions help bridge the transport-SDG literature with broader corporate SDG research on disclosure, institutional pressures, and the symbolic–substantive divide.

6. Conclusion

This study examined SDG adoption in the global transport sector, focusing on the Asia-Pacific region. Using firm-level data from 2019 to 2024, the analysis identified regional differences, temporal trends, industry variation, and financial factors. Asia-Pacific firms show greater SDG adoption than firms in other regions, covering all 17 goals. SDGs 8, 13, 12, 3, 5, and 9 have the highest adoption rates, while SDGs 2, 1, and 6 have the lowest.

The analysis further demonstrates that SDG adoption in Asia-Pacific increased significantly during the study period, primarily driven by substantial within-firm changes rather than by sample turnover. However, the regional pattern is not homogeneous. Passenger Airlines and Transportation Infrastructure exhibit the strongest overall SDG profiles, while Marine Transportation is particularly notable for SDG 14. Additionally, firm size is the most consistent correlate of broader SDG adoption in Asia-Pacific, whereas net income and leverage are not significant in multivariate analyses.

These findings advance the literature in three primary ways. First, they expand transport-SDG research by offering firm-level evidence, moving beyond policy or conceptual mapping to show how corporations engage with SDGs in practice. Second, they reveal Asia-Pacific as a comparatively strong region for SDG adoption in the transport sector, suggesting that it offers a useful comparative context and may provide relevant lessons for other settings. Third, the results show that sector and organizational scale shape regional SDG strength, indicating that targeted strategies may be more effective than uniform approaches. Together, these contributions clarify that analyzing firm-level SDG adoption not only deepens academic understanding but also informs decision-makers seeking to promote sustainable practices within the global transport sector.

Several limitations should be considered when interpreting these results. Most notably, the analysis measures the breadth of SDG adoption rather than the depth of integration. Firms associated with more SDGs are not necessarily embedding these goals substantively into targets, governance structures, materiality assessments, or performance metrics. Furthermore, the focus on publicly listed firms may limit the generalizability of the findings to privately held companies or smaller firms outside major capital markets. The regional classification employed is also broad and may not fully reflect institutional differences within the Asia-Pacific region.

These limitations suggest several avenues for future research. Subsequent studies could investigate whether broader SDG adoption in the transport sector correlates with more substantive integration, such as SDG-linked targets, key performance indicators, assurance processes, and governance mechanisms. Further research could also explore subregional differences within the Asia-Pacific region, compare listed and non-listed firms, or conduct more detailed analyses of specific transport subsectors. Additionally, linking SDG adoption to environmental and social performance outcomes would help determine whether broader adoption leads to measurable sustainability improvements.

In summary, Asia-Pacific transport firms show stronger, rapidly expanding SDG adoption than those in other regions. This highlights the region's potential as a useful context for understanding how the transport sector can engage with the SDGs and informs both policymakers and corporate leaders about the patterns and priorities that may support broader adoption. However, the results also underscore the need for caution when using broad SDG adoption as a proxy for genuine sustainability engagement, emphasizing the difference between visible adoption and substantive implementation. The study's main implication is that the breadth of SDG adoption is a useful but incomplete indicator of corporate sustainability and should be complemented by further assessment of depth and impact.

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Appendix

Appendix Table A1. SDG Adoption Rates in Asia-Pacific by Year (%).

SDG	2019	2020	2021	2022	2023	2024
SDG 1	3.7	9.0	12.6	17.4	23.2	28.4
SDG 2	1.6	5.3	7.4	10.0	15.8	18.9
SDG 3	5.3	23.7	35.3	46.3	55.8	67.9
SDG 4	6.3	22.1	31.1	40.5	49.5	56.3
SDG 5	5.3	22.1	34.2	44.2	57.4	68.9
SDG 6	4.2	10.0	14.2	18.4	27.4	34.2
SDG 7	5.3	17.9	28.4	36.3	44.7	57.4
SDG 8	8.4	29.5	42.6	53.2	65.3	77.4
SDG 9	6.3	22.6	35.3	43.7	53.2	65.8
SDG 10	3.7	11.1	20.5	32.1	41.6	54.7
SDG 11	5.3	17.9	28.9	39.5	48.9	57.9
SDG 12	6.3	20.5	34.7	46.3	58.4	69.5
SDG 13	7.9	29.5	42.6	51.1	63.7	76.3
SDG 14	4.7	16.3	25.3	29.5	31.6	38.9
SDG 15	4.7	14.7	22.1	25.3	32.1	41.6
SDG 16	2.6	14.2	23.2	32.6	45.3	56.8
SDG 17	4.7	18.4	28.4	35.3	45.3	57.9
Mean SDG index	0.86	3.05	4.67	6.02	7.59	9.29

Note: Percentages refer to the share of Asia-Pacific firm-year observations coded 1 for each SDG in a given year.

Appendix Table A2. SDG Adoption Rates in Asia-Pacific by Transport Industry (%).

SDG	Air Freight & Logistics	Ground Transportation	Marine Transportation	Passenger Airlines	Transportation Infrastructure
SDG 1	7.7	3.5	13.2	31.2	24.1
SDG 2	5.3	4.4	1.7	17.4	17.5
SDG 3	34.6	36.0	33.3	42.4	45.7
SDG 4	26.4	31.1	39.7	41.7	36.2
SDG 5	30.9	38.2	35.6	56.9	38.5
SDG 6	11.8	7.5	9.2	31.2	28.4
SDG 7	26.4	30.3	22.4	39.6	37.6
SDG 8	39.4	40.4	46.6	61.1	48.0
SDG 9	32.1	39.0	20.1	46.5	46.3
SDG 10	23.2	20.6	23.0	42.4	30.5
SDG 11	27.2	37.3	19.0	36.1	40.2
SDG 12	32.5	35.5	32.8	59.0	41.7
SDG 13	38.6	39.9	43.7	62.5	46.8
SDG 14	7.7	18.9	44.3	31.9	26.7
SDG 15	13.4	25.0	13.8	44.4	25.6
SDG 16	25.2	27.2	32.2	32.6	30.2
SDG 17	19.9	21.9	37.4	44.4	38.2
Mean SDG index	4.02	4.57	4.68	7.22	6.02

Notes: Percentages refer to the share of Asia-Pacific firm-year observations coded 1 for each SDG within each transport industry.

Appendix Table A3. Full McNemar Test Results for Asia-Pacific Firms, 2019 vs 2024.

SDG	2019 (%)	2024 (%)	Change (pp)	Gains (0→1)	Losses (1→0)	McNemar χ^2	Holm-adjusted p-value
SDG 8	8.4	77.4	+68.9	131	0	129.0	<0.001
SDG 13	7.9	76.3	+68.4	130	0	128.0	<0.001
SDG 5	5.3	68.9	+63.7	121	0	119.0	<0.001
SDG 12	6.3	69.5	+63.2	120	0	118.0	<0.001
SDG 3	5.3	67.9	+62.6	120	1	115.0	<0.001
SDG 9	6.3	65.8	+59.5	113	0	111.0	<0.001
SDG 16	2.6	56.8	+54.2	103	0	101.0	<0.001
SDG 17	4.7	57.9	+53.2	102	1	97.1	<0.001
SDG 11	5.3	57.9	+52.6	102	2	94.2	<0.001
SDG 10	3.7	54.7	+51.1	99	2	91.2	<0.001
SDG 7	5.3	57.4	+52.1	103	4	89.8	<0.001
SDG 4	6.3	56.3	+50.0	97	2	89.3	<0.001
SDG 15	4.7	41.6	+36.8	76	6	58.1	<0.001
SDG 14	4.7	38.9	+34.2	69	4	56.1	<0.001
SDG 6	4.2	34.2	+30.0	61	4	48.2	<0.001
SDG 1	3.7	28.4	+24.7	49	2	41.5	<0.001
SDG 2	1.6	18.9	+17.4	34	1	29.3	<0.001

Appendix Table A4. Full Asia-Pacific vs Rest-of-World Comparison by SDG.

SDG	Asia-Pacific (%)	Rest of world (%)	Difference (pp)	Cramér's V	Holm-adjusted p-value
SDG 1	15.7	8.3	+7.4	0.114	<0.001
SDG 2	9.8	5.1	+4.7	0.090	<0.001
SDG 3	39.0	29.6	+9.4	0.099	<0.001
SDG 4	34.3	23.9	+10.4	0.115	<0.001
SDG 5	38.7	29.4	+9.3	0.098	<0.001
SDG 6	18.1	10.9	+7.2	0.102	<0.001
SDG 7	31.7	22.8	+8.9	0.099	<0.001
SDG 8	46.1	38.8	+7.3	0.074	0.001
SDG 9	37.8	30.7	+7.1	0.075	0.001
SDG 10	27.3	21.8	+5.4	0.063	0.004
SDG 11	33.1	22.4	+10.7	0.119	<0.001
SDG 12	39.3	29.1	+10.2	0.108	<0.001
SDG 13	45.2	38.7	+6.5	0.066	0.004
SDG 14	24.4	10.0	+14.4	0.191	<0.001
SDG 15	23.4	13.3	+10.1	0.131	<0.001
SDG 16	29.1	20.2	+8.9	0.103	<0.001
SDG 17	31.7	21.3	+10.4	0.117	<0.001

Appendix Table A5. Full Kruskal–Wallis Results by Industry Within Asia-Pacific.

SDG	Kruskal–Wallis statistic	df	Effect size (ϵ^2)	Magnitude	Holm-adjusted p-value
SDG 1	83.2	4	0.0698	Moderate	<0.001
SDG 2	58.7	4	0.0482	Small	<0.001
SDG 3	12.5	4	0.0075	Small	0.028
SDG 4	14.0	4	0.0088	Small	0.022
SDG 5	27.2	4	0.0205	Small	<0.001
SDG 6	75.3	4	0.0628	Moderate	<0.001
SDG 7	20.1	4	0.0142	Small	0.002
SDG 8	21.0	4	0.0150	Small	0.002
SDG 9	41.9	4	0.0334	Small	<0.001
SDG 10	27.1	4	0.0203	Small	<0.001

SDG	Kruskal–Wallis statistic	df	Effect size (ϵ^2)	Magnitude	Holm-adjusted p-value
SDG 11	29.9	4	0.0228	Small	<0.001
SDG 12	33.5	4	0.0260	Small	<0.001
SDG 13	24.8	4	0.0183	Small	<0.001
SDG 14	83.5	4	0.0700	Moderate	<0.001
SDG 15	59.4	4	0.0488	Small	<0.001
SDG 16	4.08	4	0.0001	Small	0.396
SDG 17	46.0	4	0.0370	Small	<0.001

Appendix Table A6. Spearman Correlations Between SDG Index and Financial Variables in Asia-Pacific.

Variable	N	Spearman's ρ	p-value	Holm-adjusted p-value
Log assets	1,140	0.313	<0.001	<0.001
Net income	1,140	0.198	<0.001	<0.001
Leverage (debt-to-equity ratio)	1,140	0.065	0.029	0.057

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