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AUTOMOTIVE INDUSTRY AND SUSTAINABILITY: HOW TO PROMOTE GREEN TRANSPORTATION*

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Abstract. In the context of societal pressures, legislative standards, regulatory requirements, and the demonstrable negative environmental impact of the automotive industry, companies are facing increasing pressure to integrate sustainability into their management practices. Due to increasing pressure from shifting stakeholder behavior and expectations, sustainability and corporate social responsibility play a crucial role in management practices. For many organizations such as automotive, logistics, sports organizations, educational institutions etc. this process is still a challenge. This paper aims to identify gaps in the implementation of sustainability in the automotive industry and provide recommendations for the effective integration of sustainability and the promotion of green transport. The research is based on a comparison of sustainability implementation practices in the largest automotive companies in Slovakia. In addition to enhancing competitiveness, financial sustainability, and market position, such implementation has a broader societal impact, contributing to systemic change in green transportation. The research identifies gaps and opportunities to optimize the implementation of sustainability, provides recommendations for companies that have not yet adopted sustainability practices, and offers guidance for effective implementation. The study reveals that although companies implement sustainability measures, significant gaps and inefficiencies remain. Addressing these gaps could enhance the effectiveness of sustainability initiatives, enhance organizational performance, contribute to mitigating societal problems related to transportation, reduce negative environmental impacts, and improve the quality of life.

Keywords: automotive; sustainability; green transportation; Slovakia; management

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1. Introduction

As air quality and human health continue to deteriorate, pressure is mounting on individual companies to take responsible action and implement policies and strategies to improve this situation (Saman & Pauna, 2023). Increasingly stringent legislative standards and regulations to achieve sustainability are complicating the management of organizations as they attempt to adapt to them (Chiki et al., 2025). In addition to these external pressures, organizations face demand from customers driven by shifting expectations and evolving needs.

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Companies are adapting their strategies to meet these expectations and enhance their social responsibility. (Singh, 2024) The implementation of sustainability and social responsibility practices has become crucial for companies operating in various fields - from non-profit organizations, and sports organizations, to education institutions or services, manufacturing, and industry. The long-term issues being addressed primarily include slowing the process of global warming, reducing the ecological footprint, promoting health to preserve the quality of life on Earth, and ensuring the efficient use of scarce resources.

The automotive industry is one of the most significant contributors to global warming, particularly in the context of internal combustion engines. (Abro et.al., 2019) These engines emit carbon dioxide, nitrogen oxides, and particulate matter and may also result in the leakage of petroleum substances, including oil and fuels, into groundwater. The European Union and its institutions are currently working to enhance the management of sustainable development, issuing regulations and recommendations to facilitate the implementation of sustainable practices. The automotive industry is one of the most addressed and affected sectors in terms of restrictions. The challenge for automotive companies lies in successfully integrating sustainability requirements into their strategic plans while minimizing impacts on the economic performance and prosperity of individual organizations. While it is in the interest of companies to promote environmentally friendly transportation and production, none wish to jeopardize their business operations.

This thesis explores the potential pathways for successfully integrating sustainability into the management of companies within the automotive industry. It also compares the implementation of key sustainability elements across major automotive sector players. The research primarily focuses on Slovak automotive companies. The automotive industry in Slovakia accounts for the largest share of the country's GDP and exports and provides a significant portion of employment through automotive plants and their suppliers. (Augustin et al., 2024) Thus, implementing sustainability is not only an option but a necessity. This is not only due to legislative and public pressure but also to enhance competitiveness, improve performance, attract new investment, and meet evolving consumer expectations, as demonstrated in previous research. (Hermundsdottir & Aspelund, 2022) To maintain their position, companies must respond effectively to these influences. Based on the findings, gaps in the implementation of sustainability within corporate governance are identified, and recommendations are provided to optimize these efforts. Implementing sustainability elements requires integration into business operations, clear communication, and alignment with corporate policy and strategy, along with the provision of transparent information to key stakeholders. The implementation of sustainability depends on the capabilities of organizations, including their financial and technological resources, as well as the availability and development of innovation. From this standpoint, implementing sustainability is crucial not only for organizations but also for society. Research guides effectively incorporating sustainability elements to advance green transportation. This research also serves as a source of inspiration and guidance for companies yet to adopt sustainability practices or seek to improve their current implementation. It also maps the market position of individual organizations, offering valuable insights for potential investors. The paper lays the groundwork for further research aimed at achieving sustainability and promoting green transportation.

2. Theoretical background

In recent decades, rapid industrial development and the shift toward a consumer lifestyle have contributed to a decline in quality of life and have negatively impacted the planet as a whole. This raises the question of how long the current resources will be sufficient to meet the needs of today's generation, and for how long we will be able to maintain a sufficiently high standard of living. It has become clear that, if we want to preserve life on Earth, individuals, businesses, and society as a whole must start acting responsibly and work toward achieving long-term sustainability. In literature, two distinct concepts are often encountered: sustainability and sustainable development. While some authors use the terms sustainability and sustainable development interchangeably, a subtle distinction exists. (Olawumi & Chan, 2017; Ruggerio, 2021; Sartori et al., 2014) However, some perspectives consider sustainable development a contradictory concept, as it may not be possible to sustain economic growth indefinitely on a planet with finite resources. (Sachs, 1999; Redclift, 2005; Tvaronavičienė, 2024) While sustainable development is a broader concept, both concepts share the same elements and principles, aiming towards the same goals. The principle of sustainability and sustainable development is the

use of resources and meeting the needs of the present generation in a way that does not compromise the ability to meet the needs of future generations. (Brundtland, 1987; Hajian & Jangchi Kashani 2021)

The overall issue of sustainability is based on three fundamental pillars: the triple bottom line –comprising ecological, economic, and social pillars. According to the author of this concept, in the 21st century, it will be a business imperative, and society's performance will be measured precisely by social justice, economic prosperity, and environmental quality. (Elkington & Rowlands, 1999) Each pillar includes some specific elements of sustainability. The economic pillar includes long-term economic growth, resource efficiency, financial inclusion, and sustainable supply chain management. The environmental pillar focuses on emission reduction, fuel efficiency, sustainable production, the circular economy, recycling, renewable resources, and green infrastructure. The social pillar emphasizes fair wages, working conditions, equality, inclusion, ethical principles, community development, and education. One of the business sectors under the greatest pressure to implement sustainability is the industry, specifically the automotive industry, which is a major contributor to the deteriorating quality of the environment. All elements of sustainability should be integrated into corporate governance within the automotive industry to support public transportation and promote green transportation.

Each year, the number of newly registered passenger vehicles continues to increase. Passenger car transport is one of the most significant contributors to air pollution, and the automotive industry is one of the sectors with the most essential negative environmental impact. For this reason, individual companies must implement changes aimed at achieving long-term sustainability, such as improving fuel efficiency, transitioning to alternative fuels, reducing emissions, or adopting new engine technologies. (McAuley, 2003) Other trends have included automated driving, connectivity, and mobility services, which have brought about a lasting change in the environment. (Koers, 2014; Pischinger & Seiffert, 2016; Isopp et al., 2024) According to some authors, the future of transportation lies in autonomous vehicles (Šotek et al., 2021) or electromobility development (Koman et al., 2024; Redouani et al., 2024). These changes collectively promote sustainable transportation.

The European Union establishes standards and regulations in the automotive industry, which increases the need to integrate sustainability in these organizations. (Ostojic & Traverso, 2024) A crucial legislative step to ensure sustainable and environmentally friendly transportation was the limitation of emissions. In the EU, passenger road transport is one of the largest sources of pollution in transportation, accounting for up to 60.6% of total transport emissions. This is why the EU has proposed various measures to reduce emissions, including the adoption of alternative modes of transport, shared transportation, and measures for car manufacturers, such as increasing the efficiency of combustion engines and switching to a different type of fuel. In 2019, the most used fuels for passenger transport were diesel (66.7%) and petrol (24.55%). With the tightening of CO₂ emissions regulations, electric cars have gained popularity. While there is a reduction in emissions when electric vehicles are operated, it is worth noting that the production and disposal of such cars are significantly more burdensome to the environment compared to other types of vehicles. The number of emissions from electric cars is linked to the source of the electricity used to charge them. (European Parliament, 2025) To reduce the emissions produced by road transport, emission targets were set, with a reduction goal for passenger cars to 95 g CO₂/km from 2020 to 2024. Another essential legislative milestone was the adoption of the EU Climate Act in 2021, which aims to achieve climate neutrality by 2050. This law also applies to road transport and the automotive industry, as it includes requirements for transitioning to electric vehicles and reducing their carbon footprint during production and use. (European Commission, 2019)

However, the behavior of some companies does not always align with regulations. Many scandals, such as the reduction of CO₂ emissions by electric motors and lightweight construction, have also sparked debate. (Wellbrock et al., 2020) This puts pressure on companies. External pressures have a positive impact on environmental and social sustainability but do not have a significant positive effect on financial performance. (Szász et al., 2021) Individual companies produce standardized financial reports that allow for comparison. However, a different situation arises in the case of sustainability reporting. (Tóth et al., 2022) Therefore, it is not possible to assess the impact of sustainability on its pillars or to compare these reports. The costs of implementing sustainability also include expenses for new technologies or innovation development, which impact financial indicators, as do fines associated with non-compliance with standards and recommendations.

It is necessary to approach the implementation of sustainability elements comprehensively and understand the interrelationship between them. (Vilaya et al., 2024) While the ecological and economic elements dominate, the implementation of sustainability often overlooks the social elements. (Ajmal et al., 2018) In the social pillar, the key focus is on supporting cooperation between culturally and socially diverse groups, promoting social integration, and enhancing the quality of life. (Stren & Polèse, 2000; Davidson. 2010) Social responsibility within a company is also reflected in working conditions, employee support, educational development, health promotion, and the balance between work and personal life as well as emphasizing diversity, employability, and employee development. (Issopp et al., 2024) However, social responsibility includes community relations, consumer relations, and efforts to address social challenges related to transportation. (Dodd et al., 2024)

An organization must strike a balance between the individual elements of sustainability, ensuring that they have a positive impact on performance while maintaining financial sustainability.

3. Research objective and methodology

The study aims to identify gaps and opportunities to optimize the implementation of sustainability and to provide recommendations for more effective practices. The research is based on both qualitative and quantitative content analysis, as well as a comparison of approaches to sustainability in four large automotive companies in Slovakia. Although numerous studies address the implementation of sustainability through the analysis of individual elements, no comprehensive analysis of all three aspects (economic, environmental, and social pillar) within automotive companies operating in the Slovak market has been found.

The Slovak automotive industry holds a significant position in the national economy, as Slovak has become one of the world's leading car producers per capita. Consequently, any decline in competitiveness, performance, and production could have far-reaching consequences for the country. This study explores how companies implement sustainability to promote green transportation while supporting both business resilience and the Slovak economy.

The subject of the research includes four large automotive producers: Volkswagen Slovakia, Kia Slovakia, Stellantis Slovakia (PCA Trnava), and Jaguar Land Rover. Data are collected through content analysis and comparison of selected key indicators to understand how individual brands operate in the Slovak market and implement and communicate their sustainability strategies. Content analysis is a research method that is flexible and has a wide range of applications in studies and research with different objectives. (White & Marsh, 2006) is technique involves drawing valid and applicable conclusions from texts within their respective contexts. (Krippendorff, 2019) In short, it consists of generating answers to research questions by drawing on theoretical insights and transferring data from texts.

The research question in this study is: "How do automotive companies in Slovakia integrate sustainability principles into their management processes?"

The data are collected from annual company reports, available statistics, websites, and social media platforms. Annual reports published up to 2023 are used for analysis. From 2024 onward, companies reporting will be required according to uniform standards, which presents a challenge for automotive companies that are currently adapting to these new requirements.

The findings are divided into two parts – general and specific. The general part consists of management practices, approaches, implementation of sustainability into strategy, communication strategy, and ESG risk rating comparison. Obtained data in specific parts are analyzed following the three main areas of sustainability, commonly referred to as the "triple bottom line" model, and established key parameters and indicators are:

- Economic pillar – financial ratios, such as profit, sales, gross margin, etc.
- Environmental pillar – CO2 emissions, water consumption, production of electric vehicles, etc.
- Social pillar – labor condition, promotion of diversity, community support etc.

Based on the collected and categorized data, it is possible to logically identify interrelationships among the three pillars of sustainability, evaluate the companies' approaches to sustainability implementation, and highlight differences between the various manufacturers to answer the research question, identify gaps and fulfill the study objectives.

4. Results

The obtained data were divided into two parts. The first part contains general information regarding the implementation of sustainability in management practices and corporate strategy. The second part presents specific findings related to the three main pillars of sustainability – economy, environmental and social. This division enhanced clarity and facilitated the comparison of sustainability integration, as well as the identification of potential shortcomings.

4.1 Analysis of management practices and communication

Slovak automotive companies face increasing pressure to integrate sustainability into their operations. This pressure arises not only from legislation and governmental requirements and expectations but also from customers, business partners, and investors who increasingly favor collaboration with socially responsible companies. Moreover, suppliers are likewise expected to comply with sustainability standards. In this context, the adoption of innovative technologies with minimal environmental impact has become essential. To ensure transparency and accountability, these companies are required to report their performance on both sustainability performance and financial outcomes regularly.

The findings indicate that only two out of the four analyzed companies published annual reports specifically addressing Slovak stakeholders, including information about sustainable-related activities. Several gaps were identified in the provided information. In particular, the absence of transparency and completeness may reduce credibility. Although companies often stated their sustainability goals and reported partial progress, they typically omitted crucial details such as investment in research and development, innovation, or penalties related to environmental and social issues. The disclosed information was usually part of broader annual reports, often lacking a unified structure or framework. Globally companies published sustainable reports. Most information with stakeholders occurred through websites or social media platforms. All analyzed companies have integrated sustainability into their strategy and managerial practices intending to meet legal standards and regulatory requirements. However, the two companies disclosed only limited information on their sustainability initiatives, community involvement, or achieved goals. This lack of disclosure may negatively influence stakeholders' and business partners' perceptions, potentially affecting the company's reputation and trustworthiness.

Another crucial indicator of an organization's commitment to sustainability, and a key factor for potential investors, is its ESG rating. ESG performance reflects how a company addresses environmental, social, and corporate governance issues. Specialized agencies assign ESG ratings based on established ESG criteria. For example, Sustainalytics provides a global ESG rating, evaluating more than 20,000 companies worldwide through a combination of quantitative data and qualitative analysis. (Sonko & Sonko, 2023) Table 1 presents the ESG Risk Rating of the compared organizations, focusing on their respective parent companies.

Table 1. ESG Risk Rating

Company	Kia Corp.	Volkswagen AG	Stellantis NV	Jaguar Land Rover Automotive Plc
ESG Risk rating	24.9	26.8	21.6	16.6
Industry Rank	Medium Risk (38 out of 88)	Medium Risk (52 out of 88)	Medium Risk (22 out of 88)	Low Risk (15 out of 88)

Source: Sustainalytics (2025)

Based on the data above, Jaguar Land Rover Automotive Plc has the lowest ESG risk among the companies compared, ranking fifteenth out of the 88 automotive companies surveyed. Companies with similar or lower ESG risk levels are primarily those specializing in the production of electric vehicles or the manufacturing of

individual components. Among more significant and well-known automakers, Porsche AG, Renault SA, and Mercedes-Benz Group AG also achieved comparable rankings. (Sustainalytics, 2025)

4.2 Analysis by sustainability pillars

The concrete findings in this specific part were sorted into three main sustainability pillars – economic, environmental, and social. Based on this process, it was enabled to identify which pillar managers of companies perceive as more important.

4.2.1 Economic pillar

The economic pillar connected financial indicators and business investment in sustainability, innovation, new technologies, modern trends, and opportunities to fund science and research. Activities aim to improve the negative impact of production and car use on the environment and living conditions and promote green transportation. From the available sources, it was impossible to accurately identify the proportion of funding that individual companies invest in promoting sustainability, either through direct investment or investment in innovation and research in this area or penalties. However, it was possible to obtain information on financial indicators and performance and make a comparison. This comparison allowed us to partially assess the financial health of companies, the impact of sustainability implementation on their financial performance and stability, and the opportunities to invest in sustainability development and innovation. Table 2 presents a comparison of indicators, including profit, revenue, and gross margin, for each company, along with a year-on-year comparison.

Table 2. Financial ratios of the compared companies

	Kia Slovakia a.s.	Volkswagen Slovakia a.s.	PCA Slovakia, s.r.o. / Stellantis Slovakia	Jaguar Land Rover Slovakia, s.r.o.
Profit 2023	390 131 000	233 411 000	56 646 000	8 873 000
Profit 2022	175 506 000	202 405 000	34 314 000	10 846 000
Change	122% ↑	15% ↑	65% ↑	18% ↓
Sales 2023	8 065 938 000	11 757 330 000	3 284 362 000	373 018 000
Sales 2022	6 758 817 000	9 734 840 000	3 658 551 000	351 010 000
Change	19% ↑	21% ↑	10% ↓	6% ↑
Gross margin = Added Value / Total Sale	15,39%	8,72%	7,95%	77,10%

Source: Finstat.sk (2025)

Based on the above data, it can be concluded that despite the constraints and regulations related to sustainability, the companies compared have been relatively successful in generating profit. None of the companies reported a loss during the period analyzed. While Jaguar Land Rover experienced a decrease in profit, it saw an increase in sales. Notably, the company operates with a gross margin that is significantly higher than that of other companies in the Slovak automotive sector. Kia recorded the highest profit, with a 122% year-on-year increase, driven by a 19% rise in sales, and achieved the second-highest gross margin of 15.39%. (Finstat.sk, 2025)

The most significant sustainability restrictions were introduced by the European Union in 2019, followed by the onset of the global COVID-19 pandemic in 2020, which led to operational restrictions. The profit development from this period through to 2023 is presented in Figure 1.

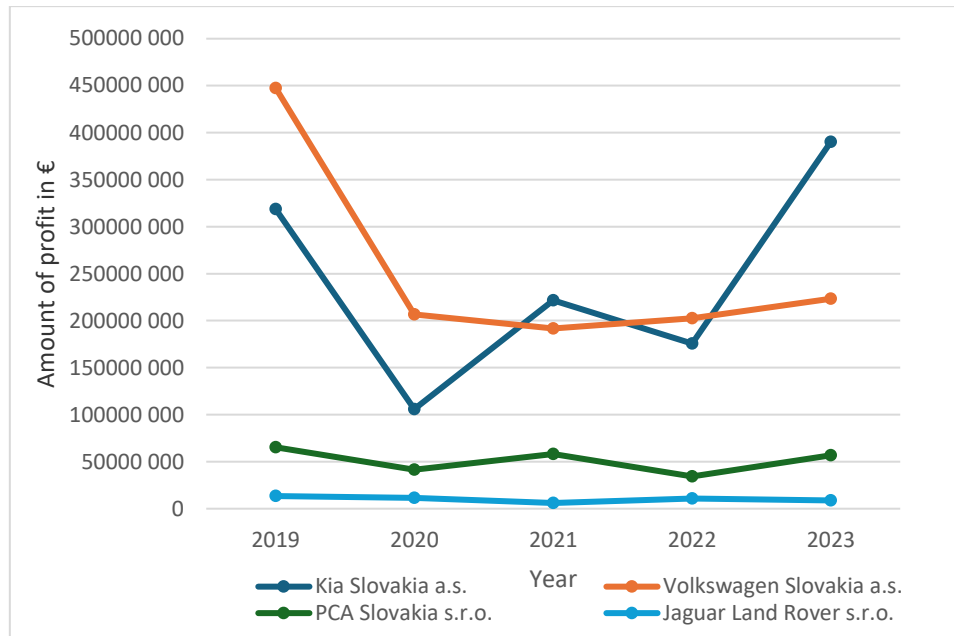


Figure 1. Profit of the compared companies from 2019

Source: Finstat.sk (2025)

In 2020, all companies experienced a decline in profit, likely due to the constraints imposed by the global pandemic and a weakening economy. For Kia, it is evident that by 2023, the company had achieved a profit level exceeding that of the pre-pandemic period in 2019. In contrast, Volkswagen has not yet returned to its pre-pandemic profit levels, remaining at a profit level similar to that of the years following the pandemic and the introduction of new European Union regulations. These changes in profit volumes may indicate that Kia Slovakia is adapting relatively quickly to new societal trends and market shifts.

The primary objective is to reduce the impact on air quality and the environment. Of the companies surveyed, only two – Kia Slovakia and Volkswagen Slovakia- publish annual reports specific to the Slovak market. The other companies do not provide annual reports for Slovakia; instead, they issue reports for their parent companies in Slovakia. One-year increase, driven by a 19% rise in sales, and achieved the second-highest gross margin of 15.39%. (Finstat.sk, 2025)

4.2.2 Environmental pillar

Kia aims to become a global leader in sustainable mobility. The company plans to have a fully electric product lineup in Europe by 2032 and in the remaining markets by 2040. Additionally, from 2028, Kia intends to focus on hydrogen fuel cell vehicles. By 2040, the company aims to utilize only renewable energy in all its plants. In terms of supply chain management, Kia is introducing a greenhouse gas management system. As steel suppliers, who are the most significant contributors to carbon emissions, collaborate to provide “green steel,” the company expects to reduce its carbon emissions by one-third. By 2030, Kia plans to incorporate recycled plastics in 20% of the plastic parts used in its vehicles. (Kia Slovakia a.s., 2023)

Volkswagen also communicates its sustainability efforts through annual reports. The company is committed to complying with all applicable legislative standards and regulations to protect the environment and provides transparent information on its sustainability activities. By 2025, Volkswagen aims to make its cars 45% greener than they were in 2010 and reduce its environmental impact by 59% in five key indicators (water consumption, CO2 emission, VOC production, waste production and energy consumption). By 2023, Volkswagen had already achieved a 67.5% reduction in its overall ecological burden compared to 2010, with improvements in energy use (60.38%), water consumption (65.64%), CO2 emissions (82.55%), volatile organic compounds (VOCs) (46.59%), and waste (72.38%). This progress allowed the company to surpass its set targets. By 2050,

Volkswagen plans to produce vehicles with minimal negative environmental impact and achieve carbon neutrality. (Volkswagen Slovakia a.s., 2023)

For Stellantis and Jaguar Land Rover, it was not possible to obtain annual reports specifically related to the Slovak subsidiaries. Therefore, information from the annual reports of the parent companies was utilized. However, all brands provide at least some information on their sustainability activities on their websites. The following table (Table 3) summarizes the key factors within the sustainability pillar. It indicates whether each company incorporates these factors into its objectives, as presented in either its annual reports or on its website.

Table 3. The Presence of key environmental sustainability factors in annual reports and websites.

	Kia Slovakia a.s.	Volkswagen Slovakia a.s.	Stellantis Slovakia, s.r.o.	Jaguar Land Rover Slovakia, s.r.o.
Reduction of emissions, waste, chemicals, and greenhouse gases	✓	✓	✓	✓
Use of renewable energy sources	✓	✓	✓	✓
Long-term partnership in sustainability, transparent communication	✓	✓	✓	✓
Circular economy and resource efficiency	✓	✓	✓	✓

Source: Kia Slovakia a.s. (2023), Volkswagen Slovakia s.s. (2023), Stellantis (2023), Jaguar Land Rover (2025)

As shown in Table 3, all organizations address these key areas within the environmental pillar of their production processes, aiming to reduce their environmental impact while contributing to green transportation. However, some automotive plants face challenges in meeting specific standards, particularly concerning CO2 emissions. This leads to financial implications for the organization, such as fines, and necessitates innovation, technological changes, and adjustments to the production system. Most companies focus on reducing emissions by increasing the production of electric vehicles rather than traditional combustion engine vehicles. The rapid adaptation to these conditions provides companies with a significant competitive advantage. Table 4 presents the CO2 emissions from producing various car types at four car plants in Slovakia.

Table 4. CO2 Emissions of Passenger Cars (g CO2/km)

Year	Kia	Volkswagen	Stellantis			Jaguar Land Rover
			Opel	Peugeot	Citroën	
2019	124	124	124	106	110	173
2020	121	121	119	106	108	180
2021	108	98	111	99	105	162
2022	60	146	96	22	108	167
2023	55	133	88	40	93	146
2024	54	115	74	35	80	140
2025	50	107	69	32	74	127

Source: Statista (2025)

As shown in Table 4, Volkswagen and Jaguar Land Rover have failed to meet the target figure set by European Union legislation to reduce emissions to 95 g CO2/km by 2024, resulting in substantial fines from the European Union and a negative impact on the companies' financial indicators. From 2025 to 2029, emissions are expected to be reduced to 93.6 g CO2/km and even to 49.5 g CO2/km from 2030 to 2034. (European Commission, 2025) Volkswagen's plan to reach 93 g CO2/km is only for 2027, whereas Jaguar Land Rover's predicted figures for 2029 remain at 102 g CO2/km. (Statista, 2025) Consequently, from 2035 onwards, there will be a ban on the sale of new cars with internal combustion engines, which has compelled many companies in the automotive industry to modify their production methods and prioritize the production of electric vehicles.

In terms of fuel, in 2019, Kia produced almost 80% of gasoline-fueled cars, 5.62% of cars were electric, and the total number of cars with alternative or hybrid power was approximately 3%. In 2024, the share of electric cars was already almost 14%, and for 2029, the company plans to produce gasoline-fueled cars at 52.65% and

electric cars at 39.44%. In 2019, Volkswagen primarily produced cars fueled by gasoline (60.42%) and diesel (36.7%), with electric cars accounting for just 1.77% of the total that year. In 2024, the share of cars fueled by gasoline (75.91%) and diesel (5.85%) decreased, while the share of electric cars increased to 15.2%. In 2029, the company plans to increase the share of electric cars to 33.01%. In 2019, Jaguar Land Rover primarily produced cars fueled by diesel (76.52%) and gasoline (18.92%), with electric cars accounting for 0.03%. In 2024, the share of diesel cars changed to 67.45%, and the share of electric cars increased to 10.79%. The prediction for 2029 is that the share of electric cars will reach 47.42% while the share of diesel-using cars will decrease to 36.85%. Stellantis in Trnava produces three car brands: Opel, Peugeot, and Citroën. In 2019, the Opel brand had 77% of cars burning gasoline, while electric cars accounted for just over 1%. By 2024, the share of electric cars had already increased to almost 35%, and gasoline cars made up just over 51%. The prediction for 2029 is that electric cars will account for 51.68% of production. The Peugeot brand primarily produced gasoline (60.28%) and diesel (38.9%) fueled cars in 2019; the share of electric hybrid and alternative fuel cars together was under 1%. In 2024, the share of electric cars was already higher (46.29%), while gasoline (32.87%) and diesel (18.68%) cars declined. In 2019, the share of electric cars is projected to increase to 58.02%. The Citroën brand primarily produced cars burning gasoline (62.81%) and diesel (33.66%) in 2019. In 2024, the share of electric cars is expected to increase to 19.33%, and by 2029, it is projected to reach 55.14%. This year, the share of diesel-burning cars is planned to decrease to 10.92%, and gasoline-burning cars are expected to account for 30.4%. (Statista, 2025)

The automotive industry and road transport have a significant impact on environmental degradation. As a result, companies operating in this market are adapting to evolving legislative standards and emerging trends. The comparison highlights that Stellantis and Kia are currently ahead of their competitors in terms of meeting sustainability goals and reducing environmental impact. Companies thus gain a significant competitive advantage and market position. It shows that all companies view the future in electromobility and alternative energy sources, actively working to increase the share of electric vehicles over combustion-engine cars.

4.2.3 Social pillar

The social pillar assesses key aspects, including working conditions, equal opportunities, and support for education and community development. Table 5 below outlines the main factors within the social pillar of sustainability and how each organization addresses them.

Table 5. Comparison of key indicators in the social pillar

The average wage of production employees	2408	2688	-	1936
Share of women	13%	-	-	35%
Education	✓	✓	✓	✓
Promoting diversity	✓	✓	✓	✓
Community support, foundation	✓	✓	✓	✓

Source: own

Kia and Volkswagen disclose information about their activities in the Slovak market through their annual reports. Given the ongoing labor shortage in Slovakia, these companies must support existing employees, enhance job satisfaction, and reduce turnover. Additionally, they aim to increase job attractiveness and support educational and talent development programs to create opportunities for potential employees. The relevant data were obtained from annual reports, company websites, and social media platforms supplemented by statistics and press releases.

Kia's annual report provides detailed insights, including the number of employees, the proportion of women, and the average salary per position. The company actively supports employees, education, and community development. (Kia Slovakia a.s., 2023) Volkswagen, the largest employer among the companies compared,

offers the highest salaries based on available data. While the proportion of women in its workforce was not explicitly stated, the company emphasizes its commitment to promoting women's employment in the automotive industry and fostering an inclusive and diverse work environment. (Volkswagen Slovakia a.s., 2023) Companies take a proactive approach to addressing social issues.

Stellantis employs nearly 4,000 people. However, information on average salaries and gender distribution was unavailable. (Stellantis Slovakia, 2025) Jaguar Land Rover employs 4,400 employees. Among the organizations compared, Jaguar Land Rover offers the lowest average salary but has the highest proportion of female employees. (TASR, 2024)

All companies are also involved in supporting Slovak educational institutions. Kia and Volkswagen have long-standing collaborations with these institutions, actively support academic initiatives, and promote sustainable mobility and green transportation by offering a bike-sharing service to the public. Furthermore, all organizations contribute to community development through various grant programs and foundations.

One of the key indicators in the social pillar is employee access and satisfaction. According to a recent employer survey, Volkswagen ranked second in the automotive sector. Employees cited benefits such as transportation reimbursement, holiday allowances, and childbirth allowances. Additionally, Volkswagen provides childcare support for children up to four years old in private facilities, access to children's camps, operational leasing options, free education, premium healthcare services, extended leave, and other employee benefits. The company is a signatory of the Diversity Charter, advocating for workplace inclusion and diversity. It actively combats discrimination and fosters a safe working environment as part of the Equality Initiative. Moreover, Volkswagen's ExperKA project encourages young women to pursue careers in technical fields. (Najzamestnávateľ.sk, 2025)

Jaguar Land Rover ranked fourth in the same survey. Employees highlighted benefits such as holiday allowances, free training, premium healthcare, and rewards for life milestones. Other incentives include weekend access to iconic company vehicles and unlimited use of an in-house health and fitness center. The company has also established employee support programs, including grants, assistance for adverse life situations, and health promotion initiatives. (Najzamestnávateľ.sk, 2025)

Kia ranked sixteenth in the survey. Employees cited discounts on company products and services, premium healthcare, and free professional education as key benefits. The company provides a lump-sum employee bonus, a cafeteria system offering an annual allowance of €150 for purchases, and gifts for significant life events. Kia is also engaged in volunteer activities, supports local communities, and collaborates with the city of Žilina. Employees have access to health consultations at a rehabilitation center, as well as personal and legal advisory services. Stellantis was not ranked among the top 18 employers in Slovakia. (Najzamestnávateľ.sk, 2025)

5. Discussion

In recent years, sustainability has become a significant aspect of both everyday life and business practices, taking root across various fields. Its principles have been increasingly incorporated across diverse sectors, including sports organizations, educational institutions, manufacturing companies, and industry. Sustainability and the push for green transportation are gaining momentum across industries, particularly in the automotive sector. However, there is pressure on companies to implement sustainability. Still, they have not been provided with guidance on how to concretely integrate the different elements and what the effect on their business will be.

The study's results highlighted differences in the approach and implementation of sustainability within the automotive industry's organizations. While all the companies studied incorporate sustainability into their management strategies and comply with relevant legislative standards, only two dedicate a significant portion of their annual reports to sustainability. All companies also communicate their activities or objectives to their stakeholder groups on their websites. This finding aligns with the previous study and confirms the importance of sustainability reporting in the automotive industry with defined methods and frameworks for such reporting.

(Kamińska-Witkowska & Kaźmierczak, 2024) It is recommended that organizations report their sustainable activities and goals on an annual basis. Such reporting should be transparent and clearly structured, including challenges associated with the sustainability implementation. This approach improves stakeholder relationships and can attract potential partners and investors. The necessity of sustainability reporting, along with its positive effects and the lack of standardized practices, aligns with previous study. (Varmus et al., 2023) Additionally, companies may improve their ESG rating and strengthen their brand position, through consistent and credible reporting. According to the ESG Rating, a higher risk can lead to a negative reputational impact or regulatory penalties, resulting in additional financial losses. Conversely, organizations with lower risk tend to invest in sustainable practices, which can reduce costs and improve their reputation.

Economically, the comparison between financial performance and stability revealed that the implementation of sustainability affects financial results. However, companies that adapt quickly to sustainability trends tend to achieve higher and more stable profits. This finding underscores the financial benefits of sustainability adaptation. Increased investment in development and innovation is what can accelerate and support adaptation. The research identified gaps in the reporting of financial indicators related to both, direct and indirect investments in sustainability, as well as in reporting the impacts of sustainability implementation on the financial stability of the businesses. Companies should aim to improve transparency in this area and inform stakeholders about their economic situation and investment capacity. Tóth et al. (2022) found that companies often avoid reporting penalties and negative impacts associated with sustainability implementation, a finding that is also confirmed by this study. Based on the results, it is possible to confirm the positive impact of sustainability implementation on financial performance. Therefore, it is recommended that companies increase their investment in innovation, research, and sustainability, as leveraging these trends has a demonstrable effect on return on investment. It is equally important not to avoid communicating negative financial impacts, as doing so helps to build trust with stakeholders, fosters a positive corporate image, and encourages continuous improvement. It aligns with the study of Vijaya et al. (2024) which highlights the need for investments in innovation and green technologies that comply with environmental regulations and thus allow to satisfy the demand for sustainable products.

In the environmental pillar, key issues include reducing emissions, waste chemicals, and greenhouse gases, as well as promoting the circular economy, and utilizing renewable resources. In the context of scandals automotive industry, particularly concerning CO₂ emissions, has highlighted the importance of long-term relationships with sustainability partners and transparent communication. However, this aspect may also fall under the social pillar. The data indicates that all companies incorporate elements of environmental sustainability and strive to mitigate the negative environmental impact of their operations while also promoting green transportation practices. However, the two companies fail to meet the required standards set by legislation. It is also possible to demonstrate a correlation between the implementation of sustainability and financial indicators. It is recommended that companies continue advancing efforts to meet the targets set within the environmental pillar of sustainability. The finding supports the previous recommendation related to the economic pillar, particularly the need to increase investment in sustainability. By following this guidance, companies can achieve the mandated targets and standards, avoid potential penalties, and simultaneously contribute to green transportation, environmental improvement, and broader societal goals.

On the social pillar, secondary data from the “Najzamestnávateľ.sk” best employer survey showed that Volkswagen ranked highest. All companies studied aim to provide suitable working conditions, promote diversity and inclusion, support employee education, and foster the health of their employees. They also support and encourage young people to pursue careers in the technical field, and each of the organizations has established a foundation for supporting community development. However, employees generally rate company activities positively in areas such as diversity, inclusion, and employee support, with pay being a key factor in satisfaction. It is recommended that companies prioritize market research in sustainability and engage in active, transparent communication with stakeholders. This approach enables businesses to better understand market trends, stakeholder expectations, and emerging opportunities, thereby supporting strategic decision-making and long-term value creation.

Previous research has noted that the environmental and social pillars are not the primary focus of attention for company managers and are often not included in reports and disclosures. Furthermore, as profits decline in profits, companies' willingness to engage in social and environmental issues may also diminish. (Doktoralina et al., 2018) In contrast, this research confirmed shortcomings in reporting sustainability elements in the automotive industry; however, companies that are currently failing to increase profits are actively addressing the social and ecological pillars of sustainability.

Conclusions

This study's aim is to identify gaps in the implementation of sustainability in the automotive industry and to provide recommendations for the effective integration of sustainability and the promotion of green transportation. This study reveals opportunities to optimize sustainability implementation, provides recommendations for companies that have not yet adopted sustainability practices, and offers guidance for effective implementation.

The research confirmed that individual automotive companies are integrating sustainability into their practices. It also highlighted gaps in communication and transparency of information, with companies failing to report on sustainability activities or concealing essential indicators. Therefore, the recommendation for companies is to focus on addressing these gaps. Sustainability should be embedded within the company's strategy, with specific, measurable objectives set. It is also essential to keep stakeholders informed through comprehensive annual reports.

Regarding the economic and environmental pillars, the recommendation is to leverage innovations and available technologies, and to invest in development and rapid adaptation to emerging trends, as these measures have a positive impact on the company's financial performance. It has been proven that companies that adapt more quickly to new trends and technologies achieve higher profits and financial stability than companies that are unable to adapt their production to new requirements. In the social pillar, it is crucial to focus on the needs and satisfaction of employees and the community. Employees particularly value initiatives addressing company-wide issues such as diversity, inclusion, and non-financial benefits. The study reveals that social pillar issues are important and a priority even for companies that do not achieve higher economic results.

The research confirmed the significant impact of sustainability on organizational performance in each pillar. However, it also identified gaps in the implementation of sustainability, based on which recommendations for improvement have been provided. By implementing these recommendations organizations can enhance their sustainable management practices and ensure long-term stability.

A limitation of the research was the lack of information obtained from available sources. Nevertheless, the research identified gaps and key areas where recommendations were made. These results provide a solid foundation for future research. Future research should focus on exploring the issue in greater depth, possibly by using qualitative data from interviews with managers.

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