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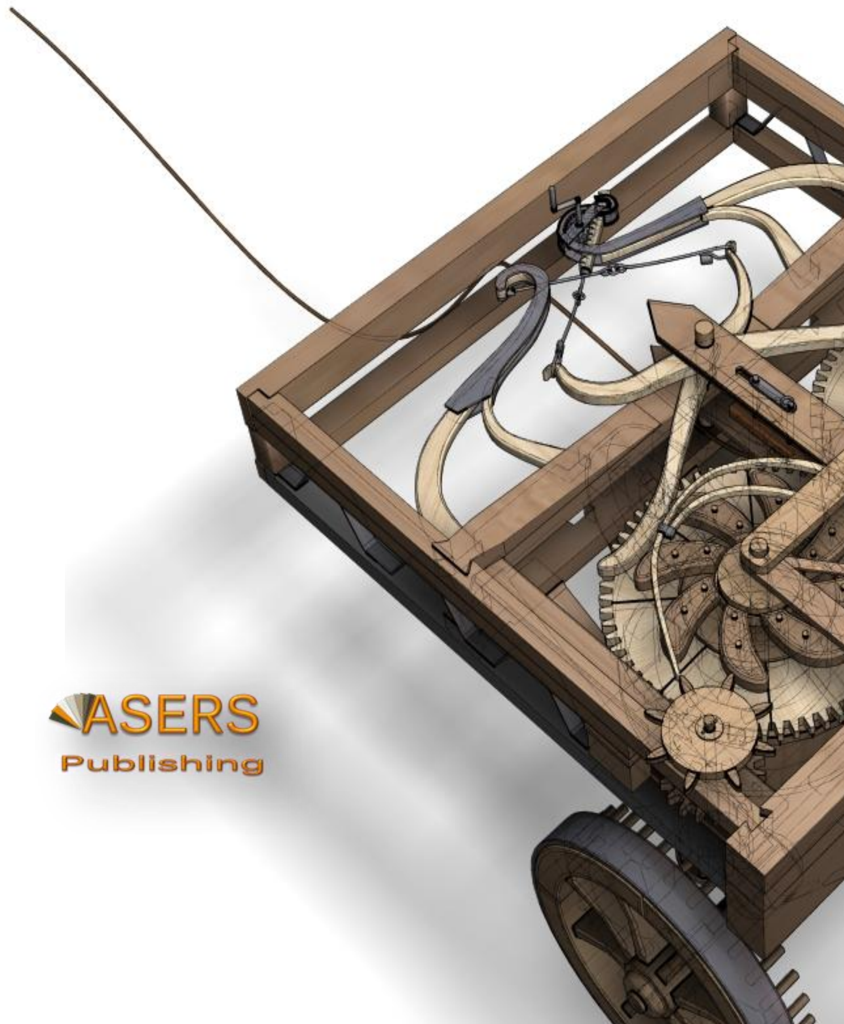

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Environmental Challenges and Innovations in the Asia-Europe Rail Transport Corridors in the Context of the ESG Concept

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Abstract: The aim of the publication is to assess the significance of contemporary environmental challenges that shape strategies and expectations towards long-distance rail freight transport, as well as to present solutions aimed at reducing the environmental pressure of this mode of transport.

The proposed objective and the subject of the analysis indicate that the basic research method used for the purposes of this article should be a literature review, including primarily documents that define objectives in the field of environmental protection and confrontation with programs and projects implemented in railway companies involved in the organization of long-distance rail transport on the Asia-Europe-Asia routes. The study is based on selected, detailed case studies. A marketing concept for sustainable transport development is also presented.

It has been shown that innovative technologies and growing consumers' environmental demands are increasingly responsible for the development of the modern economy. New technologies and solutions not only become part of the attractiveness and competitiveness of transport logistics chains, but also contribute to reducing their environmental impact, thanks to application of the concept of sustainable marketing.

The subject of rail freight traffic between Asia and Europe is analyzed in the paper in the specific context of the ESG concept, with a valuable contribution of the unique materials of various railway entities, including the Organization for Co-Operation between Railways, illustrating state-of-the-art environmental solutions in Eurasian transport corridors.

Keywords: eco-innovation; rail transport; transport corridors; sustainable development.

JEL Classification: L92; M31; Q56.

Introduction

Modern transport and logistics industry is undergoing dynamic changes due to the continuous development of new information and digital technologies. On the one hand, this transformation is based on the use of advanced technologies intended to fundamentally change the ways and methods of managing operational activities and customer service, and on the other hand, it is based on adjusting to changing expectations, requirements and regulations (Pieriegud 2016, 12). In this context, worldwide trends are becoming one of the key drivers of development. These trends are global in their scale, shaping the development strategies of companies, economic sectors, entire countries and international organizations. In the case of transportation as part of global supply chains, one of the key challenges is climate and environmental policy, which is reflected in the ESG concept.

The ESG (Environmental, Social, and Governance) concept provides organizations with a framework to assess the sustainability of their operations and evaluate their impact on the planet, people, societies and profits. The ESG environmental aspect is focused on reducing the negative impact of production and other activities on the environment. This includes reducing energy consumption, waste management, greenhouse gas emissions and related practices. Companies must openly report their environmental practices to maintain transparency and prove their compliance with ESG standards. The transportation sector is a significant polluter, but at the same time it provides services to other sectors of the economy. Therefore it must both increase its efficiency and reduce its impact on the environment. Sustainability is becoming the main feature of transport development in terms of environmental friendliness, which means minimizing negative impact on the environment, as well as preventing and eliminating the effects of transport-related environmental hazards (Pawłowska 2013, 205). This is also reflected in society's expectations of marketing activities.

The aim of this paper is to assess the significance of contemporary environmental challenges that affect strategies and expectations for long-distance rail freight transport, as well as to present solutions aimed at reducing the environmental impact of this mode of transport. What makes this research novel and important is its holistic approach to solving the heterogenous challenges of Eurasian rail traffic. Especially noteworthy is integrating environmental issues directly with practical technical and operational strategies implemented in various Eurasian countries. By identifying how innovation can help overcome continental-scale obstacles, this work contributes meaningfully not only to railway transport expertise but also to the broader, urgent objectives of sustainable development, economic cohesion and climate action across continents.

1. Research Background

When it comes to environmental trends in the rail freight market, it must be noted that he European Union's transport policy has long emphasized the need to transfer as much long-distance freight as possible to rail. Postulates on this matter can be found in a number of documents related to transportation development, including the European Union Strategy for Sustainable Development, which is detailed in the White Paper "European Transport Policy for 2010: Time to Decide"[1] (European Commission 2001), in the White Paper "Roadmap to a Single European Transport Area – Towards a Competitive and Resource-Efficient Transport System" (European Commission 2011), as well as the latest Sustainable and Smart Mobility Strategy (European Commission 2020) and the "Fit for 55" package that implement the latest proposals of the European Green Deal of 2020. All of the documents mentioned emphasize the necessity of reconciling the growing demand for transportation services with the decreasing availability of resources and environmental restrictions. They point to the necessity of changes in the sectoral distribution, limiting the level of external costs and the dominance of road transport, counteracting congestion and reducing the negative pressure of the sector on the environment and public health. An integral part of this is also the demand for a significant increase in the share of rail transport in the transport market, specifically for freight traffic that involves routes exceeding 300 km. When analyzing international climate policy issues in a broader context, it can be seen that the European Union, which aspires to be a leader in the global fight against climate change, is simultaneously implementing its own and external commitments that result, among other things, from the ratification of the Paris Agreement (United Nations 2015)[2]. The document, which will operationalize the provisions of the Kyoto Protocol[3], is considered to be "the first-ever universal, legally binding climate agreement" (Czepiel 2021). The aforementioned documents include tools for implementing a global environmental policy, such as increasing the use of renewable energy sources, eliminating tax incentives in greenhouse gas-emitting sectors, and, in the case of transport, the need for measures to reduce greenhouse gas emissions and the need to develop low-carbon means of transport while reducing road traffic. Table 1 shows an example of the proposed changes in European transportation.

[1] Both the document issued by the European Commission following the June 2001 summit and the immediately preceding White Paper of 2001 set a new direction for the Community's transport policy, resulting in numerous program documents and executive acts adopted by the Member States.

[2] Almost 190 countries have signed the Paris Agreement. It was ratified in 2016 with the participation of 55 countries that generate 55% of global greenhouse gas emissions.

[3] The Kyoto Protocol to the United Nations Framework Convention on Climate Change (2008) is a document from 1997 that was finally ratified and entered into force in 2005. It is considered one of the main international agreements in which the task of improving the quality of the environment and combating climate change is defined in a concrete, unambiguous and effective way. Thus, this protocol lays the foundation for the contemporary way of thinking about reducing carbon dioxide emissions as the main cause of global warming.

Table 1. Schedule of planned changes in European transportation

Task	Time frame
– 30 million emission-free passenger cars and 80 million emission-free trucks, – 100 climate-neutral cities, – climate-neutral travel using public transportation for distances up to 500 km, – doubling of long-distance and freight rail traffic, – equalization of competitive conditions for road, rail and inland waterway transport, – full digitization of information in logistics chains, – significant share of automation in transport operations, – full availability of integrated ticketing systems, – providing access to the basic elements of the Trans-European Transport Network (TEN-T), – introducing emission-free maritime vessels,	overall by 2030
– market launch of emission-free airplanes,	2035
– emission-free cars, delivery vans and buses, – new emission-free trucks, – doubling of rail freight traffic, tripling of high-speed rail traffic, – 50% increase in inland waterway and short-sea shipping, – linking transportation charges and external costs, – providing access to the complete Trans-European Transport Network (TEN-T).	overall by 2050

Source: Zych-Lewandowska *et al.* (2021, 15).

Regarding the subject of this analysis, it is worth noting that the Paris Agreement is based on international cooperation, which focuses on the joint implementation of agreed environmental goals through the support of richer countries for developing countries. In terms of transport, this means cooperation in organizing low-carbon logistics chains and coordinating solutions to ensure maximum efficiency – not only in individual countries, but also along the existing transport corridors. The European Green Deal prioritizes research, development and innovation, as well as other aspects, such as the circular economy, zero pollution and sustainable transportation (cf. *e.g.* Piotrowski 2021). Table 2 shows the environmental challenges associated with the circular economy. In 2019, transportation accounted for approximately 25% of greenhouse gas emissions in the EU, with road transportation being responsible for more than 70% of these emissions and air travel for almost 15%. In Poland, the share of transport emissions in the entire economy was lower and amounted to 17%, including over 92% for road transport and almost 5% for air transport[4].

Table 2. Environmental challenges for a modern circular economy

Today Inefficient production and unreasonable consumption	10-30-year perspective Resources demand increase, mining development	After 2040 Danger for the ecosystems, the future generations
• 35% of the materials that circulate in the economy are used for the manufacturing of short-term consumption products • current pace of the resource mining and processing causes loss of 90% of the biodiversity and 50% of the increase of greenhouse gases • 1/3 of all food products become garbage • 460 $ bn/year – the value of clothes thrown out despite of its usability retained • 8,9% only of the materials are recycled.	• 75% of the infrastructure to be developed by 2050 does not yet exist • a two-fold increase of the resources mining and usage thereof in the period from 2017 to 2050 • a five-fold increase of the middle class in the ATR area by 2030, total 5,6 bn of the middle class representative in the world • 68% of the world population live in the towns by 2050 • 43 metropolises with population of 10 mil people by 2030.	• resources shortage at the planet for the well-being of 9,9 bn world population (2050), the rundown of the resources being vital for production, • the 1,9-3.0 C° increase of global temperature by 2030-2060 will cause mass scale natural disasters, • 70% increase of waste volume by 2050 – devastating for human health and climate.

Source: Kudryavtseva 2022.

[4] Transport was the second most polluting sector of the Polish economy (see Maj, Miniszewski and Rabiega 2022, 6). According to Lewandowska's assessment (cf. Ołdak 2021), taking into account air pollution, climate change and noise, rail freight traffic generates annual costs of around PLN 0.35 billion. This means that it is 75 times less harmful than freight transport by road.

In this context, it has to be noted that the implementation of ESG strategies in transportation and logistics can bring benefits not only to the environment and society, but also to the business sector. These benefits may include (cf. Miziński 2024): an increase in operational efficiency and cost reduction; improvement of reputation and customer loyalty; increase in innovativeness and competitiveness; easier access to financing and support from public and private institutions.

2. Research Methodology

The proposed objective and subject of the analysis indicate that the basic method of research carried out for the purposes of this paper should be a review of the literature, primarily documents that define environmental protection objectives, as well as a comparison of these objectives with the programs and projects implemented in railway companies involved in the organization of long-distance rail transport on the Asia-Europe-Asia routes. The study, based on selected, thoroughly analyzed examples, makes it possible to examine the practical implementation of environmental requirements addressed to the rail transport sector and to assess the extent to which trends and results of activities followed in European policy are also reflected outside its borders. Because of the broad geographical scope, the analysis of source materials comprises international documents that represent obligations undertaken at the trans-European and global level, including materials from the United Nations Economic Commission for Europe (UNECE), Organization for Co-Operation between Railways (OSJD) and International Union of Railways (UIC). In this respect, the suggested approach to the relationship between transport policy and environmental policy has a practical dimension. Based on a specific sectoral example, this makes it possible to identify the dependencies and differences between the measures implemented in the European Union and in other countries. Also, since intermodal[5] transport dominates rail traffic in the Eurasian area, a synthetic marketing concept for this type of transport will be outlined.

3. Environmental Measures in Eurasian Transport Corridors

One way to meet general environmental demands is to transfer long-distance freight transportation to rail transport via international transport corridors[6]. on a global scale, there are hardly any routes where they can compete with sea or air transportation. Environmental pressure as well as the digitalization of transport operations are becoming key challenges for the transformation of rail transportation in Eastern European and Asian countries. This is because the situation is different in non-EU countries. Most of them pursue their own innovation and environmental policies, coordinating them through bilateral cooperation. To illustrate this phenomenon, it is worth looking at a few specific examples implemented in the countries involved in the so-called New Silk Road (Jakóbowski, Popławski and Kaczmarski 2018; see also Figure 1). The first few of them involve the starting point of the New Silk Road, which is China. China is a country that until recently built its economic power on the intensive exploitation of environmental resources and that is now paying increasing attention to the limitations in this area. In the 21st century, the issue of environmental protection is clearly increasing in importance. Regulations, standards and guidelines in this area are becoming more restrictive, and there is also growing pressure to increase environmental management requirements in both infrastructure investments and the organization and operation of the transportation system. The combination of trends that determine the development of long-distance rail freight traffic on the one hand, and the expected gradual increase in the competitiveness of this form of transport, on the other hand, results in the need for technological development and innovation aimed at reducing the environmental impact of this sector (see OSJD 2025a). In the individual countries involved in economic exchange, it has a different nature and advancement level.

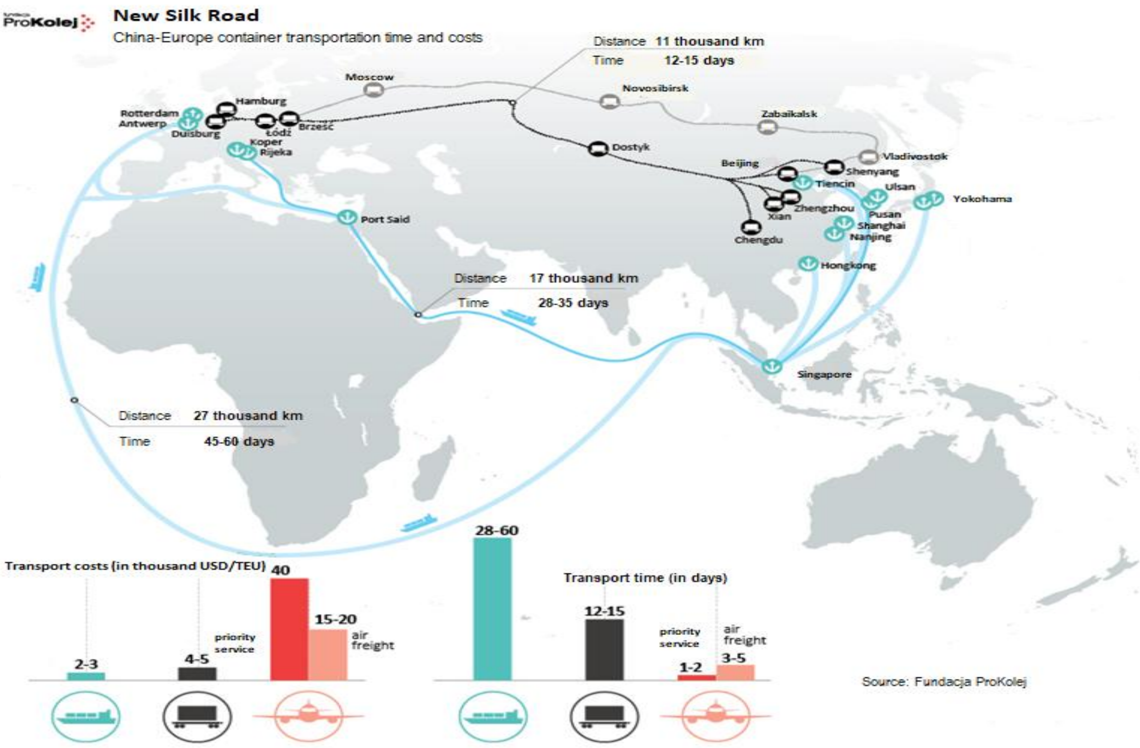
The importance of the individual railway systems in Eurasian traffic is illustrated in Figure 2. Environmental solutions cover the entire transportation system, from new power technologies, such as hydrogen fuel cell engines, to new rolling stock designs and innovations in infrastructure construction. The modernization of infrastructure and rolling stock in Eurasian transport corridors, and especially purchasing new vehicles, are increasingly subject to environmental criteria. The Organization for Co-Operation between Railways (OSJD) is a valuable source of information on initiatives in this area (see eg. relevant articles in the *OSJD Bulletin* Nos.

[5] In 2024, rail freight traffic from China to Europe reached over 330,000 TEUs and increased by over 131% compared to 2023, of which traffic from China to Poland reached over 192,000 TEUs (see Stefaniak 2025 and European Rail Alliance data).

[6] An international corridor is part of a national or international transport system which is used to transfer sufficient passenger and freight flows between geographical regions. It includes the infrastructure facilities and means of transport of all transportation modes presented in this corridor, as well as all technical, organizational and legal conditions for the implementation of this transportation (Engelhardt 2018, 85).

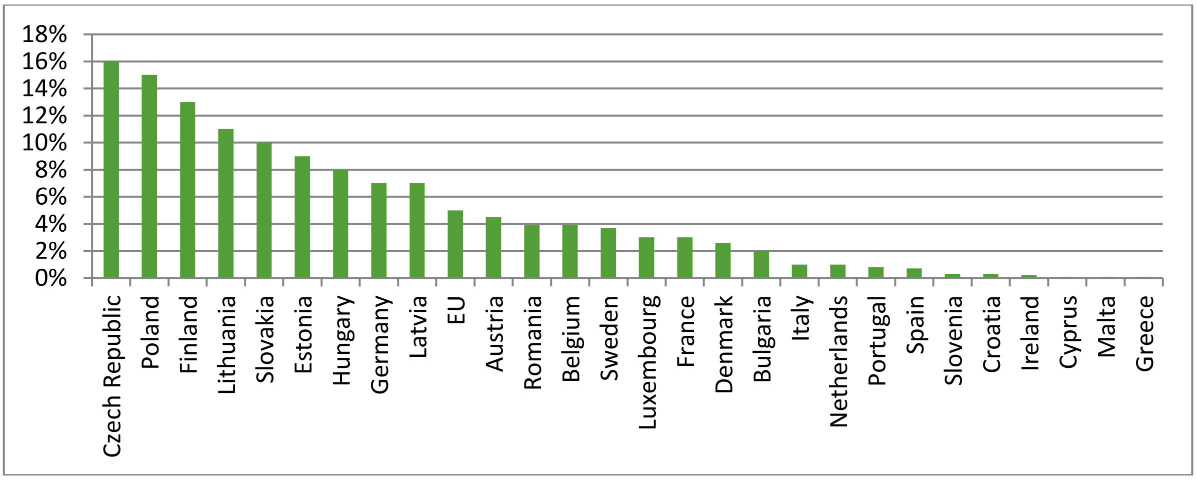
5/2022 and 1/2025). OJSD member companies are paying increasing attention to this issue in their development and investment strategies in Eurasian transport corridors.

Figure 1. New Silk Road – China-Europe container transportation time and costs



Source: ProKolej Foundation 2020.

Figure 2. Railway share in the import volume from China to the EU-countries



Source: Piechociński 2022.

Examples of such measures, which are not always well-known in Europe, include selected initiatives undertaken by *e.g.* the Chinese and Azerbaijani railways that operate on the Silk Road Railway, which are briefly described in the further part of the study.

3.1. Case Studies: China

For more than a decade, the Chinese railways have been paying special attention to environmental standards and are increasingly taking into account the impact of investment and transport activities on the environment (CRRC 2024, OSJD 2025a). On a corporate level, this is achieved by such solutions as an environmental management system based on advanced management methods – including environmental management of railway construction projects, environmentally friendly technologies and techniques in railway construction, as well as intelligent environmental information management systems (Zhang 2022). The design and construction of railway lines are based on external legal acts defining standards and rules, as well as on internal regulations. Several solutions are also provided by technology – including innovations used to reduce and eliminate negative phenomena resulting from railway operations and infrastructure investments. The most interesting solutions that combine operational needs with environmental requirements include a line construction system based on LVT[7] (ballastless track), ecological sleepers[8] and the use of photocatalytic concrete[9] in engineering structures. In terms of geographical location, in turn, examples of environmental projects can be provided that relate to particularly valuable natural areas. These examples will be discussed below.

3.1.1. Whooper Swan Protection Project

The first example of an investment that respects particularly sensitive ecosystems is the road and rail bridge over the Yellow River. It was built in Jiangxi Province, in the autonomous region of Inner Mongolia, to serve the Haolebaoji-Ji'an connection. The railway line crosses the Yellow River National Wildlife Refuge and passes just 470 meters from Lake Tsanglong. It is one of the main habitats of rare water birds, mainly whooper swans. According to classifications, this species is categorized as a second-class protected animal. To reduce the impact of noise and light on whooper swans, flexible ballast seals are used in the operation of the bridge, which reduces the noise level of passing trains by 2-3 decibels. In addition, a 2.5-meter-high light barrier has been installed on both sides of the bridge to block the train headlights in the habitat area (Zhang 2022). An evaluation of both solutions shows that despite the commissioning of the investment, the number of swans on both sides of the bridge has remained at the same level as in previous years, and their habitat has not been degraded.

3.1.2. Crested Ibis Protection Project

Another example of a solution aimed at protecting birds is the Xi'an-Chengdu railway line, which crosses the national nature reserve of the crested ibis in Shaanxi Province, near the city of Hanzhong. In order to protect the animals from the negative impact of rail traffic, detailed studies and simulations were carried out before the investment was implemented, aimed at selecting solutions to protect the numerous colonies of rare birds in this area. As a result, a 4-meter-high safety net and reflective warning elements were installed on both sides of the line (Wangshu 2017). Here, too, the effectiveness of the solution was confirmed by monitoring after the line was put into operation, as no collisions between protected birds and trains were recorded during operation, and thus train traffic did not affect the habitat of the ibis population.

3.1.3. Giant Panda Protection Project

The Chengdu-Lanzhou railway is a third example of a railway investment in an environmentally sensitive area. One section of the line crosses the Qianfo mountain range. This area is part of the Baodingou nature reserve and is home to many rare species, including the giant panda[10]. The railroad route uses a long tunnel with a reduced level on this section. Due to the fact that the entrances to the facility are at 1,100 and 1,800 meters above sea level, respectively, the railroad infrastructure does not interfere with the higher parts of the mountains, which are subject to protection. Therefore, it does not pose a threat to giant pandas, which feed in bamboo communities at an altitude of over 2,000 meters above sea level. Scientific research and monitoring of the panda population confirm the effectiveness of the solution adopted already at the design stage of the new railway line. The measures taken to avoid the habitats during both the construction and operation of the connection minimized the impact on the panda population (Wan 2022, Xinhua 2021).

3.1.4. Bird Paradise Protection Project

Bird Paradise is a small island with a bird colony in Jiangmen, Guangdong Province. The central point of the island is a 300-year-old tree on the banks of the Tianm River, which is home to around 96 species of heron, with a total population of over 30,000 birds. It is also one of the most famous bird watching spots in China. The Shenzhen-Maoming railway line was built just 300 meters from this spot. To reduce the impact of train noise on

[7] The LVT surface consists of concrete reinforced elements placed on elastic pads, covered with rubber sheaths and set on a concrete subgrade. This design dampens vibrations and thus reduces noise and environmental impact.

[8] Green sleepers are modern, recyclable composite sleepers made of technical sulfur. Their carbon footprint is 40% lower compared to the production of classic concrete sleepers, and their service life amounts to 40-50 years.

[9] Photocatalytic concrete owes its properties to the use of cement containing titanium dioxide particles, which initiate reactions with oxygen molecules through UV absorption. It is also used to reduce noise.

[10] Currently, there are 42 wild giant pandas living in the reserve.

the birds, the world's first fully enclosed high-speed rail sound barrier with a height of 2,036 meters was installed. To protect birds from the train headlights, 5-meter-long shading panels were installed at both ends of the noise barrier to completely block the light from night trains. More about sustainable transport measures and goals to be achieved in Chinese transportation can be found in the study by the Chinese Academy of Transportation Sciences (China Academy of Transportation Sciences 2023, 67-71).

Overall, China is trying to remodel its energy consumption in the face of significant pressure to decarbonize the country's energy- and emission-intensive industries such as transportation, steel and cement. The government is ordering more solar power to reduce emissions from the energy sector, which is the country's largest emitter of greenhouse gases due to its dependence on coal. According to forecasts (cf. *e.g.* Economist Intelligence 2023), coal consumption will peak in 2026 and then decline steadily. Even if coal power remains indispensable in the short term, it should be seen as an indicator of larger global changes in the long term.

3.2. Case Studies: Other Countries

The UN Sustainable Development Goals in the field of environmental protection are part of the development strategy of railway companies in various countries. The implementation of the environmental strategy by 2030 is intended to contribute to improving the economic efficiency, investment attractiveness and competitiveness of rail transport and to promote the railway as an environmentally and socially responsible sector (see UNECE 2021a, UNECE 2021b, UIC 2021).

3.1.5. Russian Federation

The project to protect Lake Baikal is a practical example of the use of digital technologies. In 2020, the development of the first version of the module for monitoring and controlling the environment in the natural territory of Lake Baikal during the construction and reconstruction of infrastructure facilities, the so-called Baikal-M module, was completed The purpose of the project is to protect the valuable natural ecosystems during the construction of the Baikal-Amur Mainline and the Trans-Siberian Railway (RZD OJSC 2021). The project, which is based on environmental monitoring, is highly complex and includes environmental protection and fire safety components. Everything is supervised by an informational and analytical platform that can record images and collect, process and analyze data on the state of the environment. An environmental passport is created for each construction site, containing detailed information on the situation before the investment, measurements of current parameters and possible compensation measures. The procedures for soil sampling and monitoring of the parameters of the atmosphere, water and individual ecosystem components are standardized. In 2021, in order to organize the transfer of data from the Baikal-M module to information systems, an appropriate agreement on the exchange of information in electronic form was concluded between the interested partners and the railway. In order to increase the automation of the monitoring process, two mobile stations and a pilot project for permanent environmental stations in the natural area of Lake Baikal with a function for direct transmission of measurement results to the EC ACS OPB system were put into operation in 2021 (RZD OJSC 2022).

3.1.6. Projects in Azerbaijan[11]

In the current geopolitical situation, the Trans-Caspian International Transport Route (TITR) is an alternative to long-distance rail corridors through the Russian Federation and Belarus[12]. The World Bank (World Bank 2023) sees significant opportunities for the development of this corridor by 2030 as an alternative to China-Europe rail freight transport, which was confirmed at the 2024 UN conference in Baku (cf. Antonowicz 2025, 1-7). The initiator and supporter of this route is the Azerbaijani Railways. The activities of the Azerbaijani Railways in the field of the broadly understood green energy concept are vital and significant for the entire corridor. Particular attention is paid to energy issues, including, above all, the acquisition of energy from renewable sources. Consequently, specific measures are being taken to ensure that renewable green energy is actually used. To this end, the Garadagh solar power plant project with a capacity of 230 MW has been initiated[13]. The green energy

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[11] The example is based on Shurganova 2022.

[12] The corridor was created in 2013 as part of the 2nd International Transport and Logistics Business Forum "New Silk Road" in Astana. The agreement to establish the Coordination Committee for the development of the Trans-Caspian International Transport Route was signed by Kazakhstan Temir Zholy, Azerbaijani Railways and Georgian Railways.

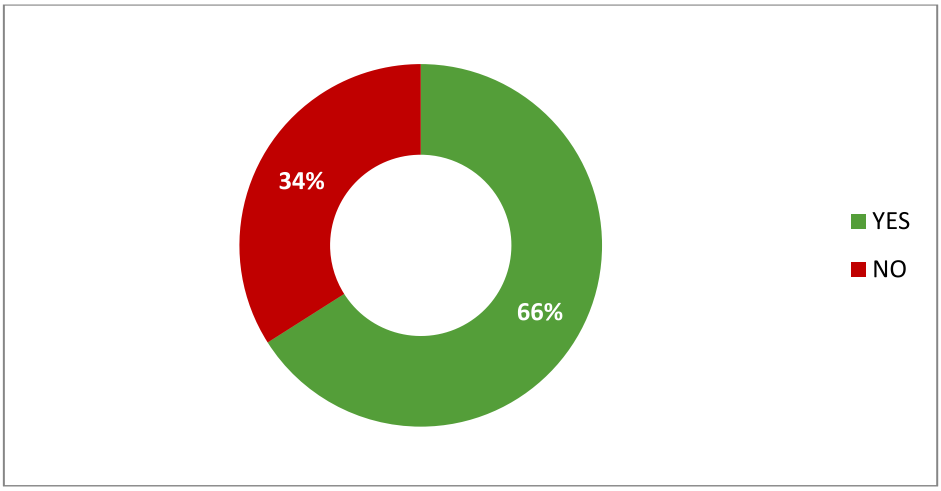
[13] For example, in 2022, the Azerbaijani Railways signed a memorandum with Masdar, a company from the United Arab Emirates, in the field of renewable energy and energy efficiency. Its aim is to explore the possibilities of using renewable energy sources (solar and wind energy) in the railway sector and to prepare a comprehensive energy efficiency program.

policy is reflected in practical measures in the railway infrastructure sector. The Republic of Azerbaijan is paving the way for a greener future by introducing renewable energies in its railway industry. The Azerbaijani Railways are working on the use of renewable energies. For the technical inspection and repair of AC locomotives to promote green energy and reduce carbon emissions, more than 650 solar panels were installed in the newly built locomotive depots in Bilajar and Ganja, which generated 79,000 kilowatt-hours of electricity and saved more than 8,000 cubic meters of natural gas. The Azerbaijani Railways take all necessary measures to avoid environmental damage during the construction of railway lines. In every new project, ESG principles are analyzed and applied in the most effective way. Since 2023, the Azerbaijani Railways have been a member of the UN Global Compact and are guided by the principles of environmental protection, social responsibility and transparent management (ESG) in their activities (OSJD 2025b, 10-11). The Azerbaijani Railways as an organization aim to attract young employees through organized events, raising their awareness of the Sustainable Development Goals in the context of Azerbaijan's socio-economic development by 2030.

4. An Outline of a Marketing Concept for Intermodal Transportation via Rail Transport Corridors

Intermodal transportation[14], due to the multitude of actors involved in the process, requires the adoption of a customer-oriented and relationship-based marketing philosophy. If, for example, we understand marketing as the process of planning and implementing ideas, pricing, distributing and promoting ideas, goods and services to create an exchange that meets the goals of an individual, company, society and the state (Kotler 2005, 8), then the idea of developing and promoting intermodal transport is undoubtedly socially significant from a marketing point of view. Marketing science has developed the concepts of green marketing or social marketing, and in the modern sense, the concept of sustainable marketing. Social marketing means applying marketing principles and techniques to influence a target audience to voluntarily adopt, reject, modify, or discontinue certain behavior for the good of individuals, groups, or society as a whole (Kotler 2005, 26). This is aimed at improving the quality of life, for example by influencing decision-makers to protect the environment. This also applies to the development of the idea of intermodal transport with the participation of railways as an environmentally friendly means of transport within the concept of ESG and sustainable development. All the more so because – as shown by research conducted on emissions in intermodal transport – when asked about taking measures to reduce emissions, the majority of the entities surveyed respond positively, as shown in Figure 3.

Figure 3. Implementation of measures to reduce emissions in intermodal transportation



Source: Jemiołek *et al.* 2022.

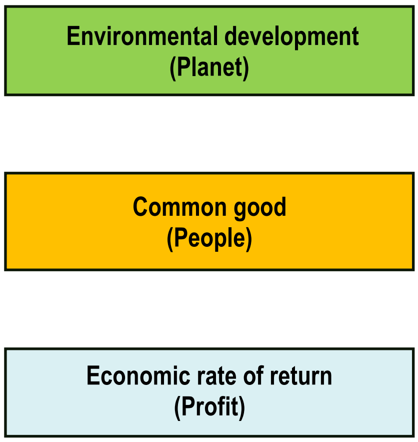
A closer look at the survey results shows that the majority of the companies surveyed are taking measures to reduce CO_2 emissions. Among this group of respondents, the most popular measure for the green transformation was increasing fuel efficiency. There was visible interest in introducing electric or hydrogen-powered vehicles to the fleet. About 14% of the respondents opted for introducing an alternative mode of transportation to their business profile. The respondents considered investments in training on how to reduce CO_2 emissions to be of great importance. Additionally, barriers to pro-emission activities in the form of a lack of

[14] Multimodal transportation carried out using an intermodal transportation unit, *e.g.* a container, piggyback trailer, swap body; transportation of goods using two or more modes of transportation in the same loading unit or road vehicle without reloading the cargo itself when changing modes of transportation. See Aspayeva *et al.* 2024, 307.

sufficient funds for pro-environmental investments should be noted. An important innovative solution was the development of the concept of road trains in the European Union (Jemiołek *et al.*2022).

The aforementioned concept of sustainable development combines innovation and economic progress with environmental protection and is reflected in consumer trends and marketing, *i.e.* the concept of sustainable marketing based on three basic pillars, which are shown in Figure 4. Most modern companies in transportation chains work in networks, relying heavily on partnerships with other companies. Networking is a feature of intermodal transportation, through which various links participate in the supply chain, which in the course of their operation add value to the service provided, acting in relation to each other as both supplier and customer. When it comes to marketing, service companies nowadays focus not only on customers but also on employees and, more broadly, on various stakeholders interested in an efficient solution to the problem of transportation and product delivery to the customer. The main stakeholder is society as a whole and its well-being reflected in the environment in which people live. Armstrong and Kotler (Armstrong and Kotler 2012, 331) point out a far-reaching understanding of the service-profit value chain. This chain links the profit-making potential of companies with employee satisfaction, customer satisfaction and society.

Figure 4. Pillars of the sustainable marketing concept



Source: Albrecht, Green and Hoffman 2024, 682.

This concept consists of five main links and is in line with the idea of creating a service in intermodal transport. These include:

- internal quality of service created by employees;
- satisfaction and productivity of service employees;
- higher value of service and value creation for the customer;
- customer satisfaction and loyalty;
- proper profit level and company growth, related to good performance of a service company thanks to the integration of activities, *e.g.* organizational or pricing, and the existence of sustainable marketing of an interactive nature.

Interactive marketing means that the quality of service largely depends on the quality of the relations and interactions between the seller, service provider and buyer during service provision. In service marketing, the quality of the service depends not only on the service provider, but also on the quality of the service delivery process itself. This is even more important in intermodal transport services, where various links are involved in the service delivery process, and their performance quality determines the quality of the final service. As part of the integration process, in which, for example, the operator takes over the organization and management of the transport process from the customer, a partnership is necessary in the creation of the service offer. The approach taken by the intermodal transport operator should therefore take the form of an active (partnership-based) attitude, involving the search for mutual and equivalent benefits. This attitude assumes that the intermodal transport operator treats the purchaser of the transport service, the recipient and the subcontractors (carriers) as customers and partners, and that integration with them brings mutual benefits and synergy effects, *e.g.* high quality of service and brand awareness. Customers are willing to choose brands that support the principles of sustainable development, and rail transport is one of the most environmentally efficient, as shown in Table 3 below.

Table 3. Share of the selected transportation sector in greenhouse gas emissions in 2022

Transport type	Share in % EU-27	Share in % in Poland
Road transport	73.19%	93.94%
Water transport	14.23%	1.22%
Air transport	11.77%	4.18%
Rail transport	0.33%	0.42%
other	0.49%	0.25%

Source: UTK 2024.

The important point about this concept is that the intermodal transport operator must treat clients, suppliers and intermediaries as partners in creating and guaranteeing value for the customer. The buyer benefits can be defined in terms of the value offered by companies and organizations to the buyer and to society. The role of marketing is to create this value, which promotes customer satisfaction and loyalty and the achievement of the service provider's desired results, *i.e.* long-term profits. Customers who understand the ESG concept make marketing an interactive form of engaging customers in social initiatives for the benefit of the environment, and marketing communication highlights the importance of the social aspect in companies' activities (Kotler *et al.* 2024). It is important to realize that the implementation of an intermodal transport service is a dynamic business process that integrates marketing and logistics processes, and therefore managing this process inevitably requires the integration of various links, forms and levels of activity, marketing and logistics instruments. As a result, a variety of values are created for the customer. These include utility values, *e.g.* purpose, location; communication values, *e.g.* information values; experience values, economic values, *e.g.* the relationship between price and the value perceived by the customer. In this process-oriented creation of basic values, the customer who uses intermodal transportation considers:

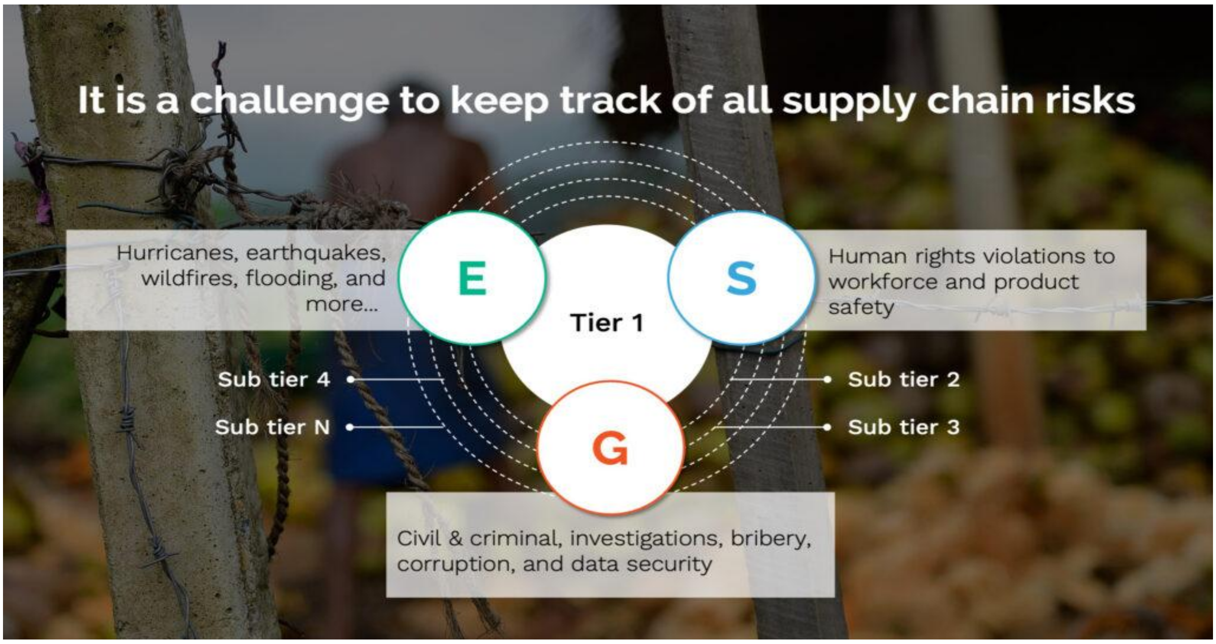
- marketing activities in terms of cost, benefits, communication, availability;
- transport and logistics activities in terms of *e.g.* customer service, the supplier's ability to respond to customer requirements, transparency of activities;
- relationships in terms of experiences resulting from contacts, experiences from interactions with a given entity, brand, service, environmental protection activities.

Hammer (cf. Bąkowski 2010, 5) confirms this reasoning and states that customer value is created by the processes that are the essence of transportation. From the economic perspective, customer value is inextricably related to price and is of a utility value (Christopher and Peck 2003, 56). Since most modern companies work in a networked manner, relying heavily on partnerships with other companies, a kind of marketing network of value creation is created (Armstrong and Kotler 2012, 95-96). In terms of sustainable marketing, the network includes the company with its employees, service providers, agents, partners, customers, and more broadly – society and other stakeholders who care about the social aspect of running a business. Managing the process of creating value for the customer by the intermodal transport operator means that the operator effectively meets the needs of the customer and other entities that constitute the value network. Value is the difference between the observed benefits that result from, for example, the properties of the service offered, such as its completeness, execution time, reliability, and the observed costs, such as the transaction costs associated with the service purchase costs (service price for the entire transportation route) or, for example, risks associated with uncertainty about the consequences of decisions made or unforeseen events during the execution of a service order. Identifying sustainability risks is a good ESG practice. Nowadays, companies are taking more responsibility than ever for their supply chains to assure stakeholders that they are applying relevant practices, thus reducing risks. See Figure 5.

Therefore, as part of an organized process and methodology of actions, it will be possible to manage this area of operation as well. The marketing concept in the value creation process in intermodal transport for the operator and the customer means that:

- when choosing a service provider, the buyer chooses the company that offers the highest value;
- the buyer is guided by the possibility of satisfying their needs, most often the economic ones, *e.g.* cost reduction;
- the buyer is guided by the belief that it is more profitable to build long-term relationships with customers, which creates trust and loyalty among customers who, as a result, continue to use the company's services (Doyle 2003, 85).

Figure 5. ESG-related supply chain risks include human rights issues and key business operation activity



Source: Everstream Team 2023.

Intermodal transport is, in fact, about providing a comprehensive solution to the customer's problems related to the flow of a specific product in a cargo unit from point A to point B. Therefore, by effectively solving the customer's problems, the intermodal transport operator also creates value in the form of, for example, a base of customers who use its services. The above reasoning is reflected by the theory that one of the most effective ways to build a stable position in the market is to create customer loyalty by providing them with the value they expect (Smyczek 2012, 21). It is therefore essential to develop an appropriate strategy for delivering value. The impact of ESG on modern marketing strategies for delivering value is therefore multidimensional and includes (cf. Kotler *et al.* 2024):

- economic benefits of sustainable marketing;
- building customer trust through transparent communication;
- creating value by engaging in solving social issues;
- creating and putting social innovation measures into practice.

In conclusion, it should be noted that meeting the challenges of sustainable development through relevant marketing strategies that take into account the management of environmental, social and corporate governance factors is gaining importance in the company's supply chain.

5. Research Results

The transportation services market is a driving force for innovation in the economy. The need for innovation applies to the entire transportation system in its individual branches and forms of transportation (cf. Antonowicz 2014). Innovation in transport means introducing new solutions or processes for any changes that contribute to increasing not only the economic, technical and technological, but also environmental efficiency of transport systems (Merta-Olejniczuk 2014, 39). One of the key instruments for reducing the environmental impact of rail freight transport is therefore innovation and new technologies (Niedzielski 2013). Global economic progress and the creative potential of the railway generate new relationships, products and services. External expectations and requirements – including those presented in Table 2 – therefore become not only part of optimization or performance improvement, but also part of adapting to the environment. This is also the case in rail freight transport, where solutions involving modern technologies become an element of creating new operational models and market strategies, playing a key role at all stages of the transport process, from planning, through investment implementation, management and execution of business processes, asset maintenance, work organization, to the arrangement of contact with contractors (Antonowicz and Majewski 2022, 142). The potential for innovation in long-distance rail transport makes it possible to overcome traditional barriers to the exchange of information, the supervision of operations throughout the logistics chain and the ongoing coordination of international transport (OSJD/UNESCAP 2022). New products and services offered by freight forwarders, carriers and service providers must meet global expectations for high environmental standards, as shown in the case studies from China, Russia and Azerbaijan. Concern for the environment extends to defining the offer, optimizing the use of resources, the selection and configuration of rolling stock, supervision and monitoring of train traffic, as well as reporting. The resulting environmental value is shared by all participants in the transportation process, including not only companies but also their partners on the border services and the administration side of individual countries, as well as end customers. The ESG environmental aspect influences marketing, transforming marketing strategies towards informing the public about their environmental activities.

6. Discussions

The authors of the paper present the relevant environmental issues related to long-distance rail freight traffic along the Eurasian corridors, showing how the sector is reacting to the sustainability demands. The paper offers valuable insights into the environmental policies and practices that bring change in the rail freight industry, including innovative sustainable technologies, marketing strategies and regulations. A thorough literature review and case studies concerning leading railway operators and international organizations show how new technologies and evolving consumer expectations influence the logistics sector and contribute to reducing the ecological impact of freight transport.

What is particularly noteworthy as regards this paper is the application of Environmental, Social, and Governance (ESG) principles to Eurasian rail freight traffic, which offers a fresh perspective on how sustainability frameworks can be successfully incorporated into global transport systems. The paper's findings broaden general understanding of the role of railway transport in the issue of global sustainability, thus providing a practical roadmap for those railway operators and decision-makers that aim to reduce their environmental footprints.

The study's value also lies in the fact that it can be a source of information for further studies on sustainable logistics, new transport technologies and industry policies. Thanks to highlighting progressive environmental practices in international rail freight corridors, the paper can serve as a basis for further research that can make an impact on environmental management in the transport sector, which proves it to be a significant contribution to the academic literature and practical applications in the development of sustainable transport.

Conclusions

Innovative technologies and consumers' growing environmental awareness are increasingly responsible for the development of the modern economy. New technologies and solutions not only make transport and logistics chains more attractive and competitive, but also help to reduce their environmental impact. In the case of rail transportation, they play a particularly important role. The multitude of companies, entities, regulations and rules that need to be integrated in order to prepare long-distance international transportation is unprecedented in this industry. Eurasian transportation requires overcoming barriers such as very diverse technical, legal, cultural, linguistic and political conditions. National borders create barriers in the form of different track gauges, signaling and power supply systems, organizational structures, business models and the application of the ESG concept. Large railway companies, which enjoy a great deal of autonomy but are usually limited to one country, find it difficult to adapt to these challenges. Innovation is therefore one of the key opportunities for overcoming barriers in this area. The examples described show how environmentally friendly innovations and increasingly advanced technologies are creating completely new perspectives for the development of environmentally friendly rail transportation, while at the same time reducing the impact of railways on the environment. They add value to the long-distance rail service and promote network solutions based on transport corridors that go beyond the scale of individual companies, countries and infrastructure networks, creating value for a number of societies and countries located along the transport corridors. Although the level of integration and the dynamics of the processes are not yet comprehensive on an international scale, it is expected that the initiatives will gradually gain international significance and ensure not only optimal service parameters along entire transport corridors, but also the lowest possible ecological footprint of cargo transported between Asia and Europe.

Credit Authorship Contribution Statement

Mirosław Antonowicz: author of the article concept, author of the text, researcher responsible for collecting source data, data analyst.

Jakub Majewski: author of the text, data analyst, editor of the final version and conclusions.

Declaration of Competing Interest

The authors declare that they have no known financial conflicts of interest or personal relationships that could influence the work described in this article.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they did not use generative artificial intelligence or artificial intelligence-assisted technologies in the preparation of this work.

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The Place of Technology in the Evolution of Modern Trade Fairs

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Abstract: This article analyses changes in the functioning of the trade fair sector resulting from the emergence of new technologies and identifies their place in the evolution of these business events. It considers particularly important the extent to which trade show stakeholders are prepared to use new technologies to achieve trade show objectives, which technologies are considered most beneficial and what prospects they have for development.

The paper reviews the relevant literature, analyses existing solutions and reports on interviews with representatives of trade fair organisers and operators. The choice of respondents was dictated by the fact that they have to plan well in advance for investments in new technological solutions to use at trade fairs in the future and therefore they carefully analyse market developments and the expectations and technological capabilities of their stakeholders.

The future of trade fairs depends on the resilience of the sector, which is facilitated by increased implementation of IT solutions at trade fairs. One trend is to use existing technologies in new ways (*e.g.* QR codes). One threat to the effectiveness of trade fair objectives arising from the presence of new technologies is the varying level of technological sophistication of individual participants – the high technological sophistication of some participants may make it challenging to build relationships with less advanced participants.

Implementing digital solutions involves large financial outlays during the initial implementation period. However, implementing them usually makes it possible to very quickly reduce the costs of trade fair participation (by better targeting activities), to conduct more accurate analyses of the effectiveness of activities and to optimise the allocation of financial resources (by more completely interpretating data and identifying the most effective strategies).

Traditional trade fair technologies associated with the construction of stands are a source of high costs and much waste after the event. Using modern technologies in trade fair management offers an opportunity to implement pro-environmental solutions in trade fair marketing.

The paper analysis how emerging technologies, particularly artificial intelligence, are reshaping trade fairs into highly coordinated, technology-driven business platforms. It offers unique, real-time empirical evidence from 2024–2025 Polish industry events, capturing evolving stakeholder expectations, opportunities, and barriers to technological adoption in this sector. Additionally, it introduces a novel perspective on balancing digital transformation with economic sustainability and highlights the need for future quantitative research to guide strategic investments in trade fair innovation.

This study is limited by its reliance on qualitative insights from industry practitioners, lacking comprehensive quantitative data from exhibitors, visitors, and other stakeholders, which restricts the generalisation of its conclusions. Rapid technological advancements in the trade fair sector also pose a challenge, as findings may quickly become outdated, reducing their long-term applicability for decision-making. Future research should focus on large-scale, coordinated quantitative surveys to better capture evolving stakeholder perspectives and guide sustainable investments in digital trade fair infrastructure.

Trade fairs will remain essential for relationship-building and networking, but future success will depend heavily on integrating digital tools to extend engagement beyond physical events. It highlights the need for long-term, well-planned technological investments despite high costs and rapid innovation cycles that risk making solutions obsolete too quickly. The findings emphasise that industry stakeholders must collaborate closely with research centers to guide digital transformation strategies and ensure sustainable, effective trade fair models in a post-pandemic, hybridised market.

The paper highlights that post-pandemic trade fairs are evolving into more technology-driven, strategically focused events, shifting from traditional “festival-like” gatherings to structured business tools that prioritise relationship-building. This transformation carries significant social implications, including the need for ongoing digital literacy among stakeholders and a redefinition of networking experiences that balance physical and virtual interactions. However, the high cost and rapid obsolescence of emerging technologies may exacerbate inequalities between more important and smaller exhibitors, potentially reshaping power dynamics within the trade fair ecosystem.

Keywords: trade shows; trade fairs; digitalisation; trade fairs/shows technology; artificial intelligence; exhibitors; visitors.

JEL Classification: D29; M15; M30; L83; L86; O33.

Introduction

This paper analyses changes in the functioning of the trade fair sector resulting from the emergence of new technologies and identifies their place in the evolution of these business events. It considers particularly important the extent to which trade show stakeholders (primarily organisers, exhibitors and visitors) are prepared to use new technologies (in particular artificial intelligence) to achieve trade show objectives. Which tools/technologies are the most useful at these events, and what are the prospects for economical trade fairs? Changes in the experiences of trade fair visitors resulting from adopting new technologies in trade fair activities are also analysed.

The research reviews the available literature, analyses existing solutions and reports on interviews with representatives of entities operating in the meetings industry during the 15th Winter Congress of the Polish Chamber of Exhibition Industry (10 December 2024) (https://pipt24zjazd.exposupport.pl/program24; accessed 10.03.2025) and the 2025 Event Industry Forum (FBE) (15 January 2025) (https://forumbranzyeventowej.pl/; accessed 10.03.2025). The rationale behind this selection of respondents was that they plan to invest in new technological solutions to use at trade fairs in the future and so they carefully analyse market changes and the expectations and technological capabilities of their stakeholders.

This paper introduces novelty by highlighting how digitalization and hybridization are fundamentally transforming trade fairs from traditional, festival-like gatherings into highly coordinated and technology-driven business tools. It provides original empirical insights from 2024–2025 industry events in Poland, offering a real-time perspective on emerging trends, opportunities, and challenges in the sector. It uniquely emphasizes the strategic role of long-term technological investments and research collaborations between industry and scientific centres to mitigate risks in a rapidly evolving tech landscape. Furthermore, it identifies a research gap in quantitative studies on digitalization's impact, proposing future empirical investigations to guide effective and sustainable trade fair innovation.

1. Research Background – Digitalisation as a Response to Challenges in Managing Trade Show Events

The rapid development of modern technologies and intensification of their presence in everyday life and the market activities of companies are increasingly visible (Malik and Janowska 2019). One manifestation of this is the increasing popularity of electronic communication and the digitalisation of business relationships (Braverman 2015) (Matovic, Knezevic and Papic Brankov 2015). On the other hand, the trade fair industry has drawn strength from face-to-face contact for years, which has helped develop relationships between stakeholders (Proszowska 2015; Tafesse and Skallerud 2017; Sarmento and Simões 2018). Therefore, the development of technology (in particular that enabling replacement of face-to-face contact with digital communication) was (and sometimes is) perceived as a threat to the development of trade fairs. However, the increasing activity in the trade fair sector confutes this assumption. When observing the activity of trade fair entrepreneurs, it can be seen that trade fairs are finding their way in digital development (Vitali *et al.* 2022). More detailed knowledge of new technological solutions at trade fairs will greatly benefit managers who make day-to-day trade fair decisions.

Contemporary trade fairs are a feature of the meetings industry, the main objective of which is to build relationships with stakeholders by creating interactions and generating engaging experiences related to brands and their offerings (Szromnik 2014; Proszowska 2016). Individual trade show events attract stakeholders interested in the industry who are looking for opportunities to increase their engagement with it. As individual attendees state, the specific objectives of trade show participation vary depending on the age and market position of the organisation (Singh, Shukla and Kalafatis 2017; Al-Edenat 2023). Sometimes it will be to present a product (new or existing), at other times it is to seek information about new market opportunities and it can also be to have specific discussions about developing cooperation (Menon and Manoj 2014; Crowther 2011). The history of trade fairs shows that the reasons for participating in trade fairs are constantly evolving (Sridhar, Voorhees and Gopalakrishna 2015; Srinath Gopalakrishna and Lilien 2012). Initially, the most important function of trade fairs was to provide information (Maroszek 1990; Golfetto and Rinallo 2015). Later, informing, marketing and educating became important (Blythe 2010). Today, the sales function of trade fairs is increasingly becoming marginalised, while the educational and relational functions are becoming more critical (Engblom 2014; Wiażewicz and

Gębarowski 2014; Gębarowski and Siemieniako 2016). In line with Marketing 6.0, trade fairs like other marketing activities are becoming increasingly immersive (Kotler, Kartayaja and Setiawan 2023). The accelerated adoption of online tools by the meetings industry results in a combination of online and offline activities (Kotler, Kartajaya and Setiawan 2021). Today's trade fairs are becoming less and less collections of static presentations visited by visitors one at a time. Increasingly, they provide opportunities to learn about a company and its products in engaging experiences and workshops both offline and online and both within and outside the trade fair space (Ling-yee 2010; Gong, Wang and Li 2019). They are adapting increasingly intensely and flexibly to the needs of their participants (Celuch 2021a). Event organisers know that a large number of stimuli mean that subsequent ones supersede previous impressions (Turner 2017). Therefore, the interactions generated should always offer opportunities to immediately deepen the relationship, *e.g.* by making an appointment or a purchase (Sarmento, Farhangmehr and Simões 2015).

The development of digitalisation, automation and artificial intelligence has become very helpful in implementing these and other trade fair activities (Romanova 2024). Thanks to the processes discussed above, it has become increasingly easy to monitor the activities of market participants, learn about their needs and prepare solutions dedicated to specific stakeholders (Ryan *et al.* 2020). The leading innovative solutions used at trade fairs include:

- interactive stands – to engage visitors (in addition to traditional tastings, classic product testing and the impacts of light and sound) they use among other things touch screens, multimedia presentations, virtual reality (VR) and autonomous solutions; in this way visitors explore exhibitors' product offerings on their own while engaging their emotions;
- mobile applications – software dedicated to a specific event enables easy access to information, the event agenda and networking opportunities with other attendees; attendees can therefore sign up for a trade show faster and more conveniently; they are provided with an event map that helps locate items of interest; they receive digital promotional materials and interact more easily with other attendees;
- artificial intelligence – the implementation of AI in the analysis of event data allows better understanding of visitor preferences and more effective planning of future editions;
- remote participation – new technologies make it possible to attend events remotely, which opens the door to global collaboration and increases accessibility by the general public (Różański 2024).

Databases modelled on CRM systems and applications dedicated to various events offer the possibility of repeatedly filtering and analysing information on attendees without direct contact with them well before the event or long afterwards (Jaywant Singh, Shukla and Kalafatis 2017). They also make it possible to communicate with selected groups of participants during the event and target them with incentives to visit a stand or participate in specific trade fair events (Prymon-Ryś 2023). The systems mentioned above make it possible to analyse the attendance at the stand and the level of involvement of event participants in real time and monitor the effectiveness of all the marketing activities carried out at the fair (Gottlieb, Brown and Ferrier 2014; Wong and Lai 2018).

Trade fair practitioners note that digitalisation of the trade fair sector is also often associated with finding new applications of existing technologies that have been used for different purposes ('The Future of Trade Shows: How Technology Is Transforming Trade Show Experiences' 2023). An example is QR codes, which have become the medium of choice for a great deal of information previously provided in print, such as flyers, business cards, product catalogues and price lists. The Japanese company Denso Wave invented the QR code in 1994 (Gregersen 2025). Initially, it was developed for the automotive industry as an improved version of the barcode to track the status of vehicles during the production process. It was only after some time that it was realised that the code could redirect to the most diverse information. When it became apparent that you could have a QR code reader on your smartphone its popularity in marketing immediately grew. For exhibitors, it is an invaluable tool.

Thanks to QR codes it is possible to reduce expenditure on advertising materials at the stand and the cost of transporting stand equipment to the trade fair and streamline the entire participation management process (Al-Edenat 2023). The same is true for wireless headphones to listen to lectures at the show (https://forumbranzyeventowej.pl/; accessed 20.02.2025). A traditional lecture requires an isolated room to give listeners a chance to focus while at the same time not distracting other attendees with content they do not want. The solution to eliminating the problem of listening to trade fair presentations and lectures is wireless headphones programmed to play a speech. This technique could only become popular when the problem of preventing the headphones being taken outside the exhibition space was solved.

Developing a precise programme of activities is necessary to make the most of the few days of a fair (Kourkouridis, Frangopoulos and Kapitsinis 2024). Prepared well in advance, the plan must be based on an analysis of the presence and potential of the other participants in the event (Gopalakrishna & Williams 1992). The scenario should also include precisely prepared tools to help attract attention, make contact and arouse the interest of participants (Huang 2016). The higher the number of participants (exhibitors and visitors) the more difficult it is to build an optimal scenario and ensure minimal loss of benefits due to essential event elements being omitted (Gopalakrishna *et al.* 2010). In planning meetings, communicating with all stakeholders and organising side events, developing digital technologies greatly helps ('The Future of Trade Shows: How Technology Is Transforming Trade Show Experiences' 2023). Increasing the results of trade fair participation can be achieved if it is possible to extend the possibility of contact with trade fair participants into the periods before and after the trade fair (Hansen 2005) (Manero and Uceda 2010). Geolocation-based participant registration systems also offer such opportunities (Kartajaya, Kotler and Hooi 2019).

2. Research Methodology

The research process implemented is a search for answers to the following questions:

- How do the participants in the exhibitor-visitor-organiser triangle treat new technologies emerging at trade fairs?
- What changes in trade fair participation management have been generated by the evolution of technology?
- What opportunities and threats are presented by the changes taking place?
- What are the prospects for developing the sector in the context of new technologies?

The research process was based on a review of available literature and studies, among which a series of reports prepared under the direction of the independent research institute IQS and MeetingPlanner.pl in cooperation with event agencies was considered the most significant. These reports (MeetingPlanner.pl 2021; MeetingPlanner.pl and Instytut Badawczy IQS 2023; MeetingPlanner.pl and Instytut Badawczy IQS 2024; Instytut Badawczy IQS and MeetingPlanner.pl 2025) provide the results of research into the transformation of the meetings industry and changes between 2020 and 2024. These changes followed, among other things, the increase in the use of technology in the management of promotional events, including trade fairs, caused by the COVID-19 pandemic (Piccioni *et al.* 2023). Complementing these reports is a study prepared by the infuture.institute (2022) and commissioned by the MTP Group.

Another source was interviews with representatives of entities operating in the meetings industry conducted during the 15th Winter Congress of the Chamber of the Exhibition Industry in Wroclaw (10 December 2024) and the 2025 Event Industry Forum in Warsaw (15 January 2025; EXPO XXI in Warsaw). Each event was dedicated to summarising activities by the participating industries and defining emerging trends. Practitioners of trade fairs and other areas of the meeting's industry attended both events. These people plan to invest in new technological solutions to use in future trade fairs. Therefore, they carefully analyse market developments, stakeholders' expectations and technological capabilities. As a result, they are a valuable source of information, and their statements are representative of the opinions of the entire market on the subject. A list of those whose opinions are used in this article is included in Appendix 1.

The results of the interviews are presented in synthesis and the event during which the issues mentioned were raised is identified. The quotations included in the next section are excerpts from statements made by the interviewees. They are not attributed to specific participants as they are statements supported by several of them. All the interviewees agreed on the prominent opinions presented in this paper.

3. Research Results and Discussions

Analysis of the secondary sources and statements by the participants in the interviews indicate that technological developments (digitalisation, AI, etc.) influence the nature of the contemporary exhibition market and the entire meetings industry. They also give the industry an entirely new dimension. Offline trade fairs combined with new technologies are becoming an increasingly attractive space for modern business.

3.1 The Place of Digitalisation and AI in the Development of Trade Fairs – A General Overview

In 2020, online meetings and events were recognised as key innovations and a necessity. Due to the constraints caused by the COVID-19 pandemic, the format of meetings and how they were organised changed. Paradoxically, the year of challenges that resulted from the total abandonment of live meetings also became the year of a new opening of live communication, consequently giving target clients the choice of an even wider range of tools. (MeetingPlanner.pl 2021) Almost all types of events were successfully transferred to virtual reality during this period. However, only a fifth of the clients surveyed considered an online event a sufficient tool for marketing communication tasks. In a study in 2021 (MeetingPlanner.pl 2021), respondents predicted that future events would be hybrid, *i.e.* involving the physical presence of some participants and online participation by others. A change observed at the time was increased interest in working with a marketing agency to plan attendance (due to the higher technological requirements online).

The limitations of the pandemic era moved the trade fair industry to a much higher technological level. It was noted that creativity coupled with technological advances allows more complete achievement of objectives. In 2022, external economic, social and economic conditions and organisational costs exceeding marketing budgets were identified as the main barriers to event marketing (MeetingPlanner.pl & Instytut Badawczy IQS, 2023).

In the following years, companies were increasingly interested in participating in offline events and allocating more resources to event marketing (MeetingPlanner.pl and Instytut Badawczy IQS 2024). Analysis of the trade fair sector in 2024 makes it possible to observe at trade fairs on the one hand a presence of artificial interlinking (in the context of event marketing, this is primarily personalisation of events, automation of tasks and analysis of participant data). On the other hand, however, anthropocentrism of communication is observed, with human beings and their values at the centre.

In 2024, around 80% of those surveyed used artificial intelligence tools in event marketing. However, only 27% had developed their own proprietary tools (Instytut Badawczy IQS and MeetingPlanner.pl 2025). A barrier to developing the use of AI in event marketing is that almost half of companies (48%) (as assessed by an employee taking part in the survey) have little experience in using AI. A limitation to using AI-generated materials is copyright of the materials used, which raises many ambiguities. In addition, an inability to obtain exclusive rights to the materials created is a problem. For these reasons, the event industry's use of AI is limited. However, participants in the research had high expectations for the future of this technology. This is an area that will continue to grow. A significant concern related to the use of AI is the risk of violating customer privacy. A second concern is the threat of human-to-human contact due to the ubiquitousness of AI and solutions based on it. Table 1 summarises the opportunities, challenges and threats facing AI in trade fairs today.

Table 1. Opportunities and challenges related to the presence of AI in trade fair marketing

Opportunities	Percentage of indications
intelligent analyses of data and trends	52
participant profiling and content matching	47
monitoring and analysis of social media	46
measuring and evaluating the effectiveness of marketing activities	43
reaching relevant target groups more effectively	42
integration of chatbots and virtual assistants	41
personalised notifications and interactions	34
personalised reporting and analysis after events	34
integration with CRM systems for better management of the customer base	32
improving marketing strategies through machine learning	27
dynamic adjustment of the event programme	24
personalised recommendations for participants	23
optimising the participant experience	23
proactive management of problems and crises	17

Risks and challenges	Percentage of indications
difficulties in assessing the reliability of materials	57
threat to participants' privacy	54
lack of authenticity of information	19
difficulty in personalising communication	19
I don't know; it's hard to say	19
other / no challenge	2

Source: authors, based on Instytut Badawczy IQS and MeetingPlanner.pl (2025)

The foremost opportunity arising from the use of AI is considered to be the possibility of generating more intelligent analysis of the data and trends collected as part of event participation management. The list of challenges and threats in Table 1 is shorter but it includes significant items. AI cannot be used indiscriminately.

3.2 Digitalisation and Sustainability at Trade Fairs

One of the key trends that is being taken into account in the development of the trade fair industry is sustainability (MeetingPlanner.pl and Instytut Badawczy IQS 2024). Entrepreneurs are increasingly emphasising their companies' concern for the environment. They are subordinating the idea of sustainability to the main areas of their activities, including participation in trade fairs (MeetingPlanner.pl and Instytut Badawczy IQS 2024). This is also a result of the emergence of the Environmental, Social and Governance (ESG) reporting requirement, which applies to an increasing number of companies. Indirectly, companies working in a supply chain with reporting organisations are also covered by this obligation. In the context of ESG and event marketing, companies must ensure that the partner with whom they undertake cooperation has the competence and experience to support, advise and organise an event consistent with the principles of ESG. Therefore, trade fair participants expect organisers to help them meet ever higher ESG standards regarding stand construction, communication with stakeholders and the organisation of accompanying events. This is linked to technological and organisational changes which are very much supported by digitalisation (*e.g.* AI in design, new technologies and materials for stand construction and trade fair hall equipment, digitalisation of the registration and participant handling process, hybridisation of events and their promotion in social media).

An example of a Polish trade fair facility using state-of-the-art technology is Pavilion 7A at the Poznan International Fair. This new event space opened on 1 December 2024. The building is located in the centre of Poznan in the most prestigious part of the Poznan Congress Centre. The exhibition area in Pavilion 7A is 3743 m^2. It is a component of the so-called four-pack, *i.e.* a complex of four exhibition pavilions at the Poznan International Fair (total area 20,000 m^2), in the centre of which is Linden Avenue with natural trees. Pavilion 7A is equipped with state-of-the-art technology. This gives it the flexibility to use many tools to influence event participants. The equipment in the facility includes 500 m^2 of LED screens, a 15m x 8m main screen on the stage, four side screens and seven additional screens on the side walls of the venue. Event organisers also have a holographic net at the front of the stage, a turntable on the stage, a driveway for car presentations (with loads up to 3.5 tonnes) and curtains to help keep the space quiet. Users hiring the space receive a package of 2 cameramen, two cameras, technical implementation and three multimedia presets. The high-tech sophistication of the facility completely changes the approach of exhibitors to trade fair stand design and company participation. Digitally designed trade show display elements provide a unique opportunity to be modified during the event, record and monitor attendees' reactions, and quickly start the planned show. For exhibitors, such a prepared facility means lower transport costs for display materials and stand elements, and time savings in stand preparation. The solutions used in Pavilion 7A offer the possibility of reducing waste generated during and after the event.

The parameters of the facility and the uncommonness of the events that can be organised there are impressive. Interview participants (EIF interview) pointed out that the facility has some limitations, however, as the basic infrastructure (walls, screens and platforms) is static. Subsequent trade fair events in this space will be repetitive. Maintaining the high level of attractiveness of Pavilion 7A for the participants in the events held there will require a highly creative approach to the planning of subsequent events. Respondents (EIF interview) also pointed out that the high-tech space for exhibitors and their visitors requires them to be digitally advanced and able to use the available technology.

Innovation is not the only area of sustainability that is helped by implementing new technologies in exhibition spaces. Trade fair organisers and operators are undertaking several initiatives concerning many of the sustainable development goals in UN Agenda 2030. For reasons of space related activity areas cannot be listed here. Examples include membership of and working for the UN Global Compact, the Net zero carbon events project, the Green Roofs project and the IDEA Expo Ecotechnologies project (https://www.mtp.pl/pl/zrownowazony-rozwoj/; accessed 10.03.2025).

3.3 Technological Developments and the Management of Trade Fairs: Conclusions and Opinions of Interviewees – PCEI Interviews and EIF Interviews

For trade fair organisers and operators (EIF interview), one of the most critical issues is choosing a reliable tool to communicate with participants and event partners. They use, for example, property management systems (PMS) for the hospitality industry (such as Oracle Hospitality OPERA) or event-specific applications. The advantage of management systems is that it is easy to get started, as the existing stakeholder base and communication system assumptions can be used. In the case of trade fair applications, the ability to quickly locate and contact selected participants is an added advantage. The system shows organisers and other participants whether the person they are interested in is a direct participant in the event and how to contact him or her. It is possible to communicate with the person (to send messages about additional activities at the fair) in real time – not only to invite him or her but also to answer questions, clarify doubts and help with registration. “Event apps open up all stakeholders to meeting new people attending the event.” “Apps allow us to monitor visitor traffic during events and thus enable us to assess which event elements best attract and focus the attention of trade visitors.”

The participants in the interviews (PCEI and EIF interviews) were enthusiastic about using modern technology at trade fairs and other events. However, they drew attention to the risks involved. First and foremost, it is essential to remember that “the technology used must not exclude less tech-savvy trade show visitors.” It must also not overwhelm participants. Respondents (EIF interview) pointed out the phenomenon of technology fatigue, which is also known as digital or screen fatigue (a state of mental and physical exhaustion resulting from excessive screen time and reliance on digital devices and tools). They stressed that technology should be as invisible as possible – it should not change reality but should help to achieve aims. In this way its full potential can be realised, and technology fatigue can be avoided.

4. The Future of the Exhibition Industry

Members of the Polish Chamber of Exhibition Industry (PIPT interview) were concerned about less interest in attending trade fairs than before the pandemic, among both exhibitors and visitors (Hooshmand *et al.* 2023). Indeed, the post-pandemic trade show industry is recovering slowly and is unlikely to return to the scale it was before 2020. However, the quality and level of engagement of trade show participation today is much higher than before 2020. Most trade fair analysts and practitioners are convinced that by skilfully harnessing the potential inherent in modern technology, trade fairs will remain an essential and effective business tool.

A significant burden for the sector is the cost of new technologies. “Technology requires long-term funding and an idea of long-term use.” Interviewees (EIF interview) pointed out that with the very rapid development of new technologies, there is a risk that some already existing solutions will be pushed out of the market by newer ones before they depreciate. There is a need for in-depth research on the future of the exhibition sector to minimise the risk of making ill-advised investment decisions. This indicates that business centres will have a growing role in bringing together exhibition organisers (*e.g.* the Polish Chamber of Exhibition Industry) and scientific centres to research the functioning of the industry. It may also be assumed that companies investing in developing trade fair infrastructure and implementing costly technological solutions will even more strongly seek ways to make fuller use of this space (growth in the popularity of trade fair co-opetition, renting, etc.).

Conclusions and Further Research

One of the most critical needs realised by visitors and exhibitors at trade fairs is the need to network and develop relationships with others (infuture.institute 2022). Modern trade fairs are still attractive platforms for direct contact between companies in the industry (Alberca, Parte and Rodríguez 2018). The dynamic digitalisation of the surrounding reality is a fact that also affects the trade fair industry. To enhance the resonance of face-to-face meetings, members of the trade fair community are using digitalisation, among other things, to communicate with their audiences, to find partners, contractors and customers, to automate appointments, to extend the life of products and services on event-related platforms and to build a community around the event on social media.

It is clear that maintaining relationships with an industry community (often identical to the community of a particular trade show) must also occur outside regular meetings in the trade show space. With digitalisation of the trade show participation process it has become much easier to plan to sustain relationships with industry stakeholders outside the trade show (Celuch 2021b).

Implementing digital solutions requires a lot of money in the initial implementation period. However, they usually make it possible to very quickly reduce the costs of trade fair participation (through better targeting of activities), conduct a more accurate analysis of effectiveness and optimise the allocation of financial resources (through more complete interpretation of data and identification of the most effective strategies) (Ryan *et al.* 2020).

The future of trade fairs will depend on the resilience of the sector (infuture.institute 2022). Observing the development of leading trade shows, it is clear that they are adapting seamlessly to changing conditions regardless of their scale and strength. The technologies used at trade shows are tools to assist exhibitors to present their products and services. They support the presentation and understanding of the information provided rather than being an attraction in themselves. The hybridisation of trade fairs makes individual events increasingly accessible (at least virtually) by visitors from increasingly distant locations. These developments suggest that trade fairs will continue to be an essential element of relationship-building in individual sectors for a long time to come. However, they will be events of a completely different nature. They will irrevocably lose the character of carefree festivals and become full-scale, coordinated and planned business tools with an increasingly large scope and a more extended period of more precise and direct impacts on stakeholders.

Although the pandemic forced some activities to move to the online world, today's technologies still do not allow us to have a complete multi-sensory experience of the digital world. However, work on developing these technologies is ongoing. The changes are so dynamic that it becomes a significant challenge to educate visitors and exhibitors in this area and to implement solutions during trade shows so that integration of elements of the metaverse world in the MICE industry is seamless and based on the needs of real-world audiences (the need for multi-sensory relationship-building engaging experiences).

A limitation of the analysis presented here is a lack of current quantitative research on the subject. This makes it challenging to infer fully conclusively all exhibitors' and visitors' opinions on the subject. However, the opinions quoted in this paper come from practitioners in the trade fair market, who can look at the industry more synthetically and more precisely isolate the trends that determine its development. A further step in analysing the place of digitalisation in the development of trade fairs is a quantitative survey of exhibitors, visitors and other stakeholders in these events. To increase the reliability of the results, it would be necessary to coordinate surveys of different stakeholder groups and conduct them simultaneously. This would eliminate the impact of changes in the industry's level of digitisation, which is rapidly progressing. Deepening this research is particularly important for future investment decisions by exhibition operators and organisers. The level of digitalisation of the exhibition space and the tools available will be one of the most critical factors in the success of trade fairs in the future.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI or AI-assisted technologies in the writing process before submission, but only to improve the language and readability of their paper and with the appropriate disclosure.

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Appendix 1.

List of interview participants and authors of opinions used in the described research (opinions collected in the described research process are presented synthetically, without attributing their authorship to individuals).

Interview ID used in the text of the article	The event at which interviews were conducted and opinions collected (date)	Participants whose statements and opinions were used in the research (in parentheses, positions and names of companies they represent)
PCEI interview	15th Winter Congress of Polish Chamber of Exhibition Industry in Wroclaw (10th of December 2024)	Wiesława Galińska (CEO – PCEI) Marcin Gębarowski (honorary member of PCEI, UEK Krakow) Robert Jurczak (Extend Vision Sp. z o.o.) Tomasz Kobierski (President of the PCEI Council, President of the Management Board of MTP Group) Andrzej Mochoń (Vice-President of the PCEI Council, President of the Management Board of Targi Kielce) Jan Studencki (Deputy Director of PCEI) Ewa Woch (Targi w Krakowie sp. z o. o.)
EIF interview	Event Industry Forum (FBE) 2025 in Warsaw (15th of January 2025)	Wojciech Chłapiński (Vice President of the Management Board El Padre sp. z o. o.) Dominik Górka (Live Age) Łukasz Gumowski (Plej) Magdalena Jędrusiak (Allegro Brand Experience Agency) Karina Mąkolska (MICE sales manager, Mercure Szczyrk Resort) Rafał Mrzygłocki (CEO firmy Aram) Rafał Nowicki (event director w agencji Bespoke) Krzysztof Paradowski (Creative Director and Vice President of the Management Board Blu Experience) Rafał Kupidura (Imagine Nation) Magdalena Kondras (MeetingPlanner.pl) Katarzyna Piwowar (KDK Events) Tomasz Piekarski (Creative Pro PL) Sabrina Żymierska (Director of Poznan Congress Center)

Source: authors, based on own experiences and event organiser materials.

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The Environmental CSR Awareness-Satisfaction Paradox: Understanding Customer Perceptions and Behavioural Intentions in Hospitality Services

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Abstract: This study explores a paradoxical relationship between environmental CSR awareness and customer satisfaction within the Malaysian hospitality sector. The research uncovers how high CSR awareness can negatively influence satisfaction while positively impacting behavioural intentions.

Data was collected via survey from 400 hospitality customers and analyzed using Random Forest, K-means clustering, and regression models to examine the relationships between environmental CSR awareness, customer satisfaction, and behavioural intentions.

The analysis reveals that increased environmental CSR awareness correlates negatively with customer satisfaction but positively with behavioural intentions like willingness to pay more. Four distinct customer segments emerged, showing varying perceptions and satisfaction patterns.

This paper challenges the conventional belief that CSR always enhances satisfaction, offering empirical evidence of the Environmental CSR Awareness-Satisfaction Paradox. The study provides a new lens to understand complex customer psychology in sustainable hospitality.

The findings are limited to the hospitality industry in Malaysia and may not generalize across regions or sectors.

Understanding this paradox helps hospitality businesses better strategize CSR communication and customer engagement.

Insights contribute to policymaking and service design promoting sustainable consumer behaviour.

Keywords: Environmental CSR; customer satisfaction; behavioural intentions; hospitality; sustainability paradox; machine learning.

JEL Classification: M14; L83; C38; D12.

Introduction

Corporate social responsibility (CSR) is now considered a significant strategic initiative in the current hospitality industry because of the increased awareness of the environment among consumers and regulatory pressures directed towards them to be environmentally sustainable (Chen & Tung, 2014). Owing to the need to stimulate economic growth in Malaysia, the hospitality industry has been active in energy-saving measures and strategies, green supply chains, and technological updates related to the overall operation process (Rahman *et al.* 2015). However, there is little documentation of the relationship between customer knowledge of the environmental CSR packages of the industry and satisfaction levels, especially in developing economies.

Traditional CSR literature states that stakeholder theory and the social exchange approach state that CSR programs satisfy customer trust and positive behavioral intentions (Carroll, 1991; Freeman, 1984; Blau, 1964). However, recent information suggests that this connection might be more complicated when customers have higher environmental awareness and demand higher company performance (Martinez Garcia de Leaniz *et al.* 2018).

Thus, the current article questions what can be called the Environmental CSR Awareness-Satisfaction Paradox in these quarters: the factual finding that environmental CSR awareness is positively associated with reduced satisfaction. However, customers' behavioral intentions may be positive. Using high-level statistical analysis and machine-learning algorithms in the analysis of statistical data of 400 Malaysian consumers of hospitality products, the project will unravel the complex multi-factorial connections between the environmental CSR-related awareness, satisfaction, and behavioural intentions levels.

This study contributes to the literature on CSR and hospitality in several ways. First, it disputes the traditional belief that CSR awareness increases satisfaction. Second, it gives empirical evidence of customer segmentation using CSR awareness-satisfaction profiles. Third, it illustrates the use of machine learning methodologies in studying intricate CSR-customer behaviour correlations. Lastly, it provides workable ideas to hospitality managers who want to maximise their environmental CSR approach.

1. Literature Review

1.1 Environmental CSR in Hospitality

In the hospitality industry, CSR and environmental sustainability incorporate various activities to balance goals to conserve the environment and service quality (Kim *et al.* 2017). Deployment of strategies for waste reduction, preservation of energy and water resources, adoption of infinite-supply sourcing, and formulation of plans for environmental authenticity/certification of environmental plans form substantial aspects of this agenda (Font & Lynes, 2018). The tourism and hospitality industry is also known to be a major producer of anthropogenic emissions, considering that it contributes to total greenhouse gas emissions (Lenzen *et al.* 2018). Therefore, it strongly motivates the industry to develop CSR activities that would limit environmental emissions. As empirical research shows, regular environmental CSR efforts bring the returning business, *i.e.*, reduced operating expenses, high brand image, and satisfied workers (Rahman *et al.* 2015). Although these benefits have been cited in the literature, the relationship between environmental CSR and customer satisfaction is ambivalent; the reports in the industry have shown a discrepancy between environmental responsibility and guest value perception (Martinez *et al.* 2019).

1.2 CSR-Customer Satisfaction Relationships

The literature on the mutual association between customer satisfaction and CSR has been vast across various studies, and most research has found positive correlations (Luo & Bhattacharya, 2006). This intersection is premised mainly within the social exchange theory, whereby perceptions about CSR generate reciprocity and, by extension, increase customer satisfaction and loyalty (Cropanzano & Mitchell, 2005). Some studies that purely relate to the hospitality industry also confirm that positive CSR perception is related to customer satisfaction, although almost all these studies do not discriminate between environmental and non-environmental aspects of CSR and investigate general impressions of CSR (Kang *et al.* 2012; Manaktola & Jauhari, 2007). In addition, the studies are biased towards developed economies, which is a weakness limiting the external validity of utilisation in evaluating developing settings.

1.3 The CSR Awareness-Satisfaction Paradox

There is increased criticism that positive CSR-satisfaction relationships may be universal. Expectation-disconfirmation theory argues that as CSR becomes well-known to customers, the expectancy set becomes high, which is hard to achieve, thus leading to dissatisfaction when performance-disconfirmation is not attained (Oliver, 1980). It is a theoretical thinking where a CSR awareness-satisfaction paradox is supported. According to Mart 0xef vez Garc meeting up to Leaniz *et al.* (2018), environmental consciousness may become a factor that moderates the relations between CSR and satisfaction, as the amount of awareness of the customer's attitude towards the environment may produce a difference in their response level in contrast to the environmentally less conscious customers. In the same way, Kim *et al.* (2017) found that the environmental knowledge of customers can build more demanding environmental performance evaluation standards.

1.4 Behavioural Intentions in Environmental Contexts

Despite possible satisfaction issues, studies have consistently demonstrated that awareness of environmental CSR positively impacts behavioural intentions like willingness to pay premiums, positive word-of-mouth, and loyalty (Nguyen & Chiu, 2023).

It indicates the possibility that the CSR awareness-behavioural intentions relationship is not mediated by the routine satisfaction-mediated paths as thought before, but could surpass m. It is based on the theory of planned behaviour that offers an understanding of environmental attitudes on behavioural intentions using attitude formation, subjective norms, and perceived behavioural control (Ajzen, 1991). The customers can perform favourable behavioural intents founded on environmental values in instances of reduced satisfaction regarding service delivery in an environmental setting.

2. Methodology

2.1 Research Design and Sample

This paper used a cross-sectional survey research design that investigated the association between environmental CSR awareness, customer satisfaction, and the behavioural intentions of customers of hospitality companies in Malaysia. A sample of 400 respondents, with the understanding that they stayed in hotels or resorts in Malaysia during the last 12 months, was used. The sample was also ethnically diverse: female 52.8 per cent and male 47.2 per cent respondents aged between 20 and 65 years (M = 42.5, SD = 12.8). The education levels were high school (25.5%), bachelor's degree (36.5%), master's degree (30.2%) and doctorate (7.8%). Ethnic representation was diverse according to the structure of Malaysia: Malay (40.0%), Chinese (30.0%), Indian (20.0%), and ethnic groups (10.0%).

2.2 Measurement Instruments

A five-dimensional environmental CSR Awareness was based on the scaled adaptation of Rahman *et al.* (2015) and Kim *et al.* (2017), which comprised energy conservation awareness, water management awareness, waste reduction awareness, sustainable sourcing awareness, and environmental certification awareness. All the dimensions had several items measured on 7-point Likert scales. Customer Satisfaction was measured using a multidimensional approach, including service, environmental, value, facility, and overall satisfaction (Oliver, 1980; Cronin & Taylor, 1992). The 7-point Likert scales were adopted in all measures of satisfaction. Due to the established scales differentiating between repeat visit intentions, recommendation intentions, price premium willingness, loyalty intentions, and word-of-mouth intentions, the measurement of behavioural Intentions was provided (Zeithaml *et al.* 1996; Nguyen & Chiu, 2023). Control Variables included demographical characteristics (age, gender, education, income, ethnicity), the characteristics of hotels (hotel type, length of stay), and the frequency of travel.

2.3 Data Analysis

To demonstrate the strength and stability of the results, the research used the multi-analysis data analysis strategy with the inclusion of various analysis methods. The methodological relationships between analysis methods were examined in descriptive statistics and correlation analysis to have a preliminary idea of the data. The multiple regression analysis was then followed to test both the direct and mediated relationship, using which the dynamics between the CSR awareness, customer satisfaction and the intention of behaviour could be clarified. Also, machine learning methods, like Random Forest, Support Vector Machine, and Neural Network models, have been applied to increase predictive accuracy and confirm patterns in data. K-means also performed clustering to reveal customer groups' CSR profiles, awareness, and satisfaction to get advanced explanations on heterogeneous consumer reactions. To facilitate interpretation and share the results with the community, more advanced visualisation was generated to understand the CSR awareness-satisfaction paradox and features of the identified segments. All calculations were done in Python by applying some of the most important libraries, including scikit-learn, pandas, and matplotlib.

3. Results

3.1 Descriptive Statistics

Table 1 shows descriptive statistics of important variables. Customers were mainly aware of environmental CSR initiatives, with a large mean (M) across all dimensions (M = 4.53, SD = 0.52 on a scale of seven). The levels of customer satisfaction differed based on the dimensions, with the highest level recorded for environmental satisfaction (M = 5.32, SD = 0.85) and the lowest value for satisfaction (M = 4.16, SD = 0.99).

Table 1. Descriptive Statistics of Key Variables

Variable	Mean	SD	Min	Max
CSR Energy Awareness	4.59	0.83	2.50	6.80
CSR Water Awareness	4.52	0.79	2.30	6.75

Variable	Mean	SD	Min	Max
CSR Waste Awareness	4.52	1.00	1.90	7.00
CSR Sourcing Awareness	4.50	1.04	1.85	7.00
CSR Certification Awareness	4.52	1.17	1.50	7.00
CSR Overall Awareness	4.53	0.52	3.22	6.01
Satisfaction Service	4.91	1.45	1.50	7.00
Satisfaction Environmental	5.32	0.85	3.20	7.00
Satisfaction Value	4.16	0.99	1.80	6.95
Satisfaction Overall	4.81	0.73	2.85	6.50
Repeat Visit Intention	4.57	1.44	1.25	7.00
Price Premium Willingness	4.76	1.33	1.50	7.00

3.2 The CSR Awareness-Satisfaction Paradox

Correlation analysis represented the primary outcome of this research since it showed an inverse relationship between environmental CSR awareness and customer satisfaction, which was statistically significant ($r = -0.112$, $p = 0.025$). This paradoxical result defies the common sense of CSR and offers empirical support for the CSR awareness-satisfaction paradox.

Table 2. Correlation Matrix - Key Relationships

Variable	CSR Overall Awareness	Satisfaction Overall	Price Premium Willingness
CSR Overall Awareness	1.000	-0.112*	0.198**
Satisfaction Overall	-0.112*	1.000	-0.030
Price Premium Willingness	0.198***	-0.030	1.000

*p < 0.05, **p < 0.01, ***p < 0.001

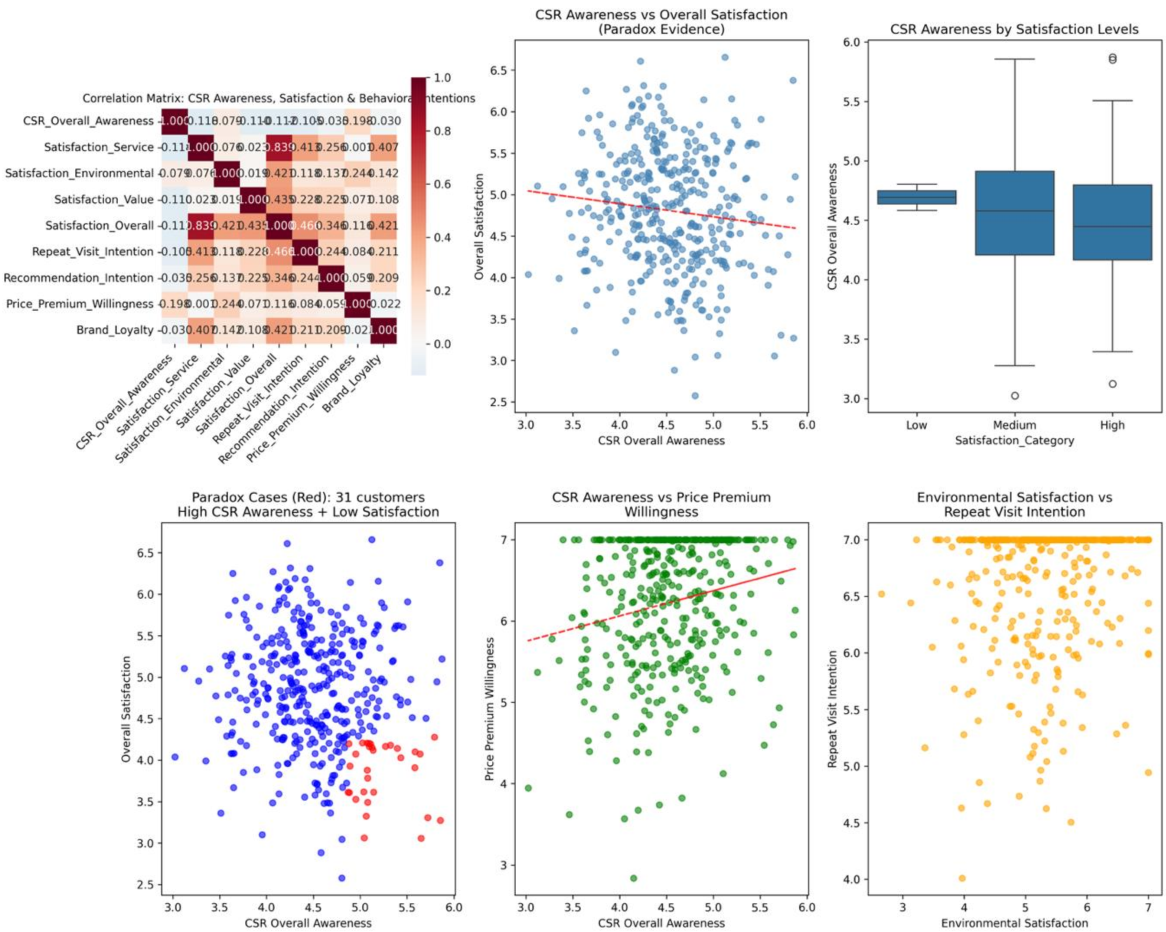
It is even more paradoxical to consider the dimensions of satisfaction. Service satisfaction ($r = -0.118$, $p = 0.018$), value ($r = -0.110$, $p = 0.030$), and facility ($r = -0.105$, $p = 0.038$) satisfaction had negative relationships with environmental CSR awareness. Although the correlations of satisfaction were negative, environmental CSR awareness showed a robust positive correlation with price premium willingness ($r = 0.198$, $p < 0.001$), showing that the aware customers are still ready to financially support environmentally responsible places even when they are not satisfied to the same extent.

3.3 Customer Segmentation Analysis

The K-means clustering analysis showed four customer segments with differing CSR awareness and satisfaction compositions. Cluster 0 was the group named Low CSR/Low Satisfaction and consisted of 76 customers (19.0%) with a moderately low awareness of environmental CSR (M = 3.87, SD = 0.26) and satisfaction levels (M = 4.33, SD = 0.59). Such customers were usually younger, with an average age of 38,5, and most preferred staying in luxurious hotels. Cluster 1, Low CSR/High Satisfaction, contained 125 customers (31.2 per cent) who were also slightly more aware of CSR (M = 4.22, SD = 0.29) but much more satisfied (M = 5.36, SD = 0.48). Primarily, this segment consisted of older customers with a median age of 47.2.

Cluster 2, representing the High CSR awareness but Low Satisfaction cluster, included 37 customers (9.2%), reflecting the satisfaction paradox. These customers were lowly satisfied (M = 4.11, SD = 0.44) even though they were highly aware of environmental CSR activities (M = 5.34, SD = 0.33). It is pertinent to mention that this segment possessed the highest level of income and the earliest average age (M = 35.8) and, therefore, was expected to have high environmental performance, which was not fulfilled to the full extent. Finally, there were 162 customers (40.5 per cent) in Cluster 3, which is identified as High CSR/High Satisfaction. What was revealed is that these women had a high degree of CSR awareness (M = 4.75, SD = 0.33) and great satisfaction (M = 4.94, SD = 0.66) with a well-balanced demographic structure and an average age of 43.1. In general, the results outline the unique segment of the paradox (Cluster 2), supporting the complexity of the customer reaction towards the environmental CSR in the hospitality field.

Figure 1. The K-means clustering analysis



3.4 Machine Learning Analysis

The Relative importance of factors in predicting customer satisfaction based on Random Forest analysis showed the following:

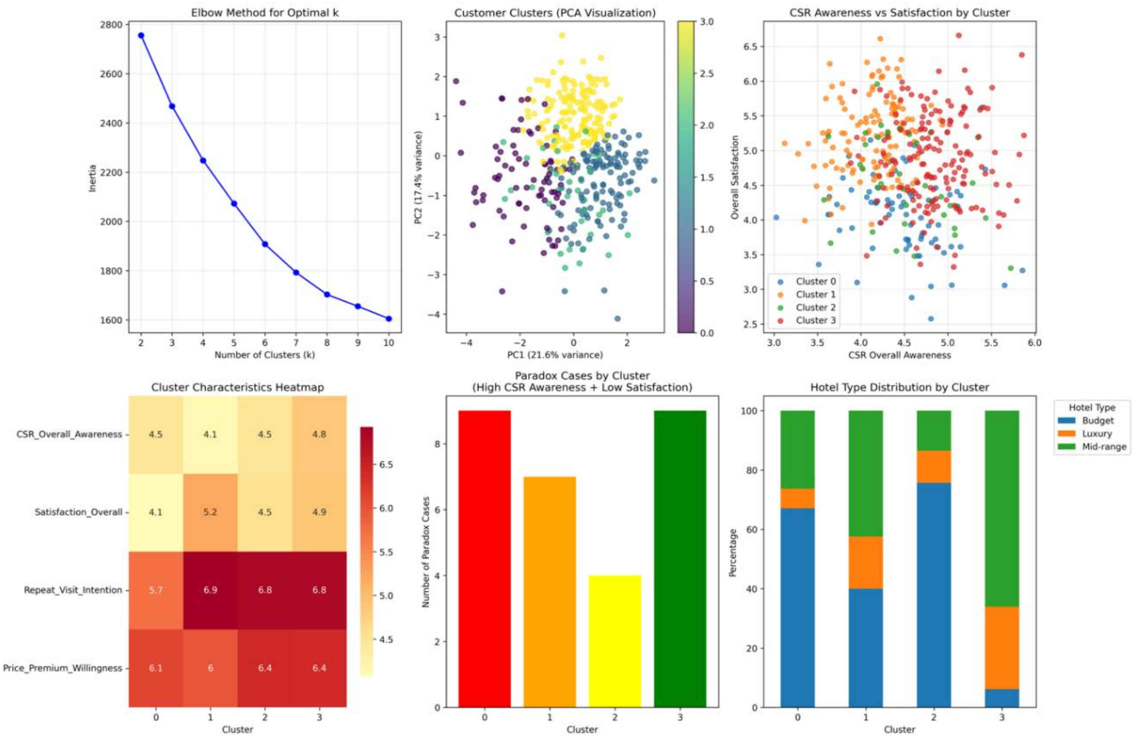
Table 3. Feature Importance for Customer Satisfaction (Top 10)

Feature	Importance
Hotel Type	0.1384
CSR Overall Awareness	0.1321
CSR Certification Awareness	0.0995

Feature	Importance
CSR Sourcing Awareness	0.0925
CSR Water Awareness	0.0899
Age	0.0855
CSR Waste Awareness	0.0842
CSR Energy Awareness	0.0763
Income	0.0595
Stay Duration	0.0487

The random forest model attained the best predictive effect on customer satisfaction (R 2 = 0.164) compared to other mechanisms, such as the Support Vector Machine (R 2 = 0.098) and Neural Network (R 2 = 0.087). It is important to note that variables influencing the CSR took out six of the top ten features of importance, proving that they play an important role in developing satisfaction.

Figure 2. The random forest model



3.5 Behavioural Intentions Analysis

Nevertheless, no matter the existence of the satisfaction paradox, environmental CSR awareness has a positive relationship with most behavioural intentions. Although neither the correlation with the repeated visit intent (r = -0.035) or with the loyalty intent (r = -0.030) was good enough to be statistically significant, the environmental CSR awareness displayed a positive but slight relation to recommend (r = 0.079, p = 0.120) and a more substantial statistically significant relation with the price premium willingness (r = 0.198, p < 0.001) and with the word-of-mouth intent (r = 0.16 These findings demonstrate that, even when customer satisfaction is not intensified, among more people who are cognizant of the environmental CSR activities of a firm, one will find desirable behavioural output. It implies that environmental values can change behaviour by bypassing dissatisfaction, affecting advocacy decision-making, high prices, and information disclosure.

4. Discussion

4.1 Theoretical Implications

The main contribution of this study is to fill the gap related to the inability to document and explain the environmental CSR awareness-satisfaction paradox in the hospitality setting. This finding that environmental CSR awareness and customer satisfaction relate negatively contradicts postulates that CSR and hospitality literature presuppose positive linear relationships between perceptions of CSR and the outcomes, perceptions, and customer satisfaction outcomes, as predicted by expectation-disconfirmation theory (Oliver, 1980). Customers with high environmental CSR awareness form high environmental performance expectations, which is hard for hospitality facilities to fulfil. Failure to meet such raised expectations leads to dissatisfaction despite the good environmental initiatives undertaken by the establishment, when these perceived results are poor. Even though behavioural intentions are positive even in scenarios that satisfy the satisfaction paradox, the values that the customers hold of the environment have provided direct channels to behavioural outcomes without travelling through the obsolete channels that involve satisfying customers first. It is consistent with the theory of planned behaviour (Ajzen, 1991), which states that subjective norms about environment-related responsibility directly affect intentions.

4.2 Practical Implications

The CSR awareness-satisfaction paradox presents both significant challenges and opportunities to hospitality managers. The standard practices aiming at pro-environmental CSR awareness might create an issue of customer satisfaction by setting the bar too high. The fact that the four customer groups were identified implies that varied CSR communication strategies should be employed. In the High CSR/Low Satisfaction category (9.2 per cent), managers need to seek ways of managing expectations and upping the delivery of environmental performance instead of merely creating awareness. As the CSR/High Satisfaction segment (31.2 per cent), satisfaction maintenance should be a priority. Gradually, a conclusion can be drawn by the positive relationship between CSR awareness and price premium willingness ($r = 0.198$), which was found despite challenges with satisfaction, thus giving hope that environmental initiatives may still have a monetary advantage using premium pricing approaches. This result provides the business case for investing in environmental CSR, even where satisfaction rewards are narrow.

4.3 Cultural Context Considerations

The Malaysian connectivity gives great pointers to the implications of cultural influences on CSR-customer affiliations. The sample, with its different ethnic backgrounds (Malay, Chinese, Indian, others), permits one to investigate the possible effect of various cultural values on the responses to the question of environmental CSR. Based on the clustering analysis, a background combined with age and income produced a unique pattern of responses to environmental CSR programs. Customers who are younger and of higher income (mostly found under Cluster 2) had the most pronounced effects of paradox (which could be due to them being more environmentally conscious and more demanding in terms of service positive relationships between CSR and customer satisfaction were presented in the case of older customers (Cluster 1), which indicates intergenerational variation in the level of environmental awareness and the formation of expectations.

4.4 Methodological Contributions

This research exemplifies the usefulness of integrating conventional statistical methods with machine learning processes in comprehending the relationship between CSR and customer. The Random Forest revealed non-linear relationships and interaction effects that could not have been easily identified with standard regression methods. Customer segmentation analysis based on K-means clustering indicated the heterogeneity of the CSR responses that may become a blur with aggregate-based correlation analysis. The methodology might be helpful to apply when conducting the CSR research in the future to learn more about a range of customer response patterns. There are a few limitations of the presented study, which should be considered, as well as recommendations for future studies.

To begin with, a cross-sectional design limits the ability to draw a causal conclusion that correlates the interdependence between CSR awareness and customer satisfaction. This can be overcome in future surveys using longitudinal designs to give better findings on the proposed expectation-disconfirmation mechanism in the

CSR awareness-satisfaction paradox. Second, the data in this research is synthetic, yet designed to resemble realistic patterns. It might not grasp the often-complicated nature of customer behaviour in a real-life scenario. Hence, there is a need to confirm this finding in future research using primary data from real hospitality consumers. Third, the research looks at a single CSR dimension: environmental. There is a chance that paradoxical effects differ across various CSR dimensions, such as social or economic initiatives. Comparative research of these dimensions would be helpful.

The project might be extended in several important ways in future. Longitudinal studies can observe the development of the CSR awareness-satisfaction paradox as customers become more enlightened about environmentally conscious businesses. Another valuable direction is cross-cultural validation, where cultural values can also determine the outcome of CSR activities regarding satisfaction. Moreover, intervention studies may be carried out to formulate and evaluate the methods of management that will help balance between mitigating the effects of paradox and maintaining the advantages of awareness of CSR.

Conclusion

In this study, the environmental CSR awareness-satisfaction paradox is the first thorough report of the phenomenon in hospitality services. The result of the fact that the increased consciousness of CSR by the environment is linked to diminished customer satisfaction is a challenge to prevailing CSR assumptions. It holds considerable implications for the sustainable management of hospitality. The study shows that the correlation between CSR awareness and customer performance is not linear, as is presumed, and customer segmentation determines various varieties in responses among various demographic and psychographic groupings. The present study also confirms that customers who are highly environmentally concerned continue to hold strong behaviour intentions and the ability to pay price premiums despite the problems of customer satisfaction, and this holds up the business case for environmental CSR as an ongoing investment in business.

The practical implications can be made regarding the hospitality managers who can no longer rely on mere awareness-level strategies but need to incorporate the concept of expectation-performance matching. By identifying different customer segments, there is now a basis for designing CSR communication and service delivery strategies based on the identified segment to obtain the most desirable results, maximally taking preventive measures to reduce or eliminate paradoxical effects. Theoretically, the study complements literature on both CSR and hospitality, since it proves the significance of considering expectation-disconfirmation processes when discussing the development of CSR-customer relationships. The paper also demonstrates the usefulness of blending traditional statistical methods with machine learning methods in comprehending the complicated patterns of customer behaviour. As the hospitality sector is moving towards more environmentally friendly processes, the awareness-satisfaction paradox of CSR becomes even more significant to the environmental and business goals to be reached. The research presents a background against which future research and practice can be based in this important field of sustainable hospitality management.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Impact of Marketing Activities on the Image of an Energy Company: A Case Study of Electricity Suppliers in Poland

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Abstract: In the energy sector, building a positive image has gained particular importance due to rising energy prices and the ongoing transformation. Companies in this sector now focus on operating with respect for the natural environment. Their activities align with the concepts of sustainable development, ensuring the security of electricity supply, and providing consumers with freedom of choice in goods and services. In the strategic document "Poland's Energy Policy until 2040", it is assumed that by 2040, zero-emission sources will account for more than half of the installed capacity. At the same time, decentralized and citizen-driven energy production, based on local capital, will continue to develop. This means that energy companies will compete for the prosumer market, which consists of individuals generating energy from small-scale renewable energy installations at home. From the perspective of an energy company, image creation therefore plays a crucial role in building market position and achieving a competitive advantage. Managing marketing activities to establish a positive image is therefore one of the key elements of the marketing management process within the company. There is a clear need for research and analysis in the field of marketing activities in the energy sector, as there is still a lack of publications dedicated to this topic. Moreover, the ongoing energy transition in Europe, aimed at achieving climate neutrality by 2050, presents energy companies with the significant challenge of shaping their image in alignment with the vision of the "European Green Deal". Therefore, the objective of this article is to determine how marketing activities undertaken by electricity suppliers influence their image.

Referring to the resource-based view (RBV) of the firm and signaling theory, research hypotheses were formulated, and a model was developed, assuming a positive impact of selected marketing activities on a company's image. To achieve the study's objective, a quantitative survey was conducted using the Paper-and-Pencil Interview method among a randomly selected sample of 503 electricity consumers. The collected data were subjected to statistical analysis.

The results show that marketing activities undertaken by electricity suppliers, such as offering energy products bundled with energy (packages), offering discounts, providing an online customer service platform, operating a physical customer service office and engaging in sponsorship activities, have a positive impact on their image.

This study is one of the first empirical investigations into the relationship between specific marketing activities and the corporate image of electricity suppliers in Poland. By integrating the resource-based view and signaling theory in the context of the energy sector's transformation, it offers a novel conceptual and methodological approach to evaluating image-building efforts in a highly regulated and evolving market.

This study has three main limitations. Focuses on selected elements of the marketing mix, omitting other potential factors that can influence the corporate image. Data were collected from household consumers, which can limit the depth of insight into perceptions of marketing activities. This study was carried out within the Polish energy market; therefore, it should not be assumed that the findings will apply to electricity providers operating in other countries or under different regulatory conditions.

The findings suggest that electricity providers can enhance their public image by implementing selected marketing activities. Specifically, offering other products along with electricity (packages), providing discounts, offering physical customer service offices and remote customer service offices, and sponsoring are recommended as effective tools for image building in the energy sector.

Keywords: marketing activities; marketing management; corporate image; energy market.

JEL Classification: L11; L14; M31; M37.

Introduction

The functioning of the Polish energy market has been shaped by European law, as Poland created and implemented the Energy Law in 1997, following the EU Directive 96/92/EC. Poland's subsequent accession to the EU in 2004 and its compliance with the EU Energy Package in 2007, along with its framework documents, granted households direct access to the competitive electricity market and the right to choose any electricity supplier. As a result of this liberalization, many new electricity suppliers emerged, leading to increased competition in the market (Wojtkowska-Łodej, Michalski, and Hawranek, 2014). With the liberalization of the energy market, electricity ceased to be treated as a commodity and became a product, with former consumers becoming customers (Taminiau, 2025). Today, electricity is one of the key resources and the fundamental product offered by energy companies' marketing efforts.

The Polish energy sector is one in which building a positive image has gained particular importance due to rising energy prices and the ongoing transformation (Wójcik-Jurkiewicz, Czarnecka, Kinelski, Sadowska, and Bilińska-Reformat, 2021). Companies in this sector are now focused on operating with respect for the natural environment (Rosak-Szyrocka, Żywiołek, and Mrowiec, 2022). Their activities align with the concepts of sustainable development (Stefańska, 2016; Hamed *et al.* 2025), ensuring the security of electricity supply, and providing consumers with freedom of choice in goods and services. In the strategic document "Poland's Energy Policy until 2040", it is assumed that by 2040, zero-emission sources will account for more than half of the total installed capacity. At the same time, decentralized and citizen-driven energy production, based on local capital, will continue to develop. This means that energy companies in Poland will compete for the prosumer market (Rodríguez-Vilches *et al.* 2024), consisting of individuals generating energy from small-scale renewable energy installations at home.

From the perspective of an energy company (Karltorp and Perez Vico, 2025), image creation plays a crucial role in building market position and achieving a competitive advantage (Sheykhan *et al.* 2024). The company's image is linked to its marketing activities (Fosu and Asiedu, 2024; Fosu *et al.* 2024), typically classified within the framework of the "4Ps" (product, price, place, and promotion). These activities encompass all marketing actions aimed at achieving goals (Kotler and Keller, 2018) such as fostering a positive company image (Holloway, 2025) or stimulating a positive consumer recommendation (Penc, 2001). Managing marketing activities to establish a positive image (Koch and Denner, 2025) is one of the key elements of the marketing management process within the company (Elhajjar, 2024; Krawiec and Krawiec 2017). Moreover, the ongoing energy transition in Europe, aimed at achieving climate neutrality by 2050, presents energy companies with the significant challenge of shaping their image in alignment with the vision of the "European Green Deal". There is a clear need for research and analysis on the impact of marketing activities on the image in the energy sector, as there is still a lack of publications dedicated to this topic. Previous Polish studies have focused on specific components of the marketing mix, most often promotion, and its influence on the image of entities in the banking sector (Fałowski, 2010), dairy industry (Parkita, 2017), hotels (Orfin-Tomaszewska and Sidorkiewicz, 2019), and in the FMCG sector (Oleś, 2017). Research conducted worldwide has primarily focused on issues related to advertising in terms of expenditures incurred, as well as sales promotion, distribution efficiency, core product, and price level in terms of their impact on a company's image. These studies encompassed entities from the sectors such as food and beverage (Sembiring, 2021), IT services (Kim and Hyun, 2011), and retail in the food industry (Mukonza and Swarts, 2020). However, research on the impact of marketing actions of electricity suppliers on their image is still lacking.

Therefore, the objective of this article is to determine how marketing activities undertaken by electricity suppliers influence their image. The relationship between marketing activities and the image of an energy company, which is the subject of this study, is grounded in the resource-based view (RBV) theory. This perspective considers a firm utilizing its tangible assets and capabilities in marketing efforts to achieve its objectives, including shaping its corporate image. However, since this relationship involves two parties – enterprises and consumers – the authors also frame the discussion within the signaling theory. According to this theory, a company conveys specific signals, but it is the recipient (consumer) who observes and interprets these signals to form their perception of the signaling company and its products. Referring to the RBV of the firm and signaling theory, research hypotheses were formulated, and a model was developed, assuming a positive impact of selected marketing activities from 4Ps on a company's image. To achieve the study's objective, a quantitative survey was conducted using the paper-and-pencil interview (PAPI) method among a randomly selected sample of 503 electricity consumers in Poland. The data collected were subjected to statistical analysis using Statistica 13.3, IBM SPSS 26, and MS Excel spreadsheets. The findings demonstrate that marketing activities undertaken by electricity suppliers, such as offering bundled products with energy (packages), offering discounts, providing an online customer service platform, operating a physical customer service office, and engaging in sponsorship activities, have a positive impact on their image.

1. Literature Review

Management actions refer to specific activities aimed at achieving organizational goals (Kotarbiński, 1975) or intended results (Mucha-Kuś, Sołtysik, Zamasz, and Szczepańska-Woszczyna, 2021). Marketing activities, as controlled actions taken by a company, seek to evoke desired responses from buyers and shape a positive, trustworthy image among consumers (Koch and Denner, 2025). These activities are often categorized within the marketing mix, known as the "4Ps" of marketing: product, price, place, and promotion (McCarthy and Perreault, 2002).

The term "image" in management science was first conceptualized in the 1950s (Martineau, 1958) and has since evolved in essence, complexity, and importance. By the 1990s, it became clear that success could not solely rely on product quality and pricing but also required a distinct company image to aid consumers in decision-making (Bombiak, 2015). Consumers make choices based on their perception, often with incomplete information. Negative perceptions may deter purchases, while positive ones can lead to buying and recommendations (Rudnicki, 2012). For this article, the authors define a company's image as associations triggered by the company's interactions with its environment, shaped by individual experiences, values, and benefits (Zawadzka, 2010). It influences perceptions (Lemmink, Schuijf, and Streukens, 2003) beliefs (Pomering and Johnson, 2009), and impressions about the organization. A positive image contributes to success and value creation in the competitive market (Spyropoulou, Skarmeas, and Katsikeas, 2010), leading to customer satisfaction and loyalty (Hart and Rosenberger, 2004). Companies aim to cultivate a positive image to enhance perceived value and achieve their goals through marketing activities.

The desire of today's organisations to have a specific image that distinguishes them in the market leads them to use various resources at their disposal to build their image in the eyes of customers, *i.e.* how they are perceived (Szlis, 2020). Therefore, if creating a desired image is a goal in the company's strategy and it is assumed that marketing actions based on the company's resources are used to achieve this goal, the relationship model between selected marketing actions within the "4P" framework and the corporate image aligns with the RBV theory. For the purpose of this article, the authors adopt the definition of corporate image as the associations formed in response to the messages and signals sent by the company to its stakeholders, where each individual evaluates the organisation based on his or her own experiences, values, and benefits (Connelly, Ireland, Certo, and Reutzel, 2011).

To the best of the author's knowledge, there is a lack of research on the impact of marketing activities on the corporate image of electricity suppliers, as stated in the introduction. In the following part of this chapter, research hypotheses related to each category of the marketing mix will be developed. The literature suggests that product-related marketing activities are important in shaping how a company is perceived by its customers. Characteristics of these activities include, among others, building product quality, service levels, provided warranties, and creating product lines in the company's offerings (Armstrong and Kotler, 2012; Rafiq and Ahmed, 1995). Customers' perceptions of a company arise from the accumulation of information through which buyers evaluate the company's offerings (Nguyen and Leblanc, 2001). In accordance with the signaling theory, this information stems from the marketing activities of companies that highlight certain aspects, such as the promise of high quality through warranties or the creation of product packages tailored to customer needs. This is intended to influence the positive perception of the energy company by its customers. A 2021 study shows that a green (ecological) product line has an impact on the perception of a company. This study focused on entities in the food industry in Indonesia and was conducted among firms (Sembiring, 2021). In another study conducted in the Korean market among companies in the IT industry, it was also shown that delivered quality, in this case through levels of service warranties, impacts the company's image (Kim and Hyun, 2011). In the context of the activities carried out by energy companies in the product area, it can be observed that in addition to the core product, which is electricity, for which uninterrupted electricity supply is guaranteed by companies (a fundamental quality criterion at the core product level), additional products are also offered, such as eco-friendly options (indicating electricity sourced exclusively from renewable energy sources or photovoltaic installations for homes with contracts for electricity purchase/sale). Offers for other products are also created in conjunction with electricity, such as natural gas or home appliances like boilers or air purifiers, signalling the satisfaction of various customer needs. Considering the above, the following hypotheses have been formulated:

H1: Offering other products along with electricity by the supplier positively influences its image.

H2: Ensuring the continuity of electricity supply positively influences its image.

Marketing activities related to pricing can be utilized to shape a company's image. Price is recognized as an initial attribute that influences the process of shaping a company's image (Dowling, 1986). The price can signal the quality of the purchased product (Yoo, Lee, and Donthu, 2000). The price level can suggest the product quality and can thus be associated with how the company is perceived (Kim and Hyun, 2011; Adhikari *et al.* 2025). An excesively high price for homogeneous products can have a negative impact on the company's image, as customers realise that they are simply paying more (Kim and Hyun, 2011). On the other hand, the use of discounts and rebates can suggest lower prices, and contribute to a positive perception of the company (Herbig and Milewicz, 1998). Characteristics of marketing activities in the area of pricing have been attributed to, among other things, setting discounts for the purchase of additional products, applying moderate or the lowest prices in the area/region (Poh, Ling, Saludin, and Mukaidono, 2011). In the context of the actions carried out by energy companies in the area of pricing, it can be observed that psychological discounts are already widely applied in fixed fees, for example, a monthly subscription fee of PLN 9.90. Seasonal promotions and discounts are less common. In light of the above, the following hypothesis has been formulated:

H3: Providing price discounts by the electricity supplier positively influence its image.

Distribution channels, owned by the company and its ability to create them in line with the expectations set by customers, as well as the standards offered in the market, can be used to shape the image (Dowling, 1986). By adjusting the intensity of the company's distribution channels, signals are sent to increase the level of convenience for customers, who engage less and sacrifice less in the purchase of products, thereby increasing their satisfaction level (Yoo *et al.* 2000). It has been shown that the intensity of distribution channels has a positive impact on the company's image (Ebeid, 2014), as does the performance of the sales channel (Kim and Hyun, 2011). Characteristics of marketing activities in the area of distribution have been attributed to, among other things, the creation of channels expressed by the distribution range, sales area, location of sales points, and customer service (Rafiq and Ahmed, 1995). Their attractiveness in terms of decor and convenience for customers, including convenient parking, short distance from the place of residence, or the possibility of reaching them by public transport (Poh *et al.* 2011). It is noted that customers prefer companies that have mastered online distribution channels, making them available to buyers and enhancing user convenience (Shpak, Kuzmin, Dvulit, Onysenko, and Sroka, 2020). In the context of activities carried out by energy companies, it can be observed that the largest ones operate physical customer service points, albeit in varying numbers and locations. The locations of these points also vary, with some companies having them exclusively in shopping centers, while others have them in county and provincial towns, often situated on main streets and city centers. Some electricity suppliers do not have physical service points at all. Additionally, the majority of energy companies, including smaller ones, offer alternative distribution channels in the form of websites and electronic platforms, thereby influencing the distribution reach and sales area. In this regard, the following hypotheses have been formulated:

H4: Providing a physical customer service office by an electricity positively influences its image.

H5: Providing a remote customer service office by an electricity supplier positively influences its image.

The ability to undertake and create appropriate promotional activities, including communication and sponsorship, can be used in shaping the image. Advertising is perceived as one of the most visible marketing activities (Buil, 2013). When consumers encounter a company's advertisement, they automatically form an image of it, not necessarily positive. Corporate advertising objectives, in line with the theory of attitudes, would be actions aimed at creating awareness and knowledge of the company among consumers (Dowling, 1986). The amount spent on advertising indicates the company's investment in its brand (Yoo *et al.* 2000). Characteristics of promotional activities include not only advertising but also engaging in events and consciously, purposefully, systematically and strategically influencing the environment through sponsoring entities and events (Rafiq and Ahmed, 1995). In the context of activities carried out by energy companies, it is common to observe advertising on the Internet, the use of billboards in urban areas, displays in sales points, as well as promotion through sponsorship and supporting sports, cultural, or other local community events. In light of the above, the following hypotheses have been formulated:

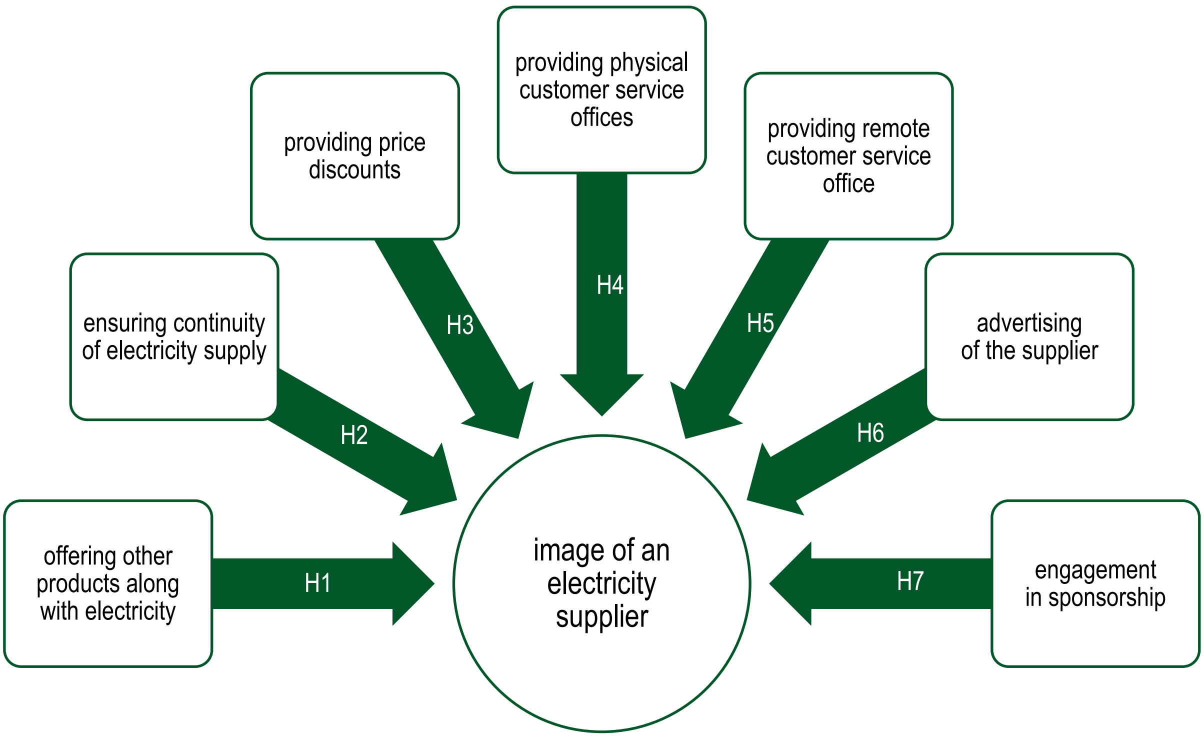
H6: Advertising by the electricity supplier has a positive impact on its image.

H7: Engagement in sponsorship by the electricity supplier has a positive impact on its image.

2. Methodology

To examine the relationship between specific marketing activities within the scope of the marketing mix and the image of an electricity supplier, a research model was developed (Figure 1).

Figure 1. Research model



Source: Own work.

The verification of research hypotheses and the achievement of the study's goal were facilitated by a quantitative study conducted based on primary sources. To gather empirical material, a survey (PAPI) was carried out among individuals responsible for cooperation with the electricity supplier in households in Poland.

The units of the studied population were households in Poland purchasing electricity for their own needs. The sample selection utilized a natural list of population units, considering the geographical distribution of households resulting from their place of residence. The sample size was 503 units, and the "random-route" method was used for its selection. Face-to-face interviews, using a standardized questionnaire, were conducted within households among individuals responsible for cooperation with the electricity supplier in a household.

In the random-route method, 80 randomly selected starting points were used. Firstly, the map of Poland was divided into territorial units according to the Nomenclature of Territorial Units for Statistics (NTUS). Sixteen voivodeships were assigned to six regions and based on the analysis from 16 provincial offices of the Central Statistical Office in Poland – specific towns for the survey were identified, meeting the criterion of the size of the place of residence (local NTUS level). The selected towns were assigned a street name randomly chosen from the publicly available Google Maps service. The first housing unit (*i.e.*, an apartment or a single-family house) was selected as the starting point. Subsequently, the interviewer moved to the next apartment or house, interviewing residents, while interviews were not conducted at the starting points. Buildings were counted by moving to the right from the selected house, on the same side of the street.

Concerning the questionnaire, the Likert scale was used to measure the independent variables describing the marketing activities of the electricity supplier. For each of these variables, a positive statement was constructed, and respondents were asked to indicate the extent to which they agree or disagree with the statement. The degree of agreement was assessed on a five-point scale, with points defined verbally from “strongly disagree” to “strongly agree”. On the other hand, the measurement of the dependent variable, expressing the image of the electricity supplier, involved evaluating this image based on a five-point scale, with points described verbally from “decidedly negative” to “decidedly positive”. The questionnaire was tested in a pilot study before conducting the main survey. A pilot study was conducted using the direct personal interview technique (PAPI) employing the snowball sampling method. It encompassed a sample of 53 Polish residents, all consumers over the age of 18 who purchase electricity for household use. The pilot study included 39 women, accounting for 74% of the respondents, and 14 men, representing 26% of the sample.

The evaluation of the image of the energy company, based on respondents’ opinions, was verified in relation to specific factors associated with the characteristics of the supplier. The results of the analyses conducted allow for the verification of research hypotheses. The decision to reject individual null hypotheses in favor of alternative hypotheses was made based on statistical analyses using the chi-square test of independence. It was assumed that individual null hypotheses would be rejected at a significance level of $p > 0.05$. Tabular summaries were created while conducting chi-square tests using Statistica 13.3.

The participants in the sample were classified based on their gender, age, and the size of their place of residence. Regarding gender, there were slightly more women (52.0%) than men (48.0%) in the sample. The majority of the participants resided in rural areas (33.4%), followed by cities with a population of over 200,000 (28.6%), then cities with a population ranging from 20,000 to 200,000 (24.9%), and the fewest participants resided in cities with less than 20,000 inhabitants. The majority of the respondents were in the age range of 30 to 49 years (50.9%), followed by the age group of 50 to 59 years (31.8%), then those over 60 years (14.7%), with the fewest participants in the age group of 18 to 29 years (2.6%).

3. Research Results and Discussion

In the considered research model, the independent variables included: offering additional products along with electricity, ensuring continuity of electricity supply, offering price discounts, providing a physical customer service office, providing a remote customer service office, advertising by the supplier, and engagement in sponsorship activities by the electricity supplier. The dependent variable was the image of the electricity supplier. The results are presented in Table 1.

Table 1. The effects of independent variables on the image of the electricity supplier

Variable	x^2	P-value)
Offering other products along with electricity	47.156	0.000
Ensuring continuity of electricity supply	8.188	0.085
Providing price discounts	29.985	0.000
Providing physical customer service offices	15.408	0.004
Providing remote customer service offices	13.912	0.008
Advertising by the supplier	9.107	0.058
Engagement in sponsorship	21.104	0.000

Source: Own work.

The results presented in Table 1 indicate that the following factors positively affect the image of the electricity supplier: offering other products along with electricity ($\chi^2 = 47.156$, $p < 0.001$), providing price discounts by the electricity supplier ($\chi^2 = 29.985$, $p < 0.001$), providing physical customer service offices ($\chi^2 = 15.408$, $p < 0.01$), providing a remote customer service office ($\chi^2 = 13{,}912$, $p < 0.01$), and engagement in sponsorship activities by the electricity supplier ($\chi^2 = 21.104$, $p < 0.001$). Therefore, the following research hypotheses were accepted: H1, H3, H4, H5, H7. However, no statistically significant impact on the electricity supplier’s image was observed for the following variables: ensuring continuity of electricity supply ($\chi^2 = 8.188$,$p > 0.05$), and advertising by the electricity supplier ($\chi^2 = 9.107$, $p > 0.05$). As a result, the following research hypotheses were rejected: H2 and H6. The analysis results verified the research hypotheses. For hypotheses H1 and H2 related to the product category, offering additional products alongside electricity positively impacted the energy company’s image. However, contrary to expectations, ensuring continuity of electricity supply didn't show the same effect, which was unexpected. Previous studies in the IT industry have shown that service quality influences company image. The result here may suggest that the reliability of electricity supply is now a basic expectation, not affecting energy companies' image. Regarding the price category and hypothesis H3, offering price discounts positively influences the image of the electricity supplier. This is likely because consumers benefit from lower electricity fees. Previous research supports this positive impact of pricing activities on the company's image (Herbig and Milewicz, 1998; Ling *et al.* 2012). Regarding distribution, providing physical customer service offices and providing remote customer service offices positively influences energy companies' image, as hypothesized (H4) and (H5). This aligns with other studies showing the positive impact of sales channel performance (Kim and Hyun, 2011) and proprietary distribution channels (Ebeid, 2014) on a company's image. In the promotion category, where hypotheses H6 and H7 were proposed, the results may seem surprising due to the rejection of the sixth hypothesis (H6). Previous studies have shown a positive link between advertising spending and company image, but these focused on product categories other than electricity, such as FMCG and food products. These products often use costly television ads for wider reach, unlike electricity suppliers. These differences may explain the varied results in advertising impact. However, regarding the seventh hypothesis (H7), it is clear that sponsorship positively influences energy companies' image, aligning with expectations and previous research (Rafiq and Ahmed, 1995).

Conclusions and Further Research

The study investigated how selected marketing activities affect the image of electricity suppliers. Seven activities across different marketing categories were examined. Drawing from the RBV and signaling theory, each activity was assumed to positively impact on the supplier's image, as hypothesized. These hypotheses were tested using survey data collected from households that use electricity.

The adopted research model assumed the influence of the analyzed marketing activities on the image of electricity suppliers. The results of the empirical study demonstrated that out of the seven examined marketing activities, five had a positive impact on the image of electricity suppliers. These activities spanned the following marketing mix categories: offering other products along with electricity (packages) in the product context, providing discounts in the price domain, offering physical customer service offices and remote customer service offices in the distribution realm, and sponsoring in the promotion domain. The results of the analysis indicate that these marketing activities, encompassing different elements of the marketing mix, have a positive impact on the image of electricity suppliers. This is a significant theoretical insight from the study and contributes to the field of marketing management in electricity supply companies.

Based on the findings, practical recommendations for electricity suppliers are provided. They should integrate the following marketing activities into their marketing mix to enhance their image among households: offering additional products alongside electricity (*e.g.*, private healthcare, access to technicians for minor home repairs), providing discounts (*e.g.*, reducing energy prices for contract extensions), ensuring access to remote customer service and physical customer service offices (*e.g.*, setting up service points in accessible shopping centers), and engaging in sponsorship (*e.g.*, sponsoring local sports events).

This study has limitations. One of these concerns its focus on specific determinants of electricity suppliers' image, namely selected marketing activities. Other unexplored factors may also influence suppliers' image, such as unique marketing activities or factors beyond the marketing mix. Additionally, adopting a consumer perspective, while suitable for image evaluation, has limitations in assessing marketing activities due to consumer perception levels. Conducted on domestic electricity suppliers, the study's results may not directly apply to other industries or countries. The limitations listed suggest potential avenues for future research. Future studies could explore additional determinants of company image beyond those in the marketing mix, such as environmental responsibility or operational transparency. Long-term research assessing marketing activities at the company level and image at the consumer level could provide valuable insights. Testing the research model in different countries is another avenue for exploration, with adjustments made for specific local conditions. Further research could also delve into the outcomes of a company's image, such as customer advocacy or engagement with supplier actions.

Credit Authorship Contribution Statement

Jakub Dąbrowski: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization.

Edyta Gołąb-Andrzejak: Project administration, Writing – original draft, Supervision, Writing – review and editing, Visualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies in the writing process before submission.

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Expo 2020 Dubai as Experiencescape to Build Image of Exhibiting Countries: Perspective of Polish Pavilion Personnel

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Abstract: The study aimed to explore world exhibitions (commonly referred to as Expos) as a place where image-related activities of exhibiting countries are performed – and the exploration was based on the experiencescape perspective. A reference was made to Expo, which in 2021 and 2022 was held in Dubai.

An individual in-depth interview was employed (a semi-structured interview), which covered 20 people serving visitors in the Polish pavilion for three months during Expo 2020 Dubai. Empirical material was developed following the rules applicable to reflexive thematic analysis.

The analysis of the empirical material made it possible to identify five topics (categories) characterising a contemporary Expo as experiencescape. The following topics were identified: (1) a unique presentation of almost all countries at one time and place; (2) multiple accompanying events; (3) promotion of countries through the latest means of expression; (4) a place with a unique atmosphere, where above-average experiences are delivered; (5) a space where event participants can be overstimulated. These categories should be the main areas of decision-making in the process of preparing and implementing national presentations, as well as provide directions for future scientific research dedicated to world exhibitions.

The study shows originality, as no other work has been published in the scientific literature to date that has considered world exhibition grounds as experiencescape.

Exhibiting countries were given guidelines to prepare national presentations meeting the expectations of Expo participants and ensuring the effectiveness of image-shaping activities.

Keywords: nation branding; mega-events; world exhibitions; customer experience; experiencescape; Expo 2020 Dubai.

JEL Classification: M31; Z32; Z33; Q01.

Introduction

Each country uses many forms of marketing communication as part of nation branding, focusing on different groups of recipients – tourists, previous and future residents, potential investors, politicians, journalists. World/universal exhibitions (commonly referred to as Expos), being an important space for countries' image-related activities for more than 170 years, have changed their character over time. World exhibitions have evolved from mere showcases of industrial achievements, through the era of cultural exchange to platforms for nation branding (Hughes, 2012, 71; Kovačević, Hristov-Stančić, and Zečević, 2024, 248). Contrary to the first editions of the exhibition, industrial products are no longer a novelty per se but Expos are still a showcase of the world with opportunities for communication, investments, development, trade and tourism (De Groote, 2005, 14). Contemporary Expos are pivotal occasions that allow both host and participating nations to present and cultivate a given image and to draw the attention and recognition of other countries (Dornscheidt, Groth and Reinhard, 2005, 904). In the context of world's fairs, some even refer to the era of performative branding practices (Ren and Gyimóthy, 2013). The continuous evolution of the world exhibition function, as well as changes in the ways in which exhibiting countries display their offers, entail the need to study and describe such events. In addition, changes in the expectations of modern people, who want to experience more and more in their lives, have become one of the key challenges for brand managers and due to them, many levels of marketing communication are directed towards providing stimuli that strongly affect all the senses (Wiedmann *et al.* 2018, 101). Consequently, this creates in recipients the value they desire, triggers their involvement and makes them emotionally tied to a brand of the sender of a message (Pine and Gilmore, 1998, 97; Shaw, 2005, 51; Hultén, 2011, 269). This is particularly important in the context of building a long-lasting brand image. Nowadays, consumers crave experiences and increasingly demand immersion into them. The same also applies to world exhibitions (Björner and Berg, 2012, 40; Gębarowski, 2019, 42). For this reason, the purpose of this article is to evaluate the latest world exhibition (which was called Expo 2020 Dubai) as a space for providing a strong visitor experience and thus shaping in them the desired image of exhibiting countries. In order to achieve the author's objective, a qualitative study was conducted in the form of individual in-depth interviews with people working at Expo 2020 Dubai.

The topic in question is relevant because world exhibitions play an important role in nation branding. Indeed, Expos are often accorded – due to the enormous scale of organisational activities, a huge number of exhibitors and visitors attending the event and widespread global media coverage – the status of mega-events (De Groote, 2005, 12; Frost and Laing, 2018, 8; Minner, Zhou and Toy, 2022, 1). A mega-event is understood as a high-profile, short-term, one-time event that differs from ordinary life and is arranged at a unique moment, involving ceremonies and/or celebrations. Such events have an extraordinary status in society due to their periodicity and large scale (Björner and Berg, 2012, 31). Expos are seen as ones of the greatest global undertakings – apart from the Summer and Winter Olympics, Football World Cup, European Football Championship and Asian Games (Müller, 2015, 636). Keeping track of changes in the world exhibition formula, as well as recognising the needs of their participants, is important not only to those who make national presentations, but also to the scientists who intend to carry out their research in relation to future Expos.

It is generally accepted that the history of world exhibitions began with *The Great Exhibition* (the full name of this event is *The Great Exhibition of the Works of Industry of All Nations*), which was held in 1851 in London's Hyde Park. The rights to hold exhibitions are granted by the *Bureau International des Expositions* (BIE). This intergovernmental organisation was established in 1928 in Paris and currently has 184 member states. In addition to these major exhibitions World Expos (which are the centre of attention in this article), the BIE also allows for the organisation of three other smaller types of events, namely: *Specialised Expos*, *Horticultural Expos* and *the Triennale di Milano*. To date, there have been 35 events having the status of universal exhibition. In the past, world's fair was organised irregularly – every couple of years or even more rarely. In the current century, Expo is held every five years and lasts for six months. The last world exhibition was Expo 2020 Dubai, which was held from 1 October 2021 to 31 March 2022 (the original date of the exhibition was postponed by a year due to the COVID-19 pandemic). Dubai saw the offers of 192 exhibiting countries and 24.1 million people visiting the event. The motto of the exhibition was: *Connecting Minds, Creating the Future*.

This article, which examines the building of national images through the intentional design of world exhibition spaces in the context of the experiencescape concept, explores an innovative area of research. It begins to address a research gap (identified in the following section of the article), thereby encouraging further scholarly inquiry. The topic is both timely and important, as it considers world exhibitions as arenas for delivering unique experiences. Such experiences are increasingly expected by contemporary customers, including the target groups of national presentations at Expos.

1. Literature Review

The scholarly literature has so far linked world exhibitions to image-related effects only in selected, narrow aspects – despite the fact that the use of Expo in place branding has been considered one of the key research areas (Richards, 2023, 75). Previous explorations took into consideration the impact of the architecture of national pavilions on the image of exhibiting countries (Bonenberg, 2015; Wang, 2013; Abou-Shouk *et al.* 2018; Swift, 2024; Çelenk Çavdar and Tavşan, 2025). In the context of the image, activity undertaken in single presentations was also analysed (Dogan, 2018; Kovačević, Hristov-Stančić, and Zečević, 2024). Some researchers focused on the Expo's impact on the image of host cities (De Carlo *et al.* 2009; Dynon, 2011; Kim *et al.* 2012; Yu, Wang and Seo, 2012; Carta, 2013; Larsen, 2014; Lv *et al.* 2017; Panwar, Chopra, and Haddad, 2024) or host countries (Chen, 2012; Xue, Chen and Yu, 2012; Lee *et al.* 2014; Aguerrebere *et al.* 2023; Yawen, 2023; Nicolescu and Barbu, 2024). What was also covered by research, is the question how world exhibitions are perceived by local residents (Yang, Zeng and Gu, 2010; Hereźniak and Florek, 2018; Magno and Dossena, 2020). As regards the image of exhibitions themselves, attention was paid to the selected elements that determined this image (Deng, Li and Shen, 2015; Yoo and Han, 2024).

The second key area addressed in this publication is the experiences of the people who attended the Expo. World exhibitions and visitor experiences were linked occasionally in not very in-depth analyses. The place of mega-events (including also world expositions) in the concepts of experiences, experiential marketing and co-creation of experience was identified, as well as the significance of experiences in the development of long-term relationships with exhibitors' brand (Björner and Berg, 2012). Researchers examined the internal and external factors influencing visitors' participation in world exhibitions (Arya *et al.* 2024). A reference was made to the need for holistic and coherent activation of the senses of people visiting national exhibitions (Gębarowski, 2019). The concept of "brand experience" was also described in the context of Expo, as well as it was determined how visitor experiences affect the overall evaluation of selected pavilions (Wang, 2013).

The experiencescape approach adopted for these considerations is derived from the servicescape model, the name of which was formed by combining the words "service" and "landscape". That primary model was developed by Bitner (1992), which was based on the effect of the physical environment that impacts on the behaviours of customers and employees in service organisations (Mari and Poggesi, 2013, 172). Servicescape refers to the total impression of a service encounter developed through the use of human senses (Sag, Zengul and Landry, 2018, 94). The experiencescape approach is an expanded version of servicescape (Tasci and Pizam, 2020, 999) and is centred around a comprehensive understanding of the consumption environment, involving not only the physical dimension but also other dimensions. This concept takes into consideration how experiences are staged and consumed (Kandampully, Bilgihan and Amer, 2023, 325). The experiencescape encompasses the entire experience environment where the production and consumption of experience occurs (Chen, Suntikul and King, 2020, 1048). However, it seems that experiencescape should be referred in particular to the environment in which strong stimuli interact with recipients, which as a result, evokes these recipients' lasting memories of and emotional connections with a brand (Kandampully, Bilgihan and Amer, 2023, 333).

Over time, the servicescape approach received attention among researchers in many different fields resulting in a line of terms containing the ending "scape", which extended the concept's use in different product and service settings. This includes, among other things, brandscape, retailscape, sportscape, cyberscape, virtual servicescape, performancescape, consumptionscape, e-servicescape, designscape, dinescape and festivalscape (Pizam and Tasci, 2019, 26). A word which appeared in the trade fair literature was boothscape (Gilliam, 2015; Woo and Jun, 2017; Shinyong, Soyoung and Joon, 2023). The perspective described by this term is used when trade fair booths are seen as a space conducive to creating the atmosphere desired by exhibitors and strong stimuli are provided to visitors – in principle, in the form of such experiences which are unique, memorable, and even bring them into a state of immersion. As far as world exhibitions are concerned – given the fact that exhibitors utilise, instead of individual stands, large facilities (pavilions) – it seems reasonable to retain the term experiencescape or use the word exhibitscape in relation to Expo (adhering to the convention of creating neologisms by adding the suffix "scape").

In the light of a review of scientific publications, based on which the state of knowledge relating to the combination of nation branding and experiencescape during world exhibitions could be determined, a research gap has been identified. As a matter of fact, previous studies did not treat Expo grounds as a place of multisensory impact on people participating in the event; a place that enables exhibiting countries to evoke unique experiences in these participants.

2. Research Methodology

The empirical material was obtained using individual in-depth interview (a semi-structured interview). This method, classified as qualitative research, used a scenario consisting of several open-ended questions. The interviews were conducted using one of the remote communication platforms. Each interview was recorded from the beginning to the end, and the answers recorded were transcribed. Next, the material obtained was coded and a reflexive thematic analysis was carried out, following the rules applicable to this method (Braun and Clarke, 2022). The data processing used Computer-Assisted Qualitative Data Analysis Software (CAQDAS).

The respondents were students of Krakow University of Economics (KUE), who went through a multi-stage recruitment process and were sent as members of the Polish pavilion personnel on behalf of the Polish Investment and Trade Agency (a governmental company responsible for the national presentation at Expo 2020 Dubai). The study involved 20 people (all KUE students sent to Dubai) who served paid internships, promoting the country at the World Expo in two rounds (each round lasted three months) – during which they were responsible, among other things, for tours of the pavilion for visitors or taking an active part in a variety of events. Given the specific nature of human memory, meaning that people forget certain details over time, it was assumed that the empirical material would be collected from the respondents within six weeks of their return from the exhibition. The interviews were conducted in two rounds, depending on the time students returned from the internships served during the Expo. The first round of collecting the empirical material took place between 10 Feb and 14 Feb 2022, and the second one between 20 Apr and 09 May 2022. Each respondent gave informed consent to participate in the study and to the recording of their answers. The interviewees' profile is showed in Table 1. The respondents were marked with the symbols from S1 to S20, which were used in the presentation of the study results.

Table 1. Research Participants' Profile

Symbol	Gender	Age	Year of Study	Symbol	Gender	Age	Year of Study
S1	Male	22	Second	S11	Male	21	Second
S2	Female	22	Third	S12	Female	21	Third
S3	Female	26	Third	S13	Female	22	Third
S4	Female	22	Fourth	S14	Male	22	Second
S5	Female	23	Fifth	S15	Male	19	Second
S6	Female	23	Fourth	S16	Male	22	Second
S7	Female	24	Fifth	S17	Female	20	Second
S8	Female	22	Third	S18	Male	22	Third
S9	Male	22	Fourth	S19	Female	21	Second
S10	Female	21	Second	S20	Female	20	Second

Source: own elaboration.

The following research problem was formulated: what – in the opinion of those who thoroughly familiarised themselves with Expo 2020 Dubai – characterises the event as a space for providing strong experiences (experiencescape) in the context of creating the image of exhibiting countries? During the interviews, the researcher attempted to get, in the context of the aforesaid research problem, elaborate answers from the respondents to the following questions: (1) Does the Expo have a unique atmosphere that is conducive to the promotion of individual countries – and if so, what determines this atmosphere?; (2) How the program (accompanying events) of this mega-event can be evaluated?; (3) Which means of expression are the most effective in the promotion of exhibiting countries at the Expo?; (4) Do the experiences gained at the Expo differ from everyday (average) life experiences – and if so, what distinguishes such experiences (which realms of an experience do prevail)?; (5) Is there anything that is a barrier to the process of building exhibitors' brands during the Expo?

It must be noted that the time which the interview participants spent at the Expo 2020 Dubai grounds, as well as the roles they played there, were sufficient to gain a good understanding of the event. This is evidenced by the following respondents' answers, for example: *I often felt that I fully co-created the Expo* (S1); *To me, it was a place that we didn't just visited; we could get to know the exhibition thoroughly – not only from the side of countries' presentations, but also from behind the scenes* (S4); *Our friends (the staff we were friends with) showed us around many pavilions, so we got a close look at various aspects of exhibit marketing* (S11).

3. Results

The extensive empirical material underwent a process of reflexive thematic analysis (including precise coding). As a result, topics (categories) describing Expo 2020 Dubai were identified with reference to the research problem. The following categories were identified: (1) a unique presentation of almost all countries at one time and place; (2) multiple accompanying events; (3) promotion of countries through the latest means of communication; (4) a place with a unique atmosphere, where above-average experiences are delivered – mainly by entertainment and education; (5) a space where event participants can be overstimulated.

Many interviewees pointed out that the world exhibition is a one-of-a-kind event during which, at a fixed time and place, almost all countries make their presentations. This perception of the Expo was reflected in the following answers: *It was an amazing experience; the one and only event on such a scale – providing a unique opportunity to communicate in one place with representatives of different countries and learn about different cultures* (S8); *My first association with the Expo was internationality; there is no other place on earth where you can feel multiculturalism so deeply*; *you could talk freely with representatives of many countries and actually feel like a citizen of the world* (S12); *It was amazing to me that the whole world is able to meet in one place once* *every five years and present their achievements – encouraging people to visit individual countries* (S9); *It was surprising that nearly 200 different nationalities gathered under "one roof"; and it happened with one idea in mind* (S16); *you could feel as if our enormous globe had been closed on the area of just four square kilometres* (S4). In the course of an in-depth analysis of the empirical material – in sub-categories (1A, 1B and 1C) – the consequences of the world exhibition characteristics included in the first category (namely that many countries are presented at one time and place) were identified. The following consequences were identified: (1A) an opportunity to conspicuously stand out from other countries and successfully attract tourists or investors; (1B) an opportunity to expand knowledge of individual countries; (1C) a place for increasing intercultural competence through interactions established by event participants. The following answers were classified under Category 1A: *My observations are that the Expo provides important experiences in the context of stimulating tourism* (S3); *The Expo brought the world closer to me; I've discovered the places I'm not able to travel to at the moment (for financial reasons); but I learned about the attractiveness of those places and maybe I'll fly there someday* (S9); *Now I know that the world exhibition is an opportunity for each country to present its various achievements (e.g. economic ones); it seems to me that it is an opportunity for each exhibitor to stand out and promote itself* (S17); *It was a kind of a "marketplace" where visitors were persuaded to "buy" a given country; they tried to show the exhibitors' offers as creatively as possible, thanks to which many visitors started to feel like visiting the countries they hadn't known before* (S18). The following answers were classified under Subcategory 1B: *I remember my conversation with one student from the United Arab Emirates; he told me that he walked around the exhibition quite a lot for three days (local schools had holidays at the time) and learned more about different countries through the exhibition than he did during the entire period of attending school lessons* (S3); *Many pavilions educated and focused on entertainment – most often exhibitors provided a lot of information about them and offered various attractions* (S5); *Educating visitors of the exhibition was common – almost every country presented its culture extensively (in various forms)* (S20). The following interview excerpts were assigned to Subcategory 1C: *Everyone who stayed in Dubai had an opportunity to develop – to learn about other cultures* (S8); *The Expo offered possibilities for development by meeting people from different (often distant) countries; this allowed me to be extremely opened to other cultures* (S10); The *Expo is multiculturalism – thanks to this you could interact with visitors from distant cultural circles* (S17).

Interviewees often linked Expo 2020 Dubai with a multitude of accompanying events. In this context, the following answers were given: *The Expo is not only pavilions, but also a lot of events that serve as a separate level of communication* (S12); *I was surprised by the magnitude of the exhibition; I mean the number of cultural events – concerts and shows* (S9); *The Expo has filled me with admiration because of the extent to which its organisers are committed – the very fact that there were more than 90 events each day shows the extremely rich offer for visitors* (S10); *There was always something happening and something you could experience; every day there were artistic events that encouraged people to come to a particular pavilion or some other specific place* (S8); *Parades were staged almost all the time – whether with people from various countries or initiated by Expo organisers; wherever you went, you could hear some music or see someone dancing (S13); It was amazing that every time we came back from work in the Polish pavilion we could come across several concerts taking place at the same time; all the time we were surrounded by something interesting; there was always something going on that we wanted to see; many times, we were wondering where to go, because it was not easy to choose one event (S4); The biggest stars of the music scene, theatre, celebrities associated with dance, athletes were invited to the Expo – among these guests, you could see for example Robert Lewandowski, Cristiano Ronaldo, Luis Hamilton; rulers of various countries also arrived there (S18).*

The Expo 2020 Dubai space was filled with many national presentations based on the latest information and communication technologies (ICT). The in-depth analysis identified three subcategories: (3A) own promotion with videos – often shown on original and high-tech media; (3B) use of virtual reality (VR); (3C) bringing into a state of escapism (immersion) people affected by content presented by means of the latest solutions. As regards film-based presentations of exhibiting countries, the respondents said as follows: *Most exhibitors based their presentations on films, which – depending on the pavilion – were displayed on walls or ceilings, sometimes the screens had unusual shapes, sometimes they were moving; more or less original ideas were used, but video solutions were present in the vast majority of pavilions* (S7); *Once you got into pavilions, you could often watch some kind of film; sometimes interactive games were displayed on screens; both films and games allowed – in an atmosphere of entertainment – to learn something about a given culture* (S8); *Expo 2020 Dubai can be seen as a "television competition"; many pavilions had screens, screens, screens – millions of animations; it was impossible to watch* everything (S15). Virtual reality was referred to by three respondents, who said: *I'm not able to count the number of VRs I saw in various pavilions* (S4); *Elements based on virtual reality were integrated into the* *presentations of many countries – these were very advanced IT solutions* (S9); *Presentations were shown using VR platforms, multimedia films or special performance – in order to encourage people to visit a particular country* (S18). As regards the issue of triggering escapism through ICT, the following opinions were given: *It was definitely a technological Expo; innovative means of expression were evident in the most of pavilions (at least one of the presentation areas in almost every pavilion was based on such means); modern technologies were used to help escape from reality; in the most of the pavilions I indeed moved to another world* (S12); *It sometimes happened that you could forget about the whole world; as a matter of fact, the presentations were so beautiful – from animations on the screens and light illuminations, to concerts and other events* (S18); *We sometimes talked with each other about the fact that we perceived our stay at the Expo, thanks to the technological world created there, as a long dream – a dream that was intense and pleasant* (S19).

Study participants indicated that the Expo was characterised by a unique atmosphere. In this context, the following answers were given: *To tell about this exhibition seems to be a difficult task – I don't think it's possible to describe this unique atmosphere* (S1); *It was something you can't describe until you see it, I will recommend to all my friends to visit any of the future world exhibitions* (S6); *The Expo is amazing; I couldn't believe that I wasn't aware before that I could be a part of something so special* (S10); *It was such a magical micro-world for me – a little bit, like Disneyland* (S3); *When I walked through the Expo gate for the first time, I felt that it was a completely different world – something futuristic; something that I had never seen in any amusement park; it was really like science fiction* (S16); *The exhibition area was a completely different world; whenever I came there, I felt this unique atmosphere – I felt like I was in some kind of game or movie* (S17); *This "small world", as I like to call the Expo, was something completely different from the reality I had always lived in; the exhibition was something I had never been able to imagine before; it was a completely new environment, so much different* (S4). Many answers described the Expo grounds as a place where experiences were created in exhibition participants by giving entertainment (this was pointed out most often) and educating. The respondents pointed this out, saying: *What mattered in the national presentations, was an element of entertainment – so that positive associations could be sparked off and thus the country be promoted – not only by giving dry facts* (S2); *I heard opinions that this was the best entertainment at that time in Dubai – because people could come to the Expo and have fun; the educational aspect was certainly important, too, because you could learn a lot about the exhibiting countries* (S3);*Many presentations provided a huge amount of information about the exhibiting country; however, what I've observed is that many countries also relied on entertainment, because it gave various opportunities to have fun* (S5); *Entertainment was most often used to encourage tourists to come over* (S6); *I would say that there was a lot of education during the Expo; but, in terms of the visitors' experience, I think that most of them, after a few hours of watching the exposition, no longer paid attention to information given in the pavilions; I would thus attach the greatest importance to entertainment* (S11); *It was impossible to leave the Expo without experiencing entertainment* (S19); *Entertainment certainly prevailed – because of the fact that most pavilions were multimedia pavilions* (S20). It should be noted that some respondents linked the dominance of education or entertainment to the nature of the pavilion in which the country's presentation was taking place. This was because exhibitors presented themselves in facilities built in accordance with their own designs (having often original architecture) or in standardised pavilions, smaller and erected by the exhibition organiser. The former option was mostly used by rich and well-developed countries. In this context, the respondents said: *In a situation where a country could afford to build its own pavilion, the presentation consists of many different components; whereas in the pavilions of poorer countries, education prevailed* (S5)*; It seems to me that the African pavilions were very similar to each other; all of them had a lot of information with text, so education dominated in these presentations* (S9); *I think that in the smaller expositions knowledge was shared, because there everything was presented rather in such a way that you can see in a "museum" (there were a lot of photos with descriptions); it was a bit of a photo exhibition; I can link entertainment mainly with larger pavilions* (S10); *Contrary to large pavilions, smaller facilities didn't take that relaxed approach; there was too much content there; you walked in, you remembered something from the description, but in fact, when you entered the next pavilion, where there was the same form of communication, you had already forgotten what was there before* (S8). The fact that the experiences of some people visiting the expositions were above average is evidenced by the following answers: *Being at the Expo was a peculiar kind of experience – and that was not only from the tourists' perspective, but also for us, the pavilion personnel; it was just something you have to experience in order to know* (S1); *Expo 2020 Dubai was a great success of both the organisers and exhibitors; it was such an amazing experience, completely out of this world* (S18). Several respondents, when describing their experiences, explicitly called it a "wow", saying: *What comes to mind in the context of the Expo is one big "wow"* (S16); *I think that wherever you went there, you could get something that captured your attention; everywhere, there was something different and something like a "wow"*

(S13); *you could generally have that feeling of a "wow"; I all the time felt like visiting more and more; I just liked it there so much (*S17).

When experiences are provided with a lot of strong stimuli, sensory overload can occur. The respondents repeatedly implied that this phenomenon might happen to people taking part in world exhibitions. This view was corroborated by the following statements: *I associate the Expo with the enormity of everything; the multiplicity of stimuli and the crowds of visitors every day* (S11); *Overstimulation could be seen very clearly; we observed it ourselves, but we also saw it among the visitors*; (S1); *If you wanted to visit the entire Expo in one day, you might feel overstimulated* (S2); *It is a difficult task to see so much in a short period of time; especially when you learn about different cultures, meet very different people* (S5); *We were so overstimulated that I needed a lot of sleep to recover after returning from Dubai; at home it was so striking that nothing was happening* (S4); *There was an excess of everything during the exhibition; but you know, each exhibitor wanted to stand out* (S6); *Sometimes there were too many visual experiences for me: here something was flashing, there you could see something which appeared; here you had to look through glasses, and there, you had also to touch something at the same time; sometimes you weren't able to discover everything that a particular presentation had to offer; some pavilions were very large; going everywhere and seeing everything was too difficult, too engaging; many times you didn't know what "the author really had in mind"* ; (S7); *I suddenly stood in the middle of a crossroads at the Expo and wondered what was going on – because: here, you could listen to someone speaking Arabic or English from loudspeakers; people were gathering close to me, pushing, taking pictures; right next to me there were queues for the pavilions; someone was talking to me; I simply told to myself: "somebody get me out of here"; sometimes, there were too many stimuli (S16); It seems to me that many pavilions had too many visitors at once; in such a crowd it was difficult to find one's way around, because here a child was crying, there a disabled person needed help, and somewhere else a couple of people came just to get some stamps [during each edition of Expos visitors can buy special passports in which they collect stamps from exhibitors] and what the country itself had to offer did not interest them; these people did not pay attention to presentations and were talking loudly (S19)*. In the context of *overstimulation,* an interesting statement was made by respondent S1: *When I recall some of the pavilions, I can only say that there was too much of everything; I wasn't able to remember all the elements of the presentation; it seems to me that someone has to test what will be the reception of the exposition before a country goes to Expo; and the Polish pavilion, in the context of an excess of stimuli, was a kind of "relief", an oasis of peace for visitors – such as the Chopin concerts; they were just such a brief respite; this is what distinguished our pavilion from other presentations* (S1). The need to find a space to rest was indicated by a study participant marked as S19: *When you wanted to go and rest, to lie down on that vast lawn, next to the main stage, it was impossible; something was going on there almost all the time – either rehearsals before big concerts, or concerts themselves; so there was no peaceful place at all*.

4. Discussions

As already noted, the scholarly literature does not present any view that would consider Expo grounds to be experiencescape for building the images of countries. However, one can relate the present study results to important conclusions of some researchers. According to Wang (2013, 109) the expo's national pavilions are constructed as branded spaces for winning the "hearts and minds" of a foreign public; what they offer is a form of "experiential goods", like going to a movie or visiting an amusement park. Similar perceptions of the world exhibition grounds were manifested by interviewees. Some answers compared the Expo directly to amusement parks. It was also pointed out that national presentations were very often based on films – containing original content and displayed on unusual media. This is also evidenced by the findings announced by Smits and Jansen (2012, 173), who – based on their own research – argued that as the technology of display came to dominate in the twentieth century, nations during world exhibitions used film to project their identities through amusing experiences for visitors (movies became an integral aspect of displays). However, the study relating to Expo 2020 Dubai showed that countries' presentations were enriched, to a large extent, with digital components – in addition to films, the use of computer games and animations, especially virtual reality, is on the rise. It is the ICT area that the Expo is expected to grow in. Nevertheless, as one respondent noted, electronic communication cannot be improved indefinitely. That respondent said: *I think Osaka* [the venue of the next world *exhibition*] *or any other Expo can beat Dubai only in one aspect, namely that technology will change a lot in the coming years and it will be easier for countries to create something unbelievable; however, after what I saw in the United Arab Emirates I don't quite believe that in the next 10-15 years anyone will beat Expo 2020 Dubai* (S18).

For several decades now, researchers have been emphasising that modern consumers expect entertainment. Holbrook and Hirschman (1982, 132), embedding experiences in the emotional dimension, put it in the form of “3F” – fantasies, feelings, fun. Moreover, as O’Dell (2005, 16) noted, experiencescape is a space of pleasure, enjoyment and entertainment. The analysis of the empirical material collected confirmed that world exhibitions are associated with entertainment that is engaging on an above-average level – primarily due to the experiences gained at national pavilions. As already noted, some respondents directly compared Expo 2020 Dubai to an amusement park. It is the opportunity to have fun that becomes the most important expectation of experiencescape. Entertainment is one of the components of customer experience, which were identified by Pine and Gilmore (1998, 102). These well-known researchers, the creators of the experience economy concept, taking into account the level of engagement of the recipients of marketing activities and their relationship with their environment, identified such realms of an experience as: entertainment, education, aesthetic, escapism. When asked about these dimensions, the respondents most often attributed two realms to the Expo – entertainment, as mentioned above, and education. Some answers mentioned escapism and the state of immersion a person could find themselves in when visiting national exhibitions or participating in events held on the exhibition grounds. According to Getz (2007, 241), in escaping everyday environment, people seek change and novelty, especially new experiences. Whereas as claimed by Goldblatt (1997) and Hiller (2000) in the context of world exhibitions, who were echoed by Björner and Berg (2012, 38), World Expos can offer unique experiences due to their high profile, short duration and distinguished difference from ordinary life, as well as their ceremonies and celebrations. That break from everyday life, through being in experiencescape, was mentioned by the respondents. They contended that the world created during the Expo was different (even as in a dream) and allowed them to forget about what was “outside”. In this case, they referred to getting into the state of immersion. As explained by Carù and Cova (2006), as well as Björner and Berg (2012, 40), this can be related to the process of “becoming one with the experience”. The respondents pointed out to the aesthetic value of national expositions the least often, which is in line with the results of other researchers dealing with world exhibitions (Wang, Lu, and Xia, 2012).

The literature on experience marketing, putting emphasis on how extremely important it is to appeal to human senses with intent, has been paying attention to sensory overload for some time (Pentz and Gerber, 2013; Doucé and Adams, 2020). The respondents also referred to this negative phenomenon. Not only world exhibition organisers, but also those who create the presentations of respective countries, cannot ignore the fact that overstimulation may occur. Indeed, as pointed out by Krishna (2012, 346), sensory overload can be overpowering so that any niceties of the experience are missed, which appears to be extremely relevant in the case of Expos. Sensory overload is a marked increase in the intensity of stimuli over the average level, which was characteristic of the Expo explored. This overload disrupts the cerebral processing of information and decreases the meaningfulness of the environment. This may entail a rise in perceived arousal and a decrease in perceived pleasantness (Ali and Srivastava, 2022, 114). This observation was reflected in the statements of Expo 2020 Dubai participants. The phenomenon of sensory overload, despite its vital importance for the proper building of experiencescape, has so far not been mentioned in publications on world exhibitions. Hence, it needs to be scientifically explored.

Conclusions and Further Research

Previous studies proved that participation in world exhibitions can effectively build the image of exhibiting countries (Abou-Shouk *et al.* 2018; Dogan, 2018; Kovačević, Hristov-Stančić and Zečević, 2024). However, to ensure that activities related to nation branding are effective, exhibitors’ presentations must keep up with the changing functions of Expos and meet the current expectations of visitors. The opinions provided by the interviews shape the image of today’s world fairs as performative events, during which strong stimuli and the latest means of expression are employed – to surprise and entertain pavilion visitors. Bringing them into a state of escapism (immersion) is becoming a task of overriding importance. Thus, world exhibitions have started to have the characteristics of experiencescape, which are described by five identified topics (categories).

The time spent by the personnel working in the Polish pavilion at Expo 2020 Dubai, who were on the grounds of the event almost every day, was an opportunity to visit all the pavilions and observe the marketing activities of exhibiting countries. The findings revealed by the analysis of the answers received should be important implications for practitioners – those preparing national presentations, as well as managers responsible for preparing Expo grounds. In addition, these findings can be used to give recommendations for future research.

Several practical tips emerge from the respondents’ answers. In the context of overstimulation, which was mentioned by the respondents – both in the presentations of respective countries and in the events of expo organisers – one should be cautious about the number and intensity of stimuli provided. Given the limitations of human perception, exhibition organisers should encourage visitors to spread their Expo visits over a period of a few days – to make sure that no single visit to the exhibition grounds is longer than several hours. It is also necessary to create "quiet zones", that is places where people visiting an exhibition can rest. To avoid overcrowding, it is also advisable to control the number of people allowed to enter national pavilions and attend events held within the Expo area at the same time. In addition, what seems reasonable and was suggested by one of the respondents, each exhibiting country – using adequate marketing research methods – should check (anticipate) the reception of its presentation before building it at an Expo.

Contemporary world exhibitions are held every five years. With such long periods of time between these mega-events, a lot can change – both within the dimension of theoretical approaches to nation branding, and in many practical aspects of country presentations (*e.g.* new, even more immersive means of communication may emerge). Accordingly, each Expo edition should generate interest among researchers in different research contexts. Certainly, sensory overload, which was often referred to by participants to Expo 2020 Dubai, should become the area of exploration. Due to the increasing use of state-of-the-art IT solutions at Expos, it is advisable to carry out research dedicated to a phenomenon known as phygital, that is when reality is deeply intermingled with the virtual world. That phenomenon has been analysed in the scientific literature for several years (Johnson and Barlow, 2021; Batat 2024), but it has still not been linked to world exhibitions. The study presented herein focused on the immediate effects of actions taken in pavilions. Further explorations should also concentrate on the long-term impact of promotion in the experiencescape environment on the image of exhibitors.

The interview conducted has some limitations that should be eliminated in future research. First of all, the interviews covered only young people who were serving their internship in the Polish pavilion. In future explorations, researchers should also include in the group of respondents older people coming from different countries and being "typical" Expo visitors. In addition, the five themes identified can – as part of a more comprehensive approach (triangulation) – be explored using quantitative research; so as to gain a more in-depth understanding of experiencescape.

This article evaluates Expo 2020 Dubai as a space for providing experiences to visitors, and thus shaping the image of exhibiting countries. Hence, the adopted research objective has been attained. Given the above considerations, contemporary world exhibitions can be regarded as an environment that fully meets the requirements of experiencescape. Some respondents directly indicated that they had never participated in such an engaging, performative event before. The current Expo therefore has its own uniqueness, and the conditions created for marketing activities at modern world exhibitions should perhaps be referred to by a separate term – as exhibitscape. However, this uniqueness requires further scientific research.

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Credit Authorship Contribution Statement

The author attests to having sole responsibility for the idea and layout of the paper, gathering empirical data, analysing, and interpreting the findings, and preparing the final manuscript preparation.

Declaration of Competing Interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The author declares that he has not used generative AI and AI-assisted technologies in the writing process before submission, but only to improve the language and readability of their paper and with the appropriate disclosure.

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Sustainable Marketing in the Sharing Economy: Strategies for Promoting Responsible Consumption

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Abstract: The study aims to analyze the role of sustainable marketing in supporting the development of the sharing economy. In particular, it focuses on its role in shaping consumer behavior, promoting the idea of responsible consumption, and building trust in sharing platforms. The explanatory research design enabled the identification of sustainable marketing activities of the selected companies. The study used purposive sampling, selecting four sharing economy companies representing different segments related to urban mobility: Lime, BlaBlaCar, Traficar and Bolt. Data was obtained from the official websites of these entities. A qualitative methodological approach was used to comprehensively assess the communication strategies of the sharing platforms within a specifically defined framework. Our results indicate that sustainable marketing is key in promoting sharing platforms as tools to support the transition to a low-carbon economy and more responsible consumption patterns. The study also highlights challenges such as authenticity in communications and building long-term consumer trust. Purposive sampling limits the possibility of generalizing the results. Analysis is based solely on materials published by the companies themselves, which may lead to an incomplete picture of reality, as firms may selectively present information, highlighting positive aspects of their activities. Assessing the impact of communication strategies on consumer behavior poses a methodological challenge due to the lack of direct data from consumers. Findings and recommendations from the study can contribute to a better understanding of how to effectively use sustainable marketing to promote the sharing economy and achieve sustainable development goals.

Keywords: sharing economy; responsible consumption; sustainable marketing

JEL Classification: M31; O33; Q56.

Introduction

Sustainable development is a crucial concept in modern business management aimed at improving the quality of life and welfare of society, while ensuring long-term economic stability and environmental protection (Gadomska-Lila and Wasilewicz, 2016). In an era of growing environmental challenges, social inequalities, and dynamic market transformations, companies increasingly recognize the need to integrate sustainability into their core strategies. Implementing these ideas requires the active involvement of enterprises that perceive them not only as a moral obligation but also as an opportunity to respond to contemporary market challenges, enhance brand reputation, and strengthen their competitive advantage (Misztal, 2024). Sustainable development has evolved into a dominant paradigm of modern management, linking economic, social, and ecological dimensions to foster long-term business resilience and stakeholder trust (Adamczyk, 2018). This approach encourages companies to go beyond short-term profit maximization and consider the broader impact of their operations, including responsible resource management, fair labor practices, and the reduction of negative externalities. As sustainability-oriented strategies gain prominence, family businesses, particularly those led by younger generations, emerge as natural allies in their implementation, driven by a long-term perspective and a commitment to ethical business practices (Domańska *et al.* 2024). In the face of escalating geopolitical tensions, economic instability, and climate change, concepts such as sustainable development, CSR (Corporate Social Responsibility), and ESG (Environmental, Social, and Governance) have become essential tools for businesses seeking to mitigate risks, ensure regulatory compliance, and build more resilient operational models (Misztal, 2024). By integrating sustainability principles into their strategies, organizations can not only prevent environmental degradation and promote social inclusion but also enhance innovation, attract impact-driven investors, and strengthen relationships with conscious consumers. As a result, sustainability-oriented business management is increasingly recognized as a necessity rather than an option, marking a shift toward more responsible and future-proof economic practices.

The novelty of this study lies in combining the perspective of sustainable marketing with the analysis of sharing economy platforms. Its importance stems from the growing role of sustainability-oriented marketing in shaping consumer attitudes and building trust in sharing-based business models.

Our study aims to analyze the role of sustainable marketing in supporting the development of the sharing economy. In particular, it focuses on its role in shaping consumer behavior, promoting the idea of responsible consumption, and building trust in sharing platforms. The study used purposive sampling, selecting four sharing economy companies representing different segments related to urban mobility: Lime, BlaBlaCar, Traficar and Bolt. The explanatory research design enabled the identification of sustainable marketing activities of the selected companies. Data was obtained from the official websites of these entities. A qualitative methodological approach was used to comprehensively assess the communication strategies of the sharing platforms within a specifically defined framework.

This research opens with a comprehensive literature review integrating sustainable marketing and sharing economic concepts. We then present the methodological approach and the data sources used. Subsequent sections present our key findings in combination with detailed analysis and interpretation. The paper concludes with a summary of the main contributions, while acknowledging the limitations and constraints of the research.

1. Literature Review

1.1. Evolution and Value Dimensions of the Sustainable Marketing Concept

Sustainable marketing is becoming an increasingly important research topic, and its definitions are undergoing new interpretations. Among the most frequently indicated tenets of this concept is the environmental orientation of the organization (Pooja *et al.* 2022). Current research on the subject, conducted by authors all over the world, demonstrates the pivotal shift of the concept toward delivering a much broader package of value, not only for the customer but also for the organization itself and its stakeholders (Yadav *et al.* 2024). Up-to-date scientific publications demonstrate the transformation from a classical marketing approach to a concept incorporating sustainability dimensions (Kurtishagai, 2024). Through a systematic literature review covering two decades, author Matthew B. Lunde proposed the following extracted definition of sustainable marketing: "Sustainable marketing is the strategic creation, communication, delivery, and exchange of offerings that produce value through consumption behaviors, business practices, and the marketplace, while lowering harm to the environment and ethically and equitably increasing the quality of life (QOL) and well-being of consumers and global stakeholders, presently and for future generations" (Lunde, 2018).

This concept has evolved from a marginal pro-environmental activity to a core strategic activity of companies (Sheth and Parvatiyar, 2021). Specific organizations are currently treating sustainability as a strategic part of their market positioning, being one of the key factors for success (Jovanovic *et al.* 2018). Entities incorporating sustainability into their marketing activities report positive effects in terms of brand perception and strengthening their relationships with customers (Lorgnier *et al.* 2022; Rastogi *et al.* 2024).

The evolution of sustainable marketing is moving towards holistically offering value. Opportunity for a holistic approach stems from the growing importance and availability of digital technologies and their use in the sustainable marketing process (Peterson, 2020). Measuring marketing activities' environmental and social impact is carried out using advanced analytical tools (Ziegler *et al.* 2023). Studies have identified validated methods for measuring sustainability, such as assessing the carbon footprint left by a company's activities (Angrisani *et al.* 2023). Sustainable marketing is noticeable in the corporate culture and influences decision-making processes (Khan *et al.* 2024). Despite the growing importance of technology in sustainable marketing, there is a clear gap between the potential of digital tools and their actual use. This is not only due to the limited competence of companies but also due to a selective approach to the sustainable development goals (Duś-Prieto, 2024).

Aforementioned technological developments, the growing environmental awareness of consumers, and the need to integrate business objectives with the global sustainability mission are just some of the reasons for the wider use of the concept in practice (Kemper and Ballantine, 2019). Organizations oriented towards values consistent with sustainable development will be forced to continuously adapt and implement innovative solutions for strategic marketing (Kue Na *et al.* 2019). Based on sustainable marketing concepts, strategy implementation takes place in three dimensions: environmental, social and economic (Danciu, 2013).

The environmental dimension focuses on thoughtful resource management and reducing the negative effects of the organization's actions on the environment (Trojanowski, 2021). These actions can be seen in the purposeful selection of biodegradable components used in the design of products, the energy efficiency of their production processes, or the responsible management of waste generated in the process (Choudhuri, 2023). In response to increasing stakeholder demands for sustainability, distribution and entire supply chain management must be adapted accordingly (Jedynak, 2023).

Another dimension, the social dimension, is the promotion of conscious, sustainable consumer behavior and collaborative value creation (Padhi, 2018). Actions taken under this aspect include educating consumers about responsible consumption, extending support to the local community, offering decent employment conditions, or supporting diversity (Matharu *et al.* 2020). The inclusion of this aspect is evident in creating products and services accessible to different social groups (Brescia-Zapata, 2023) as well as in supporting initiatives oriented towards tackling social problems (Dyck and Manchanda, 2021).

Long-term outcome-oriented activities, focused on generating stable value for both the organization and consumers, reflect the economic dimension. The results of these efforts can be seen in two areas: in the combination of cost optimization with a quality offering and in a transparent pricing policy (Trivedi *et al.* 2018). The organization's investment budgets are allocated to innovations that meet sustainable characteristics, and among the novel solutions to be highlighted is the creation of business models based on the sharing economy (Nosratabadi *et al.* 2019). In an economic context, the researchers point to transparency in finances and fair trade as key elements for maintaining customer trust (Ionica *et al.* 2020).

However, the application of the sustainable marketing concept faces challenges. Organizations must balance meeting short-term sales targets and a long-term sustainability strategy (Kamiński, 2019). On the other hand, consumers point to the inconvenience of sustainable solutions as a factor demotivating their participation in the process (Ober and Karwot, 2022). It is essential to continuously educate consumers and consistently promote sustainable attitudes and solutions (Szymoniuk, 2015). Key to the effectiveness of sustainable communication is transparency and verifiability of declarations. The communications should be supported by facts, preferably by specific company actions that the company can claim and use to prove its sustainable activities (Pimonenko *et al.* 2020).

1.2. Sustainable Marketing's Contribution to the Sharing Economy

The sharing economy is a business model that is gaining ground in the context of sustainability and marketing. It answers the question: *How can resource utilization be optimized, negative environmental impact be reduced, and the accessibility and inclusiveness of goods and services increased?* The sharing economy implements this through three primary relationships: client to client (C2C), business to client (B2C), and business to business (B2B). The first type enables users to operate as both producers/suppliers and consumers, creating the "prosumer" category (someone who both consumes and produces specific goods), enhancing resource efficiency (Chen, 2024; Czernek *et al.* 2018; Treitler, 2024; Ziobrowska-Sztuczka, 2023). The model pursued in this relationship can outperform traditional sales, combining consumer needs and lowering production costs, benefiting producers and the environment (Chomachaei *et al.* 2024). A crucial element, however, is to build trust among users by ensuring the security of transactions and the high quality of shared assets (Diallo, 2023). The B2C relationship is prioritizing face-to-face interactions with consumers, often using platforms that enable consumers to share resources or services, increasing accessibility and convenience (Bazrafshan *et al.* 2021). B2B relationships, on the other hand, focus on sharing resources between companies, especially SMEs, to access scarce resources and reduce costs (Huber *et al.* 2022). Building dynamic networks allows companies to predict behavior and optimize partnerships, increasing the efficiency of B2B transactions (Quintero *et al.* 2018).

As numerous studies show, resource sharing, which is a key element of the sharing economy, contributes to more efficient use of available goods and waste reduction, which aligns with sustainable development principles (Avdokushin and Kuznecova, 2022; Carlborg, 2024; Kawa and Nesterowicz, 2022; Rathnayake *et al.* 2024; Suciu *et al.* 2024; Sztokfisz, 2017).

An essential aspect of the sharing economy is the role of technology, which enables efficient management of resources and facilitates interactions between users. Using digital technologies, such as mobile applications and GPS systems, plays an essential role in securing safe and efficient exchanges, which is particularly evident in the transport services sector (Allen and Berg, 2014).

Digital platforms that support the sharing economy can promote sustainable marketing through transparency, accessibility of information and creation of trust between users (Griffiths *et al.* 2019; Martin *et al.* 2017; Szpringer, 2020). For instance, platforms can inform users about the environmental benefits of sharing services, which can increase their commitment to sustainable practices (Dellaert, 2018; Mi and Coffman, 2019). Studies have shown that consumers who use sharing services often experience positive changes in their consumption behaviour, leading them to be more reflective about their choices and their environmental impact (Lan et al. 2017; LLi et al.2023). Thus, the sharing economy is not only changing the way consumers view ownership but also influencing their attitudes towards sustainability.

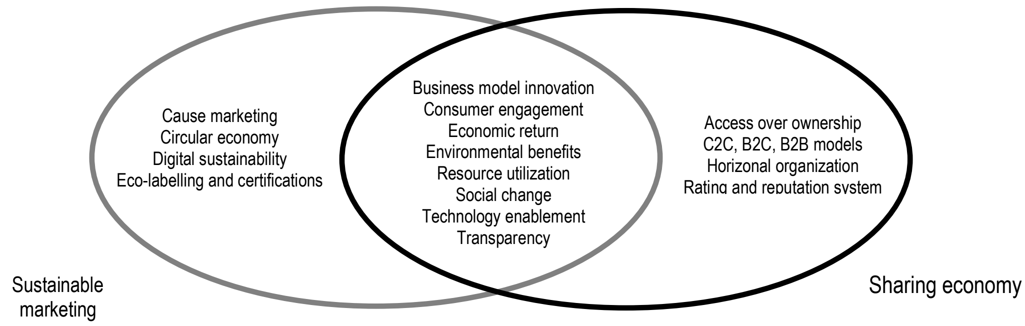
In the context of marketing, the sharing economy presents new challenges and opportunities for businesses. Sustainable marketing, which focuses on long-term social and environmental benefits (Rudawska, 2012), can be effectively integrated into the concept of sharing (Kamiński, 2019). Examples such as carsharing (Traficar, Panek CS and others), or flat rental platforms such as Airbnb, show how marketing can promote the idea of sharing while supporting local communities and reducing the negative impact on the environment (Banaszek, 2016; Kawa and Nesterowicz, 2022).

From a sustainability perspective, the sharing economy can contribute to a paradigm shift in consumption, moving from an ownership-based model to an access-based model (Stępnicka and Wiączek, 2018). Such a shift in consumer perceptions can lead to reduced demand for new products, reducing production and CO_2 emissions (Michalak *et al.* 2020). Therefore, the sharing economy primarily responds to Sustainable Development Goal 12 on responsible consumption and production but also contributes to Goals 13, 11, and 9[15].

It would not be possible for the sharing economy to operate effectively without a high level of trust and transparency in the relationships between its users (Czernek *et al.* 2017, 2018; Waśkiewicz, 2022). However, the development of the sharing economy also presents challenges, such as legal and tax regulations. In Poland, as in other countries, there is a need to create an appropriate regulatory framework that will enable the development of this model while protecting the interests of consumers and entrepreneurs (Klimczuk, 2024; Kochel, 2018). Hence, sustainable marketing should consider these aspects, promoting both economic and social and environmental benefits, which is crucial for the long-term success of the sharing economy (Kamiński, 2019; Szołtysek and Otręba, 2019).

The sharing economy and sustainable marketing demonstrate strong interdependence (Figure 1). They not only support resource efficiency but also promote new, more sustainable consumption patterns. This model's future will depend on its ability to adapt to the changing legal environment and build trust in user relationships.

Figure 1. Conceptual interdependencies between sustainable marketing and the sharing economy



Source: own elaboration based on Haqqani *et al.* (2022) and Muchenje *et al.* (2023)

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[15] Goal 13: Climate action - reduce production and CO_2 emissions by reducing demand for new products and optimising the use of existing resources.

Goal 11: Sustainable cities and communities - support efficient use of space and resources (*e.g.* shared mobility, housing, utilities).

Goal 9: Industry, innovation and infrastructure - development of innovative business models to support a sustainable economy.

2. Research Methodology

This study was conducted to analyze the contribution of sustainable marketing to the sharing economy, with a particular focus on its role in shaping consumer behavior, promoting responsible consumption, and building trust in sharing platforms. The study analyzed communication strategies highlighting environmental, social, and economic values that influence the perception and adoption of sharing models. Given the phenomenon's complexity, a qualitative methodological approach was used to comprehensively assess the communication strategies of sharing platforms within sustainable development. The explanatory research design enabled the identification of sustainable marketing mechanisms and practices within the sharing economy.

The study used purposive sampling, selecting four leading sharing economy companies: Lime (operator of electric scooters and bicycles), BlaBlaCar (ride-sharing platform), Traficar (car-sharing service), and Bolt (personal transport and micromobility platform). The actors selected for the study represent diverse segments of the sharing economy related to urban mobility. This allowed a comparison of sustainable marketing strategies in similar yet different business contexts.

Data was collected from the official websites of the selected companies. In analyzing these sources, data was structured to include official messages relevant to the analysis and company sustainability reports. These digital platforms provided information on the organizational goals, strategies, and outcomes of sustainable marketing initiatives reported by the selected actors. The methodological procedure encompassed a systematic material review and documentation of sustainability-related marketing content.

Qualitative content analysis was employed using four analytical frameworks. The first was used to identify sustainable marketing activities of individual companies, cataloging initiatives, campaigns, and marketing messages. The second involved analyzing the effects of these activities and identifying the measurable results declared by companies. The third categorized the activities according to the values promoted (environmental, social, economic). The fourth analyzed the nature of the relationships in the identified marketing activities (C2C, B2C, B2B) to underline the company's character as contributing to the sharing economy.

The research process was conducted in four stages. It began with a literature review on sustainable marketing and the sharing economy to build a theoretical foundation. In the subsequent stage, companies suitable for analysis were identified, and relevant source materials were collected. The third stage concerned the study of the collected materials. In the final stage, the results were interpreted in terms of the impact of sustainable marketing on shaping consumer behavior, promoting responsible consumption and building trust in sharing platforms.

3. Research Results

In the analysis of the marketing activities of sharing economy platforms in the context of sustainable development, we used four tables (Tables 1-4) presenting the strategies used by Lime (Table 1), BlaBlaCar (Table 2), Traficar (Table 3), and Bolt (Table 4). Each table contains the key initiatives of these companies, their impact, the dimension of value (environmental, social, economic), and the type of business relationship (C2C, B2C, B2B). The selection of tables was based on the need to synthetically present the activities of brands in a comparative perspective, which allows for identifying similarities and differences in their strategies. The comparison includes CO_2 reduction programs, social initiatives, and innovative cooperation models with institutions and users. This made it possible to capture the multidimensional nature of their activities and assess their impact on the perception of sustainable mobility.

Table 1. Sustainable marketing activities communicated by Lime

Promoted activity	Effect	Value dimension	Relationship type
Implementation of renewable energy infrastructure	100% facilities powered by renewable energy, 59.5% CO_2 reduction since 2019	Environmental	B2C, B2B
Car trip replacement program implementation	180 million car trips replaced, 33 million litres of gas saved, 77 million kg CO_2 avoided	Environmental	B2C
Zero-emission operations fleet development	More than 140 electric operational vehicles integrated into service	Environmental	B2C
Partnership with Science Based Targets Initiative	Validated emission reduction goals of 76,000 tons CO_2 by 2030, transparent reporting framework	Environmental	B2B

Promoted activity	Effect	Value dimension	Relationship type
#RideGreen promotion	Building community around sustainable transport	Environmental, Social	C2C, B2C
Safety system implementation	99.99% incident-free rides, 99.99% safe parking, reduced urban clutter	Environmental, Social	B2C
WWF strategic partnership development	Joint promotion of zero-emission urban mobility, validated environmental impact assessment	Environmental, Social	B2B
Long-lasting vehicle design	Increased vehicle lifespan (>5 years), swappable batteries, modular parts reducing waste	Environmental, Economic	B2C
Lime Hero community support program	$665,000 raised, more than 75 social partners, direct community impact	Social	B2C, B2B
Lime Access program implementation	More than 850,000 discounted rides for qualifying users, increased transportation equity	Social	B2C
Lime Times blog	Stakeholder education and communication	Social, Economic	B2C, B2B
First Ride Academy safety program	Structured safety training system for new users, increased user competence	Social, Economic	B2C
Lime Ads program implementation	Mobile advertising in 280 cities, 30 countries	Economic	B2C, B2B

Source: own elaboration based on data from li.me (access date: February 2025)

As shown in Table 1, Lime focuses on sustainability, reducing emissions and raising public awareness of green mobility. The introduction of infrastructure based on renewable energy sources, the development of a zero-emission operating fleet, and car travel replacement programs effectively reduce the carbon footprint. Collaborations with WWF and the Science Based Targets Initiative help reinforce environmental messages and increase transparency. Additionally, Lime implements social programs (*e.g.*, Lime Access and Lime Hero) that provide access to mobility for economically disadvantaged people. The company's holistic marketing strategy encompasses individual customers, institutions, and NGOs, allowing for broad community involvement.

Table 2. Sustainable marketing activities communicated by BlaBlaCar

Promoted activity	Effect	Value dimension	Relationship type
Better use of space by carpooling, "Zero empty Seats"	80 million optimised seats in cars (2023)	Environmental	C2C, B2C, B2B
Offering shared rides as eco-friendly	Reduction of CO_2 emissions by 2 million tons globally (in 2023 alone)	Environmental	C2C, B2C
Using renewable, green energy sources. Joining the ACT Pas-à-Pas program to define a decarbonization trajectory	About 5% of the BlaBlaCar Bus fleet is to be converted to biofuels in 2024/2025 Paris headquarters powered by 100% green energy	Environmental	C2C, B2B
Government and Sustainability Initiatives	The French government invested €150 million to support carpooling, including a €100 carpooling bonus for new drivers Carpooling is now recognised in European public policies, with initiatives in Spain and other countries	Environmental, Economic	B2B
Growing community of platform users, forum readers	Nearly 27 million active members across 21 countries	Social	C2C, B2C
Diversity and Inclusion	BlaBlaCar's RISE mentoring program supports female leadership	Social, Economic	B2C, B2B

Promoted activity	Effect	Value dimension	Relationship type
Verified Profiles and Super Drivers	26% of active members have verified profiles, and 580,000 drivers hold Super Driver status, improving trust and reliability	Social, Economic	B2C
Employee Well-Being	837 employees in 6 countries, with a strong culture of innovation and flexibility	Social, Economic	B2B
Programs offer rides that are cheaper than using traditional transit	Users have saved more than 1.4 billion euros since BlaBlaCar's inception	Economic	C2C, B2B
M&E operating model (evolve application from a carpooler matching service to a multimodal Service)	Offers from more than 5,000 carriers are available on a single platform (*e.g.*, Western Europe, Eastern Europe, Brazil)	Economic	B2B

Source: own elaboration based on data from blablacar.pl (access date: February 2025)

As Table 2 shows, BlaBlaCar successfully integrates the principles of the sharing economy with sustainable development's environmental and social aspects. Optimized vehicle utilization (Zero Empty Seats) significantly reduces CO_2 emissions.

Table 3. Sustainable marketing activities communicated by Traficar

Promoted activity	Effect	Value dimension	Relationship type
Access to a greener fleet of vehicles (5,000 cars, including more than 300 vans)	Using Traficar can save, on average, 500g CO_2	Environmental	B2C, B2B
Traficar blog, app	It actively shapes public attitudes, showing that caring for the common good can benefit and reward all users. It is available in 28 cities in Poland	Environmental, Social	C2C, B2B
Micromobility program (electric scooters)	Increase the accessibility and flexibility of urban transportation while complying with the city's regulations for cleaning up public space and promoting sustainable mobility	Environmental, Social	B2C
Traficar Spot service	In 2024, more than 2,000 orders for passenger and commercial vehicles were completed, and the service already has more than 1,600 active users	Environmental, Social, Economic	B2C, B2B
Traficar Ogarnia program	From its inception until the end of 2024, the program has accumulated more than 100,000 active users, granted more than 1,300,000 discounts, and committed users have performed more than 90,000 service activities	Environmental, Economic	B2C
Activities for the Szlachetna Paczka; helping those who experienced floods	The company provided over 20 passenger and commercial vehicles that generated over 6,000 kilometres in five cities	Social	B2C
Traficar Recommended	For recommending Traficar's services, you can earn £30 towards your next ride, building a community	Social, Economic	C2C, B2C
New partnerships or continuation of existing ones with the Bolt app, Lidl Benefit Plus, Żabka, CCC club, Mastercard Priceless Moments and PZU club	As part of Traficar Business' B2B offering, several thousand employees of various companies have taken advantage of the ride-sharing benefit program. Between 2021 and 2024, the customer base in the business segment increased by 91%	Social, Economic	B2B

Source: own elaboration based on data from traficar.pl (access date: February 2025)

Collaboration with governments (such as the French government's Carpooling Plan) strengthens the impact on the transportation sector. Diversity and inclusivity efforts, such as RISE's mentoring program for women, build trust and engagement with the user community. BlaBlaCar's business model encompasses both B2B (with carriers and governments) and B2C and C2C collaborations, allowing the company to engage a broad spectrum of audiences while achieving the goal of more accessible and greener mobility.

Table 3 shows that Traficar's area of activity is urban mobility, combining environmentally friendly transport solutions with economic benefits. Its 5,000 vehicles, including vans and electric scooters, significantly reduce CO_2 emissions. Collaborations with brands such as Bolt, Lidl Benefit Plus, and Mastercard Priceless Moments demonstrate a strong commitment to B2B marketing and value creation for business customers. Loyalty programs (*e.g.*, Traficar Ogarniam and Polecam) strengthen user relationships, building an active community of drivers and passengers. Through social initiatives (*e.g.*, support for the Szlachetna Paczka charity program), the company emphasizes its commitment to corporate social responsibility, which positively impacts its image.

Table 4. Sustainable marketing activities communicated by Bolt

Promoted activity	Effect	Value dimension	Relationship type
Validation of emission reduction targets by the Science Based Targets Initiative (SBTi)	Increasing the credibility of environmental commitments, conformity assurance with the Paris Agreement goals through independent verification	Environmental	B2C, B2B
Certification of the environmental management system according to ISO 14001:2015	Ensuring compliance with environmental management practices, building consumer trust through internationally recognised standards	Environmental	B2C, B2B
Strategy to achieve carbon net-zero by 2040	Demonstration of commitment to environmental responsibility, influencing consumers of the platform as a sustainable mobility provider	Environmental	B2C, B2B
Obtaining CarbonNeutral certification for micromobility services	Neutralization of CO_2 emissions generated in the vehicle lifecycle, legitimization of environmental actions	Environmental	B2C
Introduction of electric vehicles to the fleet in Warsaw	Promotion of electric cars, raising environmental awareness among customers	Environmental	B2C
Platform of shared mobility as an alternative to private cars	Reduction in the number of car trips, decrease in traffic congestion and pollution	Environmental, Social	C2C, B2C
Pilot programs encouraging the use of micromobility	Reduction in the number of cars in cities	Environmental, Social	C2C, B2C
"Proper Parking of Bolt Scooters" contest	Promotion of responsible behaviour among users, reduction of the problem of improperly parked scooters	Environmental, Social	C2C, B2C
Incentive program for drivers encouraging the replacement of cars with electric vehicles	Increase in the number of zero-emission rides, educating drivers about the benefits of electric vehicles	Environmental, Economic	C2C, B2B
Partnership with Eleport to install 750 electric vehicle charging points	Increased infrastructure availability for electric vehicle drivers, facilitation of the transition to zero-emission transport	Environmental, Economic	B2C, B2B
Introduction of the Bolt Urban Fund	Support for third-sector partners promoting sustainable transport and activating local communities	Social	B2C, B2B

Source: own elaboration based on data from bolt.eu (access date: February 2025)

Table 4 shows that Bolt's marketing communication is based on building trust in the platform, clearly focusing on encouraging users to adopt sustainable transport behavior. The company effectively uses external validations and certifications (*e.g.*, SBTi, ISO 14001:2015, CarbonNeutral) to authenticate its environmental goals while engaging consumers in responsible mobility through C2C initiatives. This is particularly evident in programs encouraging micromobility and contests promoting responsible behavior, which directly affect the user experience in urban spaces. Bolt strives to integrate environmental objectives with social and economic values, creating a multi-dimensional strategy that shapes the brand's perception as a leader in sustainable mobility. Specific infrastructure activities reinforce the long-term commitment to carbon neutrality by 2040. Indicating the establishment of a partnership with Eleport (network of electric vehicle charging stations) and the introduction of electric vehicles into the fleet, Bolt demonstrates the consistency between declarations and actual initiatives. This serves to build trust among existing and potential users and business partners.

Each company – Lime, BlaBlaCar, Traficar and Bolt uses sustainable marketing, engaging in environmental, social, and economic activities. Lime focuses on electrification and access to sustainable transportation, BlaBlaCar on reducing emissions through ride-sharing. Bolt focuses on transforming urban mobility through shared transportation alternatives and micromobility solutions, and Traficar combines urban mobility with cutting-edge technology and business partnerships. Communicating environmental and social values that attract customers and reinforce their position as leaders in sustainable transportation is critical to their success.

4. Discussions

Our results confirm that digital platforms play a significant role in the sharing economy, which is in line with the findings of Faraji *et al.* (2023). An analysis of the strategies of Lime, BlaBlaCar, Traficar and Bolt indicates that these companies not only adapt their business models to ecological requirements but also successfully shape user attitudes through educational activities and loyalty programs. According to research by Prihatiningrum *et al.* (2024), clearly communicated sustainability initiatives can increase trust in brands and minimize greenwashing. We see this particularly in the case of Lime and Bolt, which use environmental certificates (*e.g.*, SBTi, ISO 14001:2015, CarbonNeutral) in their activities and transparently present their emission reduction targets.

In addition, the results of our research indicate that companies engage users in pro-environmental activities through loyalty programs and social initiatives, which confirms Sielicka-Różyńska's (2024) observations on the impact of such activities on the promotion of collective responsibility. Traficar, through CSR campaigns (*e.g.* Szlachetna Paczka) and partnership discount programs, builds strong relationships with customers and strengthens their commitment to the idea of sharing. Similarly, BlaBlaCar, thanks to its ”Zero Empty Seats” strategy and cooperation with governments to promote carpooling, implements the principles of the sharing economy in a way that simultaneously responds to social and environmental needs.

Remarkable is the fact that the companies examined are driving the essentials of their business model by addressing social and environmental challenges (*e.g.* resource sharing, the need for micromobility) and transforming them into business goals. This is indicative of cause marketing, an important initiative within the framework of sustainable development (Bhatti *et al.* 2022). However, these activities are not just biased and suggestively promoted, but represent actual, measurable contributions within the value dimensions mentioned. The analyzed companies have elaborate sections with content about the sustainable actions taken and provide a detailed description of them. Such communication influences transparency, the multiplicity of activities undertaken emphasizes the sincerity of intentions, and the accessible form of the content communicated influences consumer trust (Schamp, *et al.* 2023).

In the context of shaping consumer behavior, it is also necessary to mention the communication of activities such as expanding the fleet of micromobility vehicles and extending the availability zone of charging stations. Explicitly promoting the socio-environmental advantages of this type of infrastructure, contributes to attracting those consumers who consciously select responsible solutions (Musova *et al.* 2021). Additionally, the active promotion of the utilization of this infrastructure, visible in activities such as “Proper Parking of Bolt Scooters” or #RideGreen from Lime, is characteristic of a user-generated content (UGC) strategy. The aggregation of user experiences of operating green and micromobility solutions, transmits into the promotion of responsible consumption. The UGC strategy itself has the potential to influence brand trust and reliability, as demonstrated by Niu (2025).

An interesting aspect that arises in the context of our results is the role of social validation and its potential consequences. As other researchers (Ballara, 2023) have pointed out, social media and rating systems can lead to an information bubble effect and affect the authenticity of user behavior. Our analysis suggests that platforms such as Bolt and Lime effectively manage this phenomenon by using social validation mechanisms to promote green behavior and transparent CSR activities. At the same time, to avoid the adverse effects of data manipulation or hyper-commercialization, it seems crucial to use clear evaluation criteria and emphasize the real impacts of pro-environmental actions. BlaBlaCar is addressing this phenomenon by allowing a rating to be given to a driver only after a ride has been made. Organizing the process of providing ratings in a conditional way increases credibility not only of the company but also of the platform users themselves, which is a social translation within the C2C relationship.

Conclusions and Further Research

In summary, our results confirm that sharing economy platforms can effectively integrate environmental, social, and economic objectives, thus contributing to the promotion of sustainable development. However, their effectiveness depends on several key factors, including transparency of operations, responsible management strategies, and active user engagement in sustainable practices.

In the context of previous research, our analysis provides new insights into the synergies between business strategies and the social perception of brands. We show that platforms that successfully communicate their values and engage their user community can build more substantial social capital, which, in the long term, translates into greater customer loyalty and willingness to adopt more sustainable consumption practices.

Furthermore, our study suggests that future initiatives in sustainable mobility should consider technological and infrastructural aspects and social mechanisms for building trust and cooperation between users. This can be an essential reference point for further research into the long-term impact of sharing platforms on urban development, mobility, and changes in consumer attitudes towards new sharing economy models.

The adopted methodology has certain limitations. Purposive sampling limits the possibility of generalizing the results. Analysis is based solely on selected materials published by the companies themselves, which may lead to an incomplete picture of reality, as firms may selectively present information, highlighting positive aspects of their activities. Assessing the impact of communication strategies on consumer behavior, poses a methodological challenge due to the lack of direct data from consumers. Research on consumers perspective could seriously refine the study. Despite these limitations, the methodology allowed for achieving research objectives and provided valuable insights regarding the role of sustainable marketing in the sharing economy.

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Justyna Ziobrowska-Sztuczka: Conceptualization, Investigation, Methodology, Project administration, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing.
Maciej Lewandowski: Conceptualization, Investigation, Methodology, Formal analysis, Writing – original draft, Data curation, Validation, Writing – review and editing

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have used generative AI and AI-assisted technologies in the writing process before submission, but only to improve the language and readability of their paper and with the appropriate disclosure.

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Examining the Impact of Demographics, Travel Patterns, and Awareness on Sustainable Tourism and Cultural Preservation in Coastal Karnataka

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Abstract: This study explores the influence of demographic factors, travel patterns, and knowledge on sustainable tourism practices and cultural preservation in coastal Karnataka. The research examines how variables such as age, income, education, and gender shape tourists' engagement in environmentally responsible behaviours and their support for cultural conservation initiatives. The findings highlight those younger tourists, particularly from Generation Z, exhibit stronger preferences for sustainable practices, while higher income groups are more likely to afford eco-friendly options. Additionally, educational background and gender differences contribute significantly to varying levels of awareness and participation in sustainable tourism. The study also underscores the importance of community-based tourism (CBT) in fostering both environmental and cultural preservation, with a particular emphasis on the role of local communities and tourists in these efforts. The implications of these findings are valuable for developing targeted strategies to promote sustainable tourism and enhance the preservation of coastal heritage. These results offer important insights for policymakers and tourism stakeholders seeking to create more inclusive and effective approaches to sustainable tourism development.

Keywords: sustainable tourism; demographic factors; cultural preservation; coastal Karnataka; community-based tourism.

JEL Classification: Q01; Z32; R11.

Introduction

Sustainable tourism has emerged as a key focus for researchers, policymakers, and stakeholders in the tourism industry due to its growing significance in mitigating negative environmental impacts, preserving cultural heritage, and ensuring the well-being of local communities. As the global tourism industry continues to expand, the need to balance the economic benefits of tourism with environmental preservation and cultural conservation becomes increasingly critical. This research aims to explore the role of various demographic factors, such as age, income, gender, and education, in shaping sustainable travel behaviours and community-based efforts.

Firstly, the study will examine the demographic factors, including gender, age, education level, and occupation, that influence sustainable travel behaviours and participation in community-based efforts among tourists in Coastal Karnataka.

Secondly, it will assess the impact of demographic factors (such as age, income, and education) on sustainable travel practices, prioritization of environmental consequences, and engagement in eco-friendly behaviours, with a focus on how these factors shape community involvement and cultural preservation efforts.

Thirdly, the research will investigate the relationship between awareness of tourism's negative impacts and sustainable behaviours, including environmental conservation and cultural preservation, and how this knowledge influences individuals' actions towards eco-friendly practices and community engagement in Coastal Karnataka.

Fourthly, it will explore the role of demographic factors, such as age and income, in shaping sustainable travel behaviours and community engagement, identifying patterns and opportunities to enhance inclusivity and promote eco-friendly practices across different population segments.

Lastly, the study will examine the relationship between consistent sustainable travel practices, participation in educational initiatives, and involvement in community-based sustainable tourism efforts, identifying strategies for fostering greater engagement and promoting sustainability in the tourism sector.

Through this analysis, we seek to provide a deeper understanding of how individual characteristics influence sustainable tourism practices and community engagement. By identifying key patterns and trends, this study aims to inform targeted strategies for promoting sustainability in tourism and fostering a more inclusive and effective approach to sustainable tourism development.

This study is unique in bringing out a more sophisticated, data-driven interpretation of the manner in which demographic dimensions - age, gender, income, and education - interact with sustainable tourism activities and community engagement in coastal Karnataka. Unlike previous studies, which portray sustainability more or less from a generic or global standpoint, this study narrows its focus to a culturally and ecologically idiosyncratic region that has been till now empirically under-researched. Such diverse sampling and statistical modelling breathe more preciseness into the findings, wherein actionable results could be drawn for different population segments. In joining behavioural components at the individual level with the preservation of culture at a higher level, this study provides local relevance to the international debate on sustainable and community-based tourism development.

1. Literature Review

Sustainable tourism has garnered significant attention in recent years as a means of promoting environmental conservation, cultural preservation, and community development (UNWTO, 2020). Various studies have emphasized the importance of aligning tourism practices with sustainability goals, including reducing environmental degradation, conserving resources, and preserving local cultures (Gössling *et al.* 2019). However, the relationship between demographic factors and sustainable tourism practices remains complex, as individuals' travel behaviours are influenced by a variety of personal, cultural, and socioeconomic factors (Seyfi *et al.* 2023).

1.1 Demographic Factors and Sustainable Travel Behaviours

Recent studies have revealed that demographic characteristics such as age, income, education, and gender influence sustainable travel. Apparently, the younger the traveller, especially the Generation-Z traveller, the more seriously sustainability is taken and the more concerned about practices and environmental issues these generations have become (Prayag *et al.* 2022; Seyfi *et al.* 2023). This is somehow steady with the idea that younger tourist populations are becoming aware of and committed to sustainability, which is essentially influenced by digital literacy and social values.

Recent empirical studies serve to firmly back this generational divide. The study conducted in 2024 reveals Generation Z travellers to exhibit interconnected eco-conscious behaviours, touching upon a high probability that low-carbon transport is used along with another distinct sustainable accommodation option in the same trip (Ma *et al.* 2024). In another case, Lima-Vargas *et al.* (2024) found that water-saving behaviours prevail much more in younger tourists with high environmental concern, especially when these tourists visit water-stressed destinations.

An income level is another factor affecting the type of sustainable behaviour exhibited by the traveller. Travellers of higher income level are generally apt to have a greater access to eco-friendly options of travel and willing to pay a premium for sustainable tourism experiences (Benson *et al.* 2018). This willingness is tied to their ability to afford sustainable options, which lower-income travellers may not possibly have access to.

Even while being perceived differently in terms of environment or sustainability behaviour, males had the attitude of environmental awareness in greater degree and went on to conduct sustainable behaviours with respect to females (Miller & Boudry, 2020). The scenario has changed a bit lately, with some recent studies suggesting that young female travellers constitute the growing demand for well-being and conservation-oriented travel, especially in terms of nature-based tourism and community projects.

Education is another social factor that lies behind sustainable travel behaviour. Well-educated individuals are likely to have greater knowledge about the environment and cultural implications of tourism and thus tend to behave more sustainably (Wang *et al.* 2018). The higher the level of education, the more it will be related to sustainable travel behaviours related to resource consumption and respect to culture (Hansen *et al.* 2024).

Understanding the variables that affect tourist behaviour then becomes essential in strategising for the promotion of sustainable tourism. The stakeholders would thus consider promoting some behaviours to tourists, knowing that their respective demographic constituencies differ on engagement in this behaviour.

1.2 Community Engagement and Cultural Preservation

With community engagement as the base, sustainable cultural tourism, and heritage preservation are built. Earlier studies support that the involvement of residents in decision-making and cultural programming increases local stewardship and visitor satisfaction (Hernandez *et al.* 2021; Timothy & Teye, 2018; Reisinger & Mavondo, 2020). In community-based tourism, there is greater stewardship of the environment where tourists and local communities come together to protect natural resources and uphold responsible practices.

Recent literature develops further from the given foundations, stressing deeper and more socially inclusive engagement. Çifçi, *et al.* (2024) studied a Bektashi-faith-based destination in Türkiye and stated that residents with longer community residency and stronger place attachment were much more supportive of tourism development and cultural heritage protection. These attitudes were linked to the perceived positive impacts and communal identity.

Similarly, Karataş *et al.* (2025) researched the archaeological site of Magarsus and identified a broad chasm between symbolic and real public participation; whereas most residents supported cultural promotion, barely around half thought that there was any merit in participating in tourism planning. The key finding here was that women were more inclined to participate actively in decision-making processes than were men; thus gender-sensitive approaches should be considered when engaging communities.

Reddy and Sailesh (2024) applied the idea of "cultural guardianship" in the view of Indigenous tourism, whereby communities are custodians of heritage while simultaneously pursuing economic resilience. Their findings suggest that real local agency guarantees that community-based tourism initiatives are sustainable and legit.

In urban societies, Woolcock and Narayan (2024) have attempted to study engagement patterns in historic Bangkok neighbourhoods through a networked social capital framework. It was found that bridging capital and bonding capital play a role in community cooperation and conflict resolution; therefore, influencing residents in tourism and conservation activities. The study thus concludes that due to inequities in social relations, community-based tourism that it hopes to be sustainable should be wary of alienating people or commodifying culture.

These new findings resonate with earlier studies that had concluded that demographics such as age, gender, and education influenced levels of engagement with community-based sustainability initiatives (Gössling *et al.* 2019; Boley *et al.* 2021). Inclusive and participative development models in which both the local people and disempowered groups can meaningfully contribute are very important for heritage conservation, environmental protection, and equitable development of tourism.

1.3 Knowledge and Sustainable Practices

A robust body of research underscores the central role of knowledge - often framed through Knowledge, Attitude, and Practice (KAP) - in shaping sustainable tourism behaviours. Earlier works show that informed and environmentally aware tourists are more likely to adopt eco-friendly practices and support community resilience (Wang & Li, 2018).

Recent studies further refine this understanding. Olivar *et al.* (2025) investigated local tourists in Davao City and found high SDG awareness but noted that positive attitudes did not consistently translate into sustainable behaviours. Their results highlight a persistent gap between knowledge and practice, mediated in part by attitude and contextual factors like infrastructure and social norms (Malik *et al.* 2025).

Broader syntheses reinforce these findings. Capucho, Leitão, and Alves (2025) offered a bibliometric analysis mapping sustainable tourism research themes, linking well being, tourism economics, and sustainability. They emphasize the importance of embedding knowledge-driven tourism policies to improve outcomes across interconnected domains (Capucho *et al.* 2025).

Ramaano (2025) explored community-based natural resource management in Southern African rural municipalities, concluding that sustainable tourism education and local leadership are critical to climate-change mitigation and conservation efforts. Their work positions knowledge and empowerment as central to tourism-based livelihoods.

At the firm and destination level, France-based research indicates that social innovation and stakeholder collaboration - when paired with education initiatives - drive adoption of sustainable practices in community tourism models (Burton *et al.* 2025).

A systematic review of community-based tourism's alignment with the United Nations SDGs by Alves de Abreu *et al.* (2024) found that several Brazilian CBT communities advance multiple SDGs through frameworks rooted in local governance, cultural preservation, and knowledge exchange - demonstrating sustainable models that integrate education and community agency.

These recent contributions build on earlier literature, reinforcing that knowledge alone is insufficient: translating awareness into sustainable practice requires enabling environments - education programs, infrastructure, governance, and community agency (Moyle & Prideaux, 2019; Hall, 2022). Effective interventions elevate sustainable tourism by bridging the knowledge - action gap and empowering both tourists and host communities.

1.4 Impact of Technology on Sustainable Tourism Practices

Technological innovation continues to transform sustainable tourism, providing tools that improve resource management, visitor personalization, and destination resilience (Buhalis & Amaranggana, 2019). Emerging solutions - such as AI, IoT, digital twins, and smart recommender systems - are reshaping sustainability strategies across tourism contexts.

A comprehensive systematic review by Zhang and Deng (2024) synthesizes global evidence on smart technologies in ecotourism. It finds that IoT, AI, and AR/VR applications significantly support environmental conservation, visitor education, and operational efficiency in destinations, enhancing stakeholder collaboration while reducing ecological footprints.

In a panel data study covering 126 countries, Jo *et al.* (2025) employed STIRPAT-based econometric modeling to demonstrate a bidirectional causal relationship between technological innovation and tourism green growth. Their findings suggest that technology adoption directly accelerates green growth outcomes at national and regional levels.

A systematic literature review on digital twin technologies in tourism showed how real-time virtual replicas can support predictive modelling for heritage preservation, visitor flow optimization, and sustainable destination planning - though challenges related to scalability and data integration remain significant (de Almeida *et al.* 2025).

Banerjee, Satish, and Wörndl (2024) proposed a novel sustainability-augmented recommender system using retrieval-augmented generation (RAG) combined with Large Language Models. Their system effectively steers tourists toward less crowded, eco-aware city destinations by incorporating sustainability metrics into recommendation logic.

These contributions not only build on earlier technological research, but also chart a more purposeful, sustainability-centered approach. They illustrate how advanced technologies - when aligned with local agency, equity, and transparency - can support environmental stewardship, reduce overtourism, and empower community-based tourism solutions.

1.5 Policy and Regulatory Frameworks for Sustainable Tourism

Policies and regulations are increasingly recognized as pivotal drivers of sustainable tourism, shaping destination recovery, environmental performance, equity, and resilience. Earlier research highlighted mechanisms like tourist taxes, visitor levies, eco-certifications, and zoning controls as essential tools in managing overtourism and protecting heritage (Reisinger, Y., & Mavondo, 2020; Dredge & Jenkins, 2020).

Building on this foundation, the OECD (2024) Tourism Trends and Policies (2024) report underscores the need for coordinated, forward-looking tourism strategies that integrate climate action, infrastructure investment, stakeholder engagement, and evidence-based governance across national and sub-national levels. These policy frameworks aim to balance tourism growth with environmental and social sustainability.

A recent spatial economics study by Serio *et al.* (2025) applied a Spatial Durbin Error Model (SDEM) to tourism and environmental policy data across Italian regions, finding that both corporate-led sustainability initiatives and public policy generate positive spillovers on tourism demand. The study emphasizes the importance of coordinated regulatory frameworks to maximize sustainability and competitiveness.

In the EU, 2024 green policy reforms have reshaped tourism governance by introducing stricter emissions standards for transport; enforcing energy-efficient infrastructure in accommodations; and promoting circular economy principles such as single-use plastic bans and waste reduction mandates. These regulations are backed by financial instruments and support schemes, underlining a continental commitment to sustainable tourism transition (European Union, 2025).

Evidence from destination-specific taxation also highlights policy effectiveness. Iceland's proposed 2024 tourism tax - expected to fund conservation, infrastructure, and community development - illustrates the local application of fiscal tools to address overtourism sustainably (Chang, 2024). Additionally, UK councils are introducing levies on overnight stays to generate revenue for local services, amenities, and housing - aimed at mitigating tourism's social and ecological impacts while maintaining economic viability.

These new contributions are aligned with past studies (*e.g.*, Hall, 2022; Farsari, 2023), reinforcing that robust policy frameworks - especially those blending international best practices, local governance, fiscal mechanisms, and stakeholder inclusion - are essential to guide sustainable tourism development across contexts.

1.6 The Role of Tourism Providers in Sustainable Practices

More recent literature supports this trend. For example, a 2024 study of upscale hotels found that the adoption of green technologies - such as solar power, rainwater harvesting, and automated waste-to-energy systems - enhanced guests' sustainable intelligence and increased pro-environmental behaviors, mediated by perceived experience quality and environmental awareness (de Lega & Smith, 2024).

More recent findings offer compelling insights. Tran, Nguyen, and Nguyen (2024) demonstrated that hotels' adoption of green practices - including energy-efficient systems, waste-reduction protocols, and staff training - significantly increased customer-driven sustainable behaviours such as recycling and conservation-minded feedback. The study also noted that guest satisfaction - and loyalty - improved when sustainability practices were visibly integrated.

In the community and rural tourism sector, Wang, Huang, and Huang (2024) investigated the role of social entrepreneurship in China's Mingyue Village. They found that legitimized community-based tourism enterprises not only drive local SDG progress but also enhance social capital and collective sustainability commitment among villagers.

Meanwhile, the recent Frontiers in Sustainable Tourism editorial by Apollo, Wengel, and Kler (2025) underscores the centrality of inclusive provider strategies in delivering social sustainability. It highlights that providers who embed equitable hiring, local procurement, and participation mechanisms are more effective in enhancing welfare, reducing inequality, and supporting destination resilience.

Finally, the Booking.com Sustainable Travel Report (2024), based on a global survey of over 31,000 travelers, reveals a critical demand signal: guests increasingly prefer accommodations and experiences marketed as "sustainable," and expect providers to demonstrate clear environmental and social credentials. Providers not meeting these standards face brand erosion and diminished trust.

These recent contributions reinforce that sustainable tourism providers must go beyond symbolic gestures - adopting holistic strategies that integrate environmental stewardship, community inclusion, and transparent communication. Institutions that operationalize sustainability through certifications, staff engagement, and local partnerships significantly enhance their legitimacy and impact.

1.7 The Future of Sustainable Tourism

Looking ahead, sustainable tourism must evolve to meet emerging environmental, social, and technological challenges. A recent systematic literature review shows that research from 2018 to 2023 is increasingly adopting multidimensional approaches that integrate ecological, sociocultural, and economic frameworks - signaling a broader and more holistic research paradigm (Mukherjee *et al.* 2025).

Research by Nunkoo *et al.* (2024) tracking over four decades of sustainable tourism scholarship reveals a maturation of traditional topics like ecotourism and rural tourism, while emerging themes related to innovation, smart technologies, inclusivity, and stakeholder collaboration gain momentum. This shift reflects the evolving priorities of sustainable tourism in both research and practice.

Innovation trends identified in SDI (Sustainability 2024) also reinforce that 'smart' technology and digital transformation - spanning AI, virtual tourism, digital twins, and Tourism 4.0 protocols - are now core drivers shaping the future of sustainable destinations.

A policy-forward report by the World Economic Forum (2025) outlines future trajectories for tourism's sustainable evolution, emphasizing inclusive growth, regenerative practices, and enhanced resilience against climate shocks. The report underscores the importance of multi-stakeholder collaboration and intentional innovation to steer tourism toward equitable and nature-positive futures.

Coupled with growing industry adoption of nature-positive travel - driven by global initiatives like the UNWTO's Nature Positive Travel & Tourism Partnership - future models will blend carbon-neutral standards, regenerative agriculture tourism, wellness experiences, and data-driven planning to support both biodiversity and local livelihoods.

Overall, these new developments suggest that future sustainable tourism research and practice will prioritize four interrelated forces: technological innovation (such as smart systems, artificial intelligence, and digital twins); inclusive governance and stakeholder collaboration; nature-positive and regenerative frameworks; and resilience through climate-aware response planning. Recognizing and integrating these dimensions will be essential to building sustainable tourism systems that are adaptive, equitable, and regenerative.

2. Research Methodology

2.1 Research Design

This study adopts a quantitative research design to explore the relationship between demographic factors (age, income, gender, and education) and sustainable tourism behaviours, including environmental actions, cultural preservation, and community engagement. A cross-sectional survey approach was employed to collect data from a sample of respondents representing diverse demographics. The use of quantitative methods ensures that the relationships between variables can be objectively measured and analyzed.

2.2 Population and Sample

The target population for this study includes tourists and trevellers visiting three prominent beaches in Karnataka: Panambur Beach, Malpe Beach, and Tagore Beach. Panambur Beach is known for its popularity and vibrant atmosphere, making it ideal for studying tourist behaviours. Malpe Beach offers scenic beauty and tranquility, attracting diverse tourists. Tagore Beach is recognized for its cultural significance and local tourism initiatives, providing insights into community engagement. A stratified random sampling technique was used to select a sample of 300 respondents from these locations. Stratification was based on demographic variables, including age, income, gender, and education level, to ensure that each subgroup is adequately represented in the analysis. By selecting participants from multiple beach locations, the study captures a diverse range of tourist behaviours and characteristics, enhancing the representativeness of the sample. This approach ensures that the findings can be generalized to a broader population of tourists visiting coastal destinations in Karnataka.

2.3 Data Collection

Data was collected through a structured questionnaire, which was designed to gather both demographic information and specific details on sustainable travel behaviours, community-based engagement, and environmental awareness. The questionnaire was divided into four sections. The first section gathered demographic details, such as age, gender, income, and education level. The second section focused on respondents' sustainable travel behaviour, asking about the frequency and types of sustainable practices, such as waste reduction and the choice of eco-friendly accommodations. The third section measured community-based engagement, examining the extent to which respondents were involved in sustainability initiatives. The final section assessed environmental awareness, specifically respondents' knowledge about the negative impacts of tourism on the environment and cultural heritage. The survey was administered online to make it accessible to a diverse group of participants, particularly across different income groups and geographic regions.

2.4 Data Analysis

The data collected from the survey was analyzed using SPSS (Statistical Package for the Social Sciences) software. Descriptive statistics were used to summarize the demographic profile of the respondents and their sustainable tourism behaviours. To examine the relationships between demographic factors and sustainable travel behaviours, correlation analysis and regression analysis were performed. Chi-square tests were used to explore associations between categorical variables, such as gender and community engagement. Additionally, cross-tabulation was employed to assess the relationship between the frequency of sustainable travel practices and community-based involvement. These statistical methods allowed for a comprehensive analysis of the data, revealing patterns and trends in the behaviours of different demographic groups.

2.5 Ethical Considerations

The study was conducted in compliance with ethical guidelines to ensure the protection of participants' rights and confidentiality. Prior to participation, all respondents were provided with informed consent, which explained the purpose of the study, the voluntary nature of participation, and the confidentiality of responses. Participants were assured that their personal data would not be disclosed and that they could withdraw from the study at any time without consequence. The study adhered to strict privacy protocols to safeguard the information provided by participants. Ethical considerations were considered at every stage of the research process, ensuring the integrity and reliability of the findings.

2.6 Limitations

While the study offers valuable insights into the relationship between demographic factors and sustainable tourism behaviours, there are several limitations to consider. One limitation is the reliance on self-reported data, which may introduce biases such as social desirability or inaccuracies in reporting. Additionally, while the sample size of 300 respondents is representative, it is limited to specific coastal areas of Karnataka - Panambur Beach, Malpe Beach, and Tagore Beach - which may not fully reflect the diversity of the global tourist population. The regional focus also restricts the generalizability of the findings to other geographic locations. These limitations should be considered when interpreting the results, as they may affect the broader applicability of the study's conclusions.

3. Data Analysis

3.1 Demographic Analysis

The demographic analysis presents the distribution of the sample in terms of gender, age, education, occupation, and annual income.

Gender Distribution

Table 1. Gender Distribution

Gender	Percentage (%)	Frequency (n)
Male	54.9	106
Female	45.1	87

The gender distribution is balanced, with 54.9% male and 45.1% female respondents. This slight male dominance does not significantly impact the study's findings, ensuring a fair representation of both genders. Gender, therefore, may not be a major factor influencing sustainable travel practices in this sample.

Age Groups

Table 2. Age Groups

Age Group	Percentage (%)	Frequency (n)
18-25	53.9	104
26-35	16.6	32
36-45	18.1	35
46-55	7.3	14
Above 55	4.1	8

A significant portion of respondents (53.9%) are from the 18-25 age group, suggesting that younger trevellers dominate the sample. This may indicate stronger sustainability awareness among youth, who are generally more receptive to eco-friendly behaviours and prioritize sustainability in their travel choices. The other age groups—26-35 (16.6%), 36-45 (18.1%), 46-55 (7.3%), and above 55 (4.1%)—show progressively lower percentages, implying that sustainable travel practices may be more common among younger generations. This distribution highlights the crucial role of younger age groups in promoting sustainable travel behaviours in Coastal Karnataka.

Education Levels

Most respondents (37.3%) held a Bachelor's degree, followed by 24.9% with Master's degrees. This suggests that the sample is relatively well-educated, which may be linked to higher environmental awareness and more sustainable travel practices. Those with higher educational qualifications are likely more informed about the negative impacts of tourism and are thus more inclined to adopt eco-friendly behaviours.

Table 3. Education Levels

Education Level	Percentage (%)	Frequency (n)
High School	26.4	51
Bachelor's Degree	37.3	72
Master's Degree	24.9	48
Doctorate Degree	7.8	15
Others	3.6	7

Smaller proportions of respondents with Doctorate degrees (7.8%) and those in the "Other" category (3.6%) indicate that advanced education is less common but still represented. Research shows that individuals with higher education are more likely to engage in sustainable practices, making education a key factor in understanding participants' environmental attitudes and actions related to sustainable tourism.

Annual Income

Table 4. Occupation

Income Range (INR)	Percentage (%)	Frequency (n)
Below 100,000	26.4	51
100,000 - 300,000	10.9	21
300,001 - 600,000	11.4	22
600,001 - 900,000	12.4	24
900,001 - 1,200,000	6.2	12
Above 1,200,000	10.9	21
Others	21.8	42

Table 4 illustrates the income distribution of the study's respondents. The largest group (26.4%) earns below INR 100,000, followed by smaller percentages in higher income ranges, with 10.9% earning between INR 100,000-300,000 and 11.4% in the 300,001-600,000 range. A moderate proportion (12.4%) falls in the 600,001-900,000 category, while 6.2% earn between INR 900,001-1,200,000, and another 10.9% earn above INR 1,200,000. Additionally, 21.8% of respondents are categorized under "Others," suggesting income sources or categories outside the specified ranges. This distribution reflects a diverse economic background among the sample.

Analysis of Behavioural and Sustainable Practices: Regression Model Insights

Prioritizing Environmental Consequences

The regression model ($R^2 = 0.146$) explains 14.6% of the variance, but demographic factors (gender, age, education, occupation, income) do not significantly influence environmental priorities ($p > 0.05$), suggesting personal values or awareness play a larger role.

Sustainable Travel Practices

The model ($R^2 = 0.130$) shows that age (26-55) and higher income (above INR 1,200,000) significantly impact sustainable travel choices, indicating financial resources enable eco-friendly options.

Table 5. Analysis of Behavioural and Sustainable Practices

Factor	Regression Model (R^2)	Significance (p-value)
Prioritizing Environmental Consequences	$R^2 = 0.146$	$p > 0.05$
Sustainable Travel Practices	$R^2 = 0.130$	$p < 0.05$
Community-Based Efforts	$R^2 = 0.130$	$p < 0.05$

Community-Based Efforts

Age is a key factor in cultural preservation participation ($R^2 = 0.130$), with older individuals (36-55) more involved, likely due to increased awareness of tourism's cultural impact.

In essence, older individuals and those with higher incomes are more likely to engage in sustainable travel and cultural preservation. However, other factors, like personal values and awareness, also influence sustainable behaviours.

Correlation between Knowledge of Tourism Impacts and Sustainable Practices

The relationship between knowledge of the negative impacts of tourism and both environmental behaviour and cultural preservation was explored using Pearson's correlation coefficient.

Table 6. Correlation Between Knowledge of Tourism Impacts and Sustainable Practices

Variable	Correlation Coefficient (r)	Significance (p-value)	Interpretation
Knowledge vs. Environmental Behaviour	0.396	$p < 0.001$	Positive and significant correlation
Knowledge vs. Cultural Preservation	0.227	$p < 0.01$	Positive and significant correlation

Knowledge vs. Environmental Behaviour

A positive and significant correlation (Pearson's $r = 0.396$, $p < 0.001$) indicates that greater awareness of tourism's environmental impacts leads to increased eco-friendly behaviours like waste reduction and energy conservation.

Knowledge vs. Cultural Preservation

A significant correlation (Pearson's $r = 0.227$, $p < 0.01$) suggests that individuals aware of tourism's effects on cultural heritage are more likely to engage in cultural preservation efforts.

The findings emphasize the role of awareness in promoting sustainable behaviours. Increased education on environmental and cultural impacts encourages actions that support both eco-friendly practices and cultural preservation. This highlights the need for tourism stakeholders to prioritize awareness programs in their sustainability efforts.

The Impact of Education and Sustainable Travel Practices on Environmental Behaviour

Table 7. Table Cross-Tabulations and Chi-Square Results

Aspect	Chi-Square Value	p-Value
Sustainable Travel and Environmental Behaviour	17.083	0.029
Education Initiatives	42.78	< 0.001

The chi-square analysis revealed two important findings related to sustainable travel behaviours and education initiatives.

First, a significant relationship was found between frequent sustainable travel practices and the adoption of eco-friendly actions ($\chi^2 = 17.083$, $p = 0.029$). This suggests that individuals who practice sustainable travel are more likely to engage in behaviours such as waste reduction and energy conservation, indicating that sustainable travel promotes broader environmental responsibility.

Second, a strong association was observed between participation in educational programs and sustainable travel behaviours ($\chi^2 = 42.780$, $p < 0.001$). This highlights the effectiveness of education in encouraging responsible tourism. Programs focused on the environmental impacts of tourism were found to significantly influence individuals to adopt sustainable travel practices, emphasizing the importance of awareness initiatives.

Impact of Demographic Factors on Sustainable Travel Behaviour

Table 8. Demographic Factors vs. Sustainable Travel Practices (Regression analysis)

Variable	Category	Sustainable Travel Behaviour	Significance (p-value)
Age Group	18-25	Low	$p > 0.05$
	26-35	Moderate	$p < 0.05$
	36-45	High	$p < 0.05$
	46-55	High	$p < 0.05$
Income Level	Below INR 100,000	Low	$p > 0.05$
	INR 100,000 - 300,000	Moderate	$p > 0.05$
	INR 300,001 - 600,000	Moderate	$p > 0.05$
	INR 600,001 - 900,000	High	$p < 0.05$
	Above INR 1,200,000	Very High	$p < 0.05$

The analysis reveals that age and income significantly influence sustainable travel behaviours.

Impact of Age on Sustainable Travel Behaviour

Younger respondents (18-25) show low engagement in sustainable practices, likely prioritizing affordability over sustainability. In contrast, individuals aged 26-35 exhibit moderate engagement, balancing personal goals with growing environmental awareness. Older respondents (36-45 and 46-55) demonstrate high levels of sustainable travel behaviour, suggesting that maturity and life experience contribute to stronger environmental responsibility.

Impact of Income on Sustainable Travel Behaviour

Income also plays a key role. Those with an income below INR 100,000 show low participation in sustainable practices due to financial constraints. Respondents earning between INR 100,000 and 600,000 display moderate engagement, while those with an income between INR 600,001 and 900,000 exhibit high engagement. Individuals earning above INR 1,200,000 are most likely to adopt premium sustainable options and actively support environmental and cultural initiatives.

These findings emphasize the need for targeted programs that address the unique needs of different demographic groups, ensuring that younger and lower-income trevellers receive education and affordable sustainable options, while older and higher-income individuals are further encouraged to continue their positive contributions.

Impact of Demographic Factors on Knowledge and Environmental Behaviour

Table 9. Knowledge vs. Environmental Behaviour by Demographics

Variable	Category	Knowledge of Negative Effects	Environmental Behaviour	Significance (p-value)
Gender	Male	High	High	$p < 0.05$
	Female	Moderate	Moderate	$p < 0.05$
Education Level	High School	Low	Low	$p < 0.05$
	Bachelor's Degree	Moderate	Moderate	$p < 0.05$
	Master’s / Doctorate	High	High	$p < 0.05$
Income Level	Below INR 100,000	Low	Low	$p < 0.05$
	Above INR 1,200,000	High	Very High	$p < 0.05$

The analysis in Table 7 shows the correlation between knowledge of tourism’s negative effects and environmental behaviour, segmented by gender, education, and income.

Impact of Gender

Male respondents exhibit high awareness and strong engagement in eco-friendly practices ($p<0.05$), while females show moderate awareness and behaviour ($p<0.05$). This highlights a need for more targeted awareness programs for women to increase their environmental involvement.

Impact of Education

Education significantly influences both awareness and behaviour. High school graduates exhibit low levels of knowledge and environmental behaviour ($p<0.05$), while those with a bachelor’s degree show moderate levels. Respondents with master’s or doctorate degrees demonstrate high awareness and engagement, indicating that advanced education enhances commitment to sustainability.

Impact of Income

Income also plays a key role. Respondents earning below INR 100,000 show low knowledge and engagement ($p<0.05$), while those earning above INR 1,200,000 display high knowledge and very high engagement in sustainable practices ($p<0.05$). This suggests that higher income provides access to eco-friendly options and the ability to act on environmental awareness.

The findings suggest the need for targeted strategies to improve awareness and behaviour across different demographics. Programs should focus on bridging knowledge gaps for women, lower-income individuals, and those with less education, while reinforcing sustainable practices in higher-income and more educated groups. Tailoring interventions based on these insights can help promote widespread environmental responsibility.

3.2 Demographic Determinants of Community Engagement in Sustainable Tourism

Table 10. Community-Based Efforts vs. Demographics

Variable	Category	Community Participation	Significance (p-value)
Age Group	18-25	Low	$p > 0.05$
	26-35	Moderate	$p < 0.05$
	36-45	High	$p < 0.05$
	46-55	Very High	$p < 0.05$
Income Level	Below INR 100,000	Low	$p > 0.05$
	Above INR 1,200,000	High	$p < 0.05$

The analysis of community-based sustainability efforts across demographics reveals important trends in participation, particularly regarding age and income, and suggests ways to improve inclusivity in sustainable tourism initiatives.

Age and Community Participation

Younger individuals (18–25) show low engagement in community sustainability efforts ($p>0.05$), possibly due to limited awareness or exposure. Participation increases in the 26–35 age group ($p<0.05$) as social and professional responsibilities rise, making individuals more aware of sustainability. Engagement peaks in the 36–45 and 46–55 age groups ($p<0.05$), where individuals have more resources, time, and a stronger commitment to environmental and cultural preservation.

Income and Community Participation

Income significantly influences participation. Those earning below INR 100,000 show low involvement ($p>0.05$) due to financial constraints. In contrast, individuals with incomes above INR 1,200,000 participate at high levels ($p<0.05$), as their financial stability enables them to contribute more actively, both through monetary support and direct involvement in sustainability initiatives.

Implications for Policy and Practice

The findings emphasize the need for targeted strategies to boost participation. For younger and lower-income groups, raising awareness and providing accessible opportunities can encourage greater involvement. For older and higher-income individuals, maintaining and enhancing their engagement can further their impact. Tailored programs can ensure community-based sustainability initiatives are inclusive and effective in achieving long-term sustainable tourism goals.

3.3 The Interconnection between Sustainable Travel Practices and Community Engagement

Table 11. Sustainable Travel vs. Community Efforts

Sustainable Travel	Community Engagement	Frequency (n)	Percentage (%)
Always	High	42	22.70%
Sometimes	Moderate	68	36.30%
Rarely	Low	83	44.90%

The data in Table 8 highlights the connection between sustainable travel behaviours and community-based engagement, revealing key trends.

High Community Engagement: "Always" Practicing Sustainable Travel

Among those who "always" practice sustainable travel, 22.7% show high community engagement. These individuals are consistently aligned with sustainable practices, indicating strong personal values and awareness of environmental and cultural preservation. Their active participation in community efforts demonstrates a proactive approach to fostering sustainable tourism.

Moderate Community Engagement: "Sometimes" Practicing Sustainable Travel

A larger group (36.3%) practices sustainable travel "sometimes" and shows moderate community involvement. This group’s engagement is less consistent, often influenced by external factors like convenience or incentives. While they contribute to community initiatives, their participation is irregular.

Low Community Engagement: "Rarely" Practicing Sustainable Travel

The majority (44.9%) "rarely" engage in sustainable travel and show low levels of community involvement. This reflects a gap in awareness or motivation, suggesting a need for targeted educational programs to raise awareness about the benefits of sustainability and community engagement.

Implications for Sustainable Tourism Development

The findings suggest that consistent sustainable travel behaviours correlate with higher community engagement. Efforts to promote sustainable tourism should focus on increasing awareness among those who "sometimes" or "rarely" practice sustainable travel. Strategies like incentives, educational campaigns, and highlighting community benefits could drive greater participation, enhancing sustainable tourism and community-based initiatives.

Conclusion

This study highlights the significant demographic factors - age, income, gender, and education - that influence sustainable travel behaviours and community-based efforts within the tourism sector. The analysis underscores the importance of these factors in shaping individuals' engagement with eco-friendly practices, cultural preservation, and participation in community initiatives. The findings emphasize that a one-size-fits-all approach may not be effective in promoting sustainable tourism. Instead, targeted strategies that cater to the specific needs and motivations of different demographic groups are essential.

Recommendations from this study include the development of educational programs aimed at increasing awareness of sustainable tourism, particularly for younger individuals and those from lower-income backgrounds. Tailored community-based initiatives should be implemented to foster greater engagement among these groups, while also reinforcing the sustainable behaviours of older adults and higher-income individuals. Furthermore, incentives, both financial and social, should be offered to encourage consistent participation in sustainable practices. By focusing on these areas, tourism stakeholders can facilitate a more inclusive and effective approach to sustainable tourism development.

Future studies could explore the long-term impact of targeted educational campaigns and community-based initiatives on sustainable tourism behaviours across different demographic segments. Additionally, further research could investigate the role of technology and digital platforms in raising awareness and facilitating engagement in sustainable tourism. Comparative studies across different regions or countries could also provide valuable insights into how cultural and socio-economic factors influence sustainable tourism practices. Lastly, future research could assess the effectiveness of policy interventions in promoting sustainable tourism at both local and global levels.

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Credit Authorship Contribution Statement

Bhaskar Sailesh: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – Original Draft, Supervision, Validation, Writing – Review & Editing, Visualization.

Nagarjun Nayani: Data Curation, Methodology, Investigation, Formal Analysis, Writing – Original Draft, Project Administration, Writing – Review & Editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Tourism and Circular Economy: A Case Study from Kumaon Himalayas

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Abstract: This study explores the integration of circular economy principles into the tourism sector, presenting a shift from the traditional linear model of "take, make, dispose" to a more sustainable and regenerative framework. The circular economy emphasizes reducing waste, reusing resources, and promoting sustainable consumption, making it highly relevant for tourism, a sector with high resource intensity and environmental impact. The objective of this Study is to qualitative and practical establishment of principles of tourism circularity in one of the untapped tourism zones of Uttarakhand State through Local Community Involvement. The paper outlines the theoretical foundations of circularity and applies them to tourism through strategies like resource efficiency, waste minimization, sustainable infrastructure, and local community engagement. Glancing through the case studies of current circular practices in Amsterdam and luxury resorts in the Maldives and Thailand – the design of the study establishes the community-driven initiatives in the Chhera Village of Kumaon Himalayas as the primary research of the author – demonstrating the successful positioning of local communities induced circular tourism as a practically feasible transformative approach capable of addressing the environmental and socio-economic challenges facing the global tourism industry towards strategizing for a regenerative future. The study has the limitation of reciprocating the results in the Mountain communities or more aptly the Himalayan regions. The paper is the practical attempt towards the shift from the traditional linear model to a more sustainable and regenerative framework towards the better society and environment along with sustainable tourism growth.

Keywords: circular economy; sustainable tourism; case study; resource management; community-based tourism; waste valorization.

JEL Classification: L83; Z32; Q01.

Introduction

The circular economy is a model that focuses on minimizing environmental impact – minimizing waste, reducing resource consumption, minimizing pollutions and CO_2 emissions and keeping products and materials in use for as long as possible. Unlike the traditional linear economy of "take, make, dispose," the circular economy emphasizes reducing, reusing, and recycling. It focuses on designing products for durability, repairability, and reuse, aiming to minimize waste by using materials that can be regenerated. In the Industrial Ecology, waste from one process becomes input for another, promoting closed-loop systems. The linear economy system is built on the model of raw material extraction from nature, converting them into products and design, then discarding them as waste (UNDP 2023). The concept of circular economy is based on three principles, namely, (a) Eradicate waste and pollution, (b) Reuse products and materials till they achieve their highest value, (c) Refurbish nature (Ellen MacArthur Foundation,2020). The circular economy is a model where production and consumption activities include reusing, regenerating, improving, recycling, and sharing materials and products for as long as they remain usable (European Parliament, 2023), thereby, extending the life cycle of product. Circularity thus entails separating economic growth from the continuous consumption of natural resources and production outputs. Therefore, circular economy also tackles other problems like pollution, climate change and loss of biodiversity. It is the basis of building the sustainable economy.

The circularity is taking the centre stage across industries. The circular economy principles are particularly relevant for tourism sector, as the sector is heavily interlinked with other sectors, such as transportation, consumer goods, food, construction, and waste management (Global Destination Sustainability Index, 2017). During the process beginning from traditional tourism, the tourism sector has adopted several forms of new tourism concepts, such as ecotourism, and sustainable tourism, nature-based tourism, and the more recent applying the principles of circular economy into the tourism sector. Tourism is resource-intensive and often produces a significant amount of waste. The circularity in tourism is complex in terms of its practicality coupled with economic benefits. The tourism-as-a-development-tool for the growth of local communities' induced sustainable tourism is the initiation of circularity in tourism that this study strives to establish. The sustainable tourism commonly has been advocated as an alternative to traditional natural human resource-based economic development and further the local communities supported Tourism sector is the best tool for sustainable economic growth, reducing poverty and generate employment opportunities.

Until 2019, tourism was the world's third-largest export category, generating USD 1.7 trillion in revenues, following fuels and chemicals (UNWTO, 2020). The tourism industry contributing 9.1% to the total global GDP remains a key pillar of the global economy. On the other hand tourism sector is also one of the largest contributors to the employment. In 2023, the Travel & Tourism sector directly generated 120.8 million jobs, accounting for 3.7% of total employment. Tourism supported approximately 329.6 million jobs in 2023, representing 10.0% of global employment combined for both direct and induced employment (WTTC, EIR, 2023). The tourism sector in the next decade shall be single largest impact factor to sustainable and circular economy planning. Globally the tourism is currently practiced on the linear economic model – growing energy demands, high waste generation, high water consumption and uncontrolled wastewater discharges as well as increasing global greenhouse gas (GHG) emissions. Gössling and Peeters (2015) have projected in their study that future tourism resource consumption of water, food, land, energy and emissions will double within the next 25 to 45 years. Gössling (2015) has shown that tourism is responsible for 8% of global GHG emissions which shall more than double in the same period. Similarly the energy consumption is also slated to more than double in this period as shown by number of studies (UNWTO, 2008). Pirani and Arafat (2014) in their studies on the solid waste generation, especially single-use consumer goods and food waste in hotels and restaurants account for 60% and 40% respectively of all solid waste generation in tourism. Further, the seasonal nature of Tourism in the respective destinations put additional stress on Waste management systems as well as stress on resource allocation to local communities in these peak tourism seasons.

1. Research Background

The people centric Tourism sector needs increasing alignment with the concept of Circular Economy as a strategy for promoting sustainability and reducing environmental impact. Being people centric where people are both the consumer and the product who are moving to tourism destination for luxury and indulgence hence making the sector linear and wasteful (Pine & Gilmore, 1998). Beginning with circular behavior adaptability of the people in tourism, the circular economy principles must aim to close the loop on resource consumption, promote the reuse and recycling of materials while fostering more sustainable and regenerative systems within tourism practices. There are various studies that explore consumer perceptions of circular economy practices in tourism, such as eco-friendly hotels and sustainable travel options. It emphasizes the importance of consumer awareness in promoting circular practices (Rodríguez, Florido, & Jacob, 2020).

The Circularity in Tourism can be achieved in multiple ways such as achieving Resource Efficiency or reducing energy, water, and material consumption, waste minimization or decreasing waste production by reusing and recycling materials. Gössling & Peeters (2015) addresses the environmental impact of tourism, providing insights into the potential for a circular economy to reduce emissions in tourism-related activities. It suggests that sustainable tourism initiatives could reduce tourism's carbon footprint through waste minimization and energy efficiency. It is thus imperative to establish the discussions around the sustainable tourism practices and linking circular economy principles in the tourism industry. Buckley (2012) highlights the importance of reducing tourism's impact through efficiency in resource usage. Sustainable mobility or integrating green transport solutions such as electric vehicles or shared transport, circular supply chains or encouraging local sourcing and reducing the carbon footprint of products, product life extension or designing products and services in such a way that they have a longer lifespan (*e.g.*, eco-friendly hotels and sustainable food systems), Regenerative practices or fostering regenerative practices like eco-tourism or community-based tourism that rebuild local environments and economies.

There shall be attempts to explore the case studies on circular practices in destinations, such as waste recycling and renewable energy integration that have helped improve sustainability in the tourism sector. One such example of case study of the ever-rising Mediterranean tourism destinations that must adopt to circular economy principles is provided by Rossana & Teodoro (2024) in order to improve sustainability outcomes in these regions. The destinations should adopt the set of guidelines for tourism stakeholders to implement circular strategies such as sustainable resource management and eco-friendly policies. Feiya, Tao, & Shanhui (2020) in their article shares the conceptual framework for integrating circular economy into tourism management.

Further as the author of this study has shown immensely in his research on the Tourism through Local Communities (Mehdi, 2013) and the rural communities in their role towards practical sustainable tourism business model in one of the village in Pithoragarh, Kumaon Himalayas (Mehdi, 2018). Emphasizing on similar lines, Krittayaruangroj, Suriyankietkaew & Hallinger (2023) focuses on the role of local communities in adopting circular economy principles within tourism destinations highlighting the community-driven initiatives like waste management programs and the promotion of local crafts. Furthering feasible modeling of the intersection between circular economy and tourism, as well as on the sustainable and potential economic benefits for tourism businesses adopting circular practices, including cost savings and brand differentiation is the need of the time (Manniche, Larsen, & Broegaard, 2021).

Geissdoerfer, *et al* (2017) had laid down the theoretical foundation for circular economy concepts, examining the various types of circular business models and their applications, including in sectors like tourism. In the context of tourism, the principles of circularity can be applied in tourism sector in several ways. Tabora (2025) suggests for Sustainable Design of Tourist Infrastructure – Hotels, resorts, and other tourist facilities can adopt circular principles by using sustainable materials, implementing energy-efficient technologies, and ensuring the ability to recycle or repurpose components at the end of their life cycle. Large tourist infrastructures should mandatorily have the system where water is treated and reused and the restaurants therein are advised to adopt biodegradable or recyclable packaging, reducing their environmental footprint. Local Community participation for creating tourists facilities should be encouraged. Circular tourism also promotes the use of local, sustainable products. A circular economy approach, for instance, might involve hotels sourcing food from local farmers who also follow sustainable practices, or tourists buying locally made eco-friendly souvenirs instead of mass-produced items. Local Sourcing and Sustainable Products forms the key to adopting the circular practices in tourism (Denia, *et al.* 2025). Tourism thus must go a step further than the reduce, reuse and recycle to regenerative tourism by focusing on improving and restoring ecosystems rather than just minimizing damage, hence forth the community engagement becomes all the more important towards improving the local environment.

The encouragements to Community-Based Tourism towards Small-scale, locally run initiatives where tourists stay with local families, learn about traditional crafts, and contribute to community projects, which this case study focuses in the Himalayan context, along with the regenerative activities like volunteering for reforestation, destination clean-ups, or helping to preserve historical landmarks – that can be made possible through Community based tourism to derive the best of sustainable tourism benefits related to socio economic and environmental benefits.

The mountains are fragile more so in the case of Himalayas of Uttarakhand region where this study is highly concentrated. The recent flash floods of August 5, 2025, in Uttarkashi, a religious Hindu yatra tourism sector has washed away an entire village. This calls for more effort to be put into the sustainable development of the mountain destinations and the local communities. There are numerous studies (Romeo *et al.* 2021) that highlight the important role the responsible sustainable tourism can play in valuing the ecological cultural, natural and social heritage of mountains and its communities; and to furthering to steps to circular mountain tourism by promoting sustainable supply chain systems and adding value to local products. The European examples of the National Association of Mayors in Mountain Resorts (ANMSM) and Mountain Riders association adopting the "Zero Waste Mountain 2030" charter towards the path to a sustainable circular economy (Mountain Planet, 2025) can be well replicated in the Himalayan Mountain destinations, hence this study acquires all the more importance to be understood and practiced.

2. Research Methodology

The objective of this Study is to qualitative and practical establishment of principles of tourism circularity in one of the untapped tourism zones of Uttarakhand State through Local Community Involvement. The study identifies the problems connected with such practical idea of tourism circularity that can be

- Transitioning to a circular model might require significant investment, such as upgrading facilities or developing new sustainable products and services.

- Creating willingness and awareness to adopt to sustainable tourism practices towards the long-term benefits as well as educating the consumers to support such businesses.
- Inculcating the practice for recycling and waste management in the local communities willing to practice circularity in tourism business
- Tackling the problems in establishing closed-loop systems across the tourism supply chain.

3. Circular Tourism Initiatives

Across the globe, a growing number of tourism businesses and destinations are embracing circular economy principles to reduce environmental impact and foster sustainability. Below are some noteworthy case studies that highlight how these concepts are being successfully applied in practice.

One of the leading examples of circular tourism can be found in Amsterdam, Netherlands, a city recognized internationally for its commitment to circular economy practices. Through its 'Amsterdam Circular Strategy 2020–2025', the city is working towards a long-term goal of achieving a zero-waste tourism model. A significant part of this strategy focuses on comprehensive recycling and waste management systems within the tourism sector. Many hotels and restaurants in Amsterdam have adopted green waste practices and are certified under the *Green Key* program, a label awarded to environmentally responsible tourism businesses. Beyond waste management, Amsterdam also champions sustainable transportation. Cycling is not just encouraged - it is embedded in the urban fabric as the primary mode of travel for both residents and tourists. The city further promotes electric bikes, energy-efficient public transit, and electric boats for sightseeing tours, reducing carbon emissions across the board. Circularity is also evident in the hospitality sector. For example, Conscious Hotels, a chain of eco-conscious accommodations in Amsterdam, incorporates sustainable materials in both construction and interior design, utilizes energy-efficient systems, and actively reduces waste through recycling and composting initiatives. Guests are invited to participate in these sustainability efforts, reinforcing a culture of environmental responsibility.

Another inspiring example is Soneva Resorts, a luxury eco-tourism brand operating in the Maldives and Thailand. Soneva has embedded circular economy principles into every facet of its operations, transforming its resorts into self-sustaining ecosystems. One of its most innovative practices involves waste-to-energy conversion, where organic waste generated on-site is processed into biogas. This clean energy source is then used for cooking and powering various resort facilities. Soneva relies primarily on solar energy, supported by renewable backup systems to ensure a continuous supply of clean power. The resorts operate closed-loop water systems that include advanced filtration and desalination processes, eliminating the need for single-use plastic water bottles and reducing freshwater extraction. The company also prioritizes local sourcing by partnering with nearby farmers and artisans, thereby lowering carbon footprints and supporting local economies. Environmental restoration is another key component of Soneva's mission. In the Maldives, for example, the brand has invested in coral reef rehabilitation and marine biodiversity programs, while also advocating for responsible fishing practices in nearby communities.

Iceland's circular eco-lodging initiatives provide yet another excellent illustration of how remote and off-grid accommodations can operate sustainably by adopting circular principles. Designed for self-sufficiency, these eco-lodges function off-grid, drawing all their energy needs from renewable sources like wind turbines and solar panels. This ensures that guests enjoy a low-impact stay even in some of the country's most isolated natural areas. Water conservation is addressed through closed-loop systems that collect, purify, and reuse water for various needs, while wastewater is treated and either reused or converted into compost. The lodges themselves are constructed from local materials such as sustainably harvested timber and volcanic rock, which reduces the environmental impact associated with transportation and building materials. Waste is carefully managed through composting toilets and the transformation of organic waste into biogas, which is then used for heating and cooking. These systems not only reduce reliance on fossil fuels but also demonstrate how circular design can enhance the guest experience while protecting fragile ecosystems.

These initiatives underscore the potential for circular economy principles to transform the tourism sector into a more regenerative and environmentally responsible industry. By focusing on waste reduction, resource efficiency, renewable energy, and community engagement, these destinations and businesses serve as models for future-oriented tourism development.

4. The Himalayan Case Study in Circular Tourism

4.1 The Rhythm Camp Resort project in Village of Pithoragarh, Kumaon Himalayas

The primary research project of the author, where tourism circular economy principles were applied to local communities, focuses on creating a closed-loop system where resources were reused and waste was minimized, benefiting both the environment and the community. These efforts culminated towards fostering the sustainable tourism by minimizing negative impacts and enhancing the positive economic, social, and environmental benefits. The objectives of this study were to support and promote sustainable tourism infrastructure, facilities and products in one of the untapped tourism zones of Uttarakhand State through Local Community Involvement in the Kumaon region of Uttarakhand, which can be in today's terminology be defined as Circular Tourism initiatives with and by the Local Communities. The study carried out through community-based Tourism Swiss Camp project undertaken at the Chhera Village, in the summers of 1996-97, with around 20 extended households. The Camp by the name RYTHM Camp (Acronym for 'Round the Year Tourism and Holiday Management) was managed and operated by the Local village community led by the researcher. The tourism so developed by promoting Local Communities induced tourism product development.

The research has started with the identification of a remote hill destination after studying and on the lines of Camp Resorts being developed at Himachal (Banjara Camp, Shoja Camp, etc.) and Kumaon (Saattal and Corbett Camps). The major limitations with the existing Camps were the non involvement of the local community which Rythm Camp successfully employed. The extensive identification around Pithoragarh district town with informal interviews with the villages led to identification of two ready villages one at Bhalot (around 15 Kms before entering Pithoragarh town with last 5 kms through non metalled or kutcha narrow road passing through the oak forests) and other at Chhera Village (8 Kms after crossing the Pithoragarh town, if travelling from Champawat or Almora – the last 2 kms through non metalled but good motor able road). The Camp in the first two year of operation were managed and operated by the Local village community led by the researcher. The proposal was next submitted to the Fast Travel Bureau who financed it as the commercial venture. The researcher has stayed and worked with local communities at the Pithoragarh area for continuous two years. The author of the study had successfully implemented local communities' supported circular tourism with the at least the below objectives

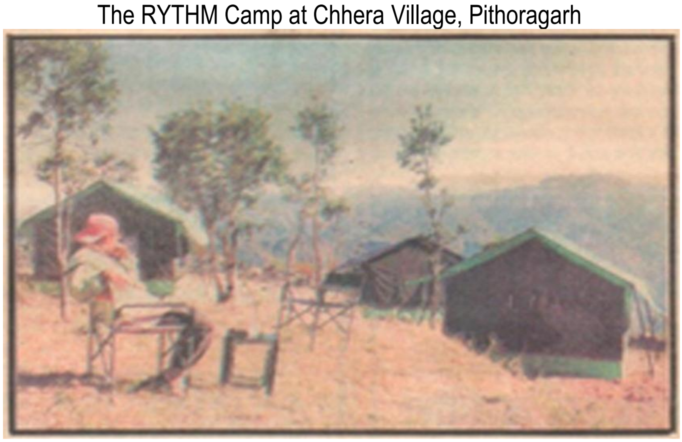
- Involving local residents in the planning, implementation, and revenue generation opportunities along with preserving and showcasing their culture and traditions. Promoting Local Entrepreneurship was the key for growth.
- Promoting responsible tourism choices, such as choosing locally sourced food, supporting community-based businesses, and reducing single-use plastics, promoting the creation of inclusive local value chains.
- Fostering increased revenue for local businesses while bolstering the local economy.
- Attracting eco-conscious tourists and fostering a positive image of the destination as a sustainable place to visit.

The local communities driven tourism project successfully created and established

a) Accommodation: A two way system with basic hospitality skilling was created

1. Initially setting Camp based Tourism, and
2. Subsequently. local community residents hosting the tourists in their decked up portion of their house with basic comforts as the guests require particularly for those who wanted alternative to Camps or during the winters

The RYTHM Camp at Chhera Village, Pithoragarh



b) Transportation: Utilizing the local transporters (few of whom were earlier plying between the village and Pithoragarh town) vehicles' and skilling on the day tour itineraries and as a result in increase in off-road / commercial Vehicle owners' in the village.

c) Foods and crafts: Food and crafts generated considerable profits for the local population, the volume production and delivery at set quality standards were set and delivered by locals both in the kitchen of Camp and Local community residents' houses serving as Guests' stays.

d) Tourism Activities: The project partnered with the local youth promoted 'Soar Adventure Club' towards planning and executing the soft to medium trekking programs on visitors' itineraries and at the same time developed free training events to promote environmental awareness amongst the villages around the Pithoragarh town.

e) Promoting local products for visitors as souvenirs: Supporting the substitution of locally-grown and locally manufactured products. Products can include food, furnishings, guest amenities and other local handicraft items.

f) Communities' small businesses: Helping set up small local shops with items of tourists' daily importance as well as selling local handicrafts from the proceeds received from tourism activities in the village. Contracting locals to provide variety of services from laundry and gardening to transportation and maintenance.

g) Revenue Earnings: Above all, almost 20 extended families in the Chhera Village collectively earned a considerably extra income.

A furnished summer tent accommodation

Author amongst Communities' based Activities

Conclusions

During the process beginning from traditional and mass tourism, the tourism sector has adopted several forms of seemingly new tourism concepts, such as ecotourism, and sustainable tourism, nature-based tourism, and the more recent applying the principles of circular economy into the tourism sector. The circularity in tourism is complex in terms of its practicality coupled with economic benefits. The tourism-as-a-development-tool for the growth of rural or local communities' induced sustainable tourism is the initiation of circularity in tourism that this study has successfully established. Such the practical and sustainable tourism albeit on a low scale can be advocated as an alternative to traditional tourism development and further the local communities supported tourism sector is the best tool for sustainable economic growth, reducing poverty and generate employment opportunities.

The case studies highlight the growing trend of circular tourism across various regions and types of businesses. From luxury resorts to community-based eco-tourism, the examples provided demonstrate how integrating circular economy principles can significantly reduce environmental footprints, promote local economies, and create a more sustainable future for tourism. The case study offers lessons that can be applied to both small and large-scale tourism businesses, showing that circular tourism is not only possible but also beneficial for both the environment and local communities.

The integration of circular economy principles in the tourism sector represents a promising pathway toward making tourism more sustainable, minimizing waste, reducing carbon emissions, and benefiting local communities. While challenges exist, there are many opportunities for tourism businesses to innovate and adopt circular practices that contribute to long-term environmental and economic benefits.

This study holds notable significance as it uniquely bridges the theoretical principles of circular economy with the on-ground, community-driven tourism initiatives in a remote Himalayan context. While circular economy in tourism is an emerging area of research, few studies have explored its real-world applicability within fragile mountain ecosystems and economically marginalized rural communities. The novelty of this study lies in its practical demonstration of how circular tourism models can be successfully implemented at a grassroots level through local community participation, sustainable infrastructure development, and regenerative practices. Through a detailed examination of the RYTHM Camp initiative in Pithoragarh, Kumaon Himalayas, the research offers a transferable framework for promoting circular tourism in other environmentally sensitive regions. It contributes both conceptually and practically to the discourse on sustainable tourism development, emphasizing the importance of integrating environmental responsibility with socio-economic empowerment. The study thereby sets a precedent for future circular tourism initiatives that aim to harmonize tourism growth with ecological preservation and community well-being.

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Tourism and Inequality in the European Union: Exploring the Determinants of Tourism Spending through a Multivariate Approach

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Abstract: This paper aims to identify and analyze economic, social, and demographic factors influencing tourism expenditures across 26 European Union member states, offering a multidimensional perspective on consumer behavior in tourism.

The study uses panel data from 2014 to 2023 obtained from Eurostat, covering all EU countries except Sweden. Variables analyzed include GDP per capita, Gini coefficient, education level, demographic structure, and life satisfaction. A correlation analysis for 2023 explores the relationships between tourism expenditure and selected socio-economic indicators.

The findings reveal significant differences in the level and composition of tourism expenditures between higher- and lower-income countries. In wealthier nations, expenditure is linked to income, social inequality, age, and life satisfaction. In less affluent countries, income, age structure, and education play a more prominent role.

This study combines traditional economic indicators with social and psychographic determinants, emphasizing the role of quality of life in shaping sustainable tourism behavior.

Further research is needed to explore causal relationships and regional patterns affecting tourism expenditure and access, supporting more targeted and effective policy interventions.

The findings support the design of inclusive tourism strategies that reflect varying development levels and cultural contexts, promoting regional cohesion and equitable access. Improving access for disadvantaged groups, such as older adults, low-income populations, and people with disabilities, is a key priority amid Europe's aging society.

Keywords: tourism determinants; tourism expenditure; consumer behavior; economic tourism exclusion

JEL Classification: Z32; D12; D63; D91; R20.

Introduction

Tourism is a key sector of both the global economy and the European Union, contributing nearly €1.8 trillion to the EU's GDP in 2024 and accounting for over 10% of the entire economy (WTTC 2024). In 2023, EU residents spent approximately €555 billion on tourism, with 77% of that related to travel within the European Union (Eurostat 2025). Considering tourism's significant contribution to socioeconomic development, this article addresses the contemporary challenges facing EU member states, both as a global leader in tourism and as a region striving for a more equitable and sustainable future.

This study is based on the hypothesis that tourism expenditure is shaped by a complex interplay of social and economic factors, which may vary depending on a country's level of economic development. The analysis examines the socioeconomic and demographic determinants of tourism expenditure across 26 EU member states, focusing on 2023 as a representative post-pandemic year. It includes variables such as income, social inequality (Gini coefficient), demographic structure (average age, education level, degree of urbanization), price dynamics (HICP), and subjective assessments of quality of life. Using cross-sectional data analyzed with the Gretl software, the results show that national wealth significantly influences these determinants, as countries with higher income levels are affected by different factors than those with lower economic development. In the context of increasing mobility and tourism consumption, the findings offer valuable insights for shaping tourism policies that promote social inclusion, reduce regional disparities, and support the sustainable development of the tourism sector.

1. Research Background

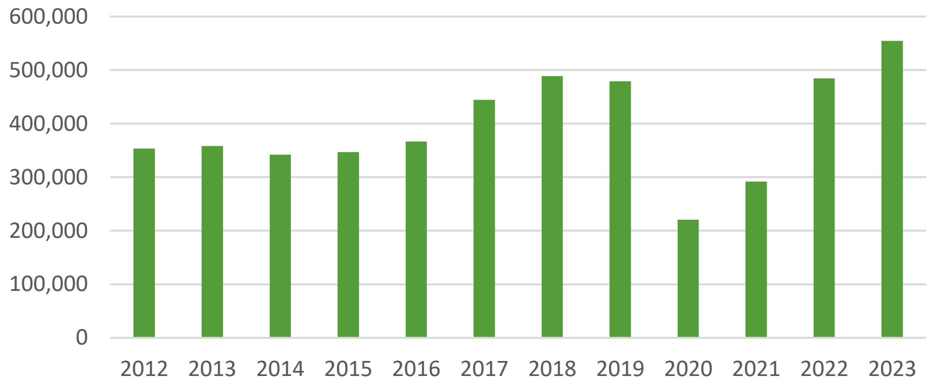
Tourism has become a vital driver of socio-economic development, contributing to several United Nations Sustainable Development Goals (SDGs), such as poverty and unemployment reduction, climate change mitigation, and environmental protection (UNWTO and UNDP 2017). Its growing importance is reflected in the increasing share of the sector within the global economy (UNWTO 2024). It plays a vital role in the expanding service-based economy by generating revenue and foreign exchange, creating employment opportunities, fostering regional development, and strengthening local communities (OECD 2020). Various definitions of tourism emphasize different dimensions of the phenomenon. For instance, the World Tourism Organization (UNWTO 2019) focuses on tourist motivations and activities, while UNESCO (2011) highlights the protection of natural and cultural resources as a basis for responsible tourism development. Eurostat (2025), by contrast, adopts an operational approach centered on measurement, which is essential for cross-country comparisons. Despite these differences, all definitions acknowledge the complexity of tourism, encompassing both human mobility and the related consumption and activities.

As previously mentioned, tourism is a key pillar of the global economy; however, its impact largely depends on the level of development and the sector's significance within a given country (Brida *et al.* 2020). Inchausti-Sintes (2015) notes that tourism can promote GDP growth, improve the trade balance, and reduce unemployment - especially in the short and medium term. On the other hand, at the macroeconomic level, overexpansion of the sector may lead to the structural weakening of traditional industries such as agriculture, manufacturing, and energy. This phenomenon is commonly referred to as "Dutch disease." Given this risk, effective tourism development requires active public administration involvement in infrastructure provision, spatial planning, sector promotion, and the protection of tourism and cultural resources, as emphasized by Duran-Román *et al.* (2020). These authors highlight the need for balanced policies that ensure sustainable development while minimizing over-reliance on tourism.

In this context, the concept of sustainable tourism, defined by Bramwell *et al.* (2017) as an approach that balances environmental, economic, social, and cultural interests, gains particular importance. This includes addressing overtourism, involving local communities in decision-making processes, and adopting digital innovations such as e-tourism and digital tourism management systems. Equally important is implementing proven governance models, especially in countries with untapped tourism potential, to foster economic diversification, job creation, and cultural heritage preservation (Muça *et al.* 2022). According to the OECD (2024), well-managed tourism can contribute to inclusive economic growth, whereas uncontrolled development may lead to social tensions and inequality. Chulaphan and Barahona (2021) further emphasize the need to support sustainable tourism forms, such as ecotourism, health tourism, adventure tourism, and cultural tourism, stressing that effective tourism policy should be adapted to local conditions and ensure economic viability.

Musriha and Rapitasari (2023), meanwhile, highlight another crucial dimension of the tourism sector, the quality of tourism services. High service quality has a positive impact on customer loyalty and profitability, particularly during periods of crisis, such as the COVID-19 pandemic. The experiences of recent years underscore the urgent need to develop more resilient, adaptable, and long-term sustainable tourism models. Such models aim not only to strengthen the sector's ability to withstand future shocks, but also to reduce the economic overdependence on tourism in certain countries (Inchausti-Sintes, 2015). Despite the significant challenges posed by the pandemic, data published by the World Tourism Organization (UNWTO, 2024) reveal a strong rebound and a continued upward trajectory for the sector. According to current forecasts, total export revenues from tourism, including passenger transport, are expected to reach a record $1.9 trillion in 2024 (UNWTO, 2025). Similarly, the travel and tourism sector in the European Union is projected to contribute nearly €1.8 trillion to the bloc's GDP, accounting for 10.5% of the total economy (WTTC, 2024). Meanwhile, according to Eurostat (2025), tourism expenditure in the EU returned to pre-pandemic levels in 2023, following a dramatic decline in 2020 and 2021 (see Figure 1), and exceeding €500 billion. These figures underscore the sector's renewed importance as a driver of socio-economic development.

Figure 1. Level of Tourism Expenditure in the European Union (milion EUR)

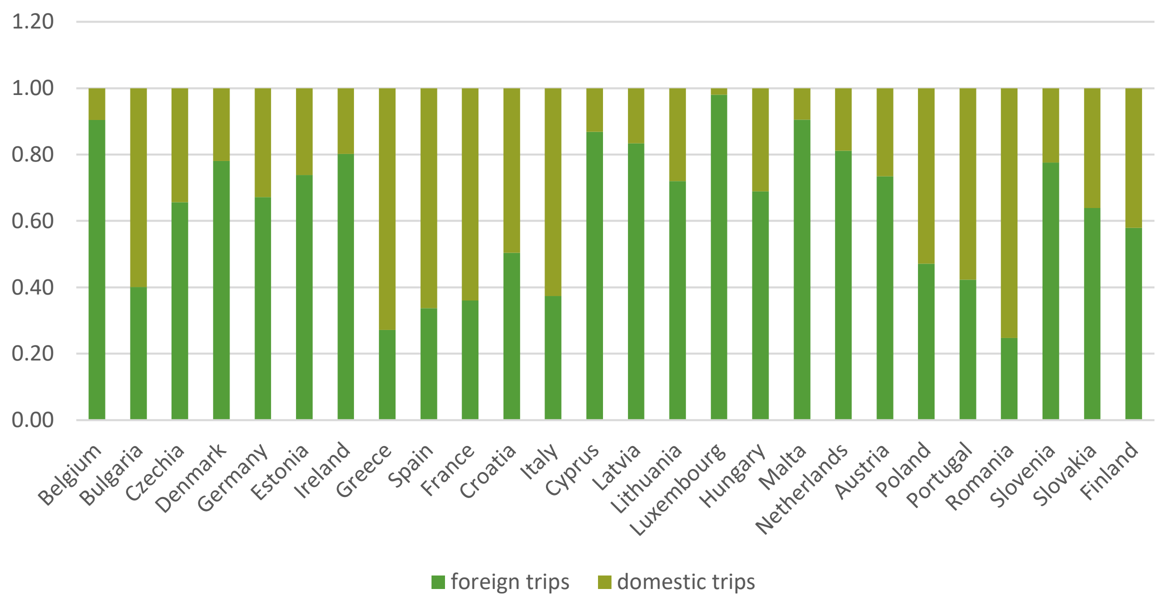


Source: own presentation based on data provided by Eurostat (2025).

The recovery is also reflected in the rebound of international tourist flows. The number of international tourist arrivals is projected to hit 1.4 billion. In this context, Europe plays a particularly prominent role, maintaining its status as the world's most visited region. In 2023 alone, it welcomed 700 million international tourist arivals, accounting for 55% of global tourist arrivals (UNWTO, 2024). In 2025, international tourism continues its upward trajectory, with forecasts suggesting a further increase in international arrivals by 3–5%. This trend signals a full recovery to pre-pandemic levels and highlights the sector's resilience and long-term growth potential (UN Tourism 2025).

To analyze the structure of tourist expenditure across individual EU member states, the classification system outlined in the *International Recommendations for Tourism Statistics* (United Nations 2010) was applied. This system categorizes expenditures based on tourists' country of residence and travel destination. According to this classification, significant differences emerge among EU countries in terms of preferences for domestic versus international travel, as illustrated in Figure 2. The highest proportions of expenditure on international travel were recorded in Luxembourg (98%), Malta (91%), and Belgium (90%). In contrast, residents of Romania, Greece, and Spain allocated the majority of their tourism expenditures to domestic travel - 75%, 73%, and 66%, respectively. Notably, intra-EU tourism accounted for 93% of all tourism activity within the EU, with 73% attributed to domestic travel and 20% to trips to other member states (Eurostat 2025). These figures not only reflect the high level of integration within the EU tourism market, but also highlight the strong mobility of its residents, laying a solid foundation for continued growth and development of the sector.

Figure 2. Percentage of Residents' Tourist Expenditure on Domestic and International Travel in 2023



Source: own presentation based on data provided by Eurostat (2025).

For an effective analysis of the tourism sector, it is essential to understand the diverse motivations of travelers and the increasing specialization within the industry. The classification proposed by the World Tourism Organization (UNWTO, 2019), a specialized agency of the United Nations responsible for global tourism policy, reflects this growing complexity. One of the most commonly identified categories is leisure tourism, which includes beach holidays, weekend getaways, and short nature-based trips. Rural tourism is also gaining popularity, encompassing activities such as connecting with nature, learning about agricultural traditions, fishing, visiting local landmarks, and engaging in the daily life of rural communities. Another key category is cultural tourism, centered on experiencing both tangible and intangible cultural heritage, such as art, architecture, traditions, local cuisine, music and participation in artistic events. A distinct and rapidly expanding segment is health tourism, which is typically divided into medical and wellness tourism. Medical tourism involves travel for treatment, diagnosis, or rehabilitation, while wellness tourism focuses on preventive care and promoting healthy lifestyles. Given the aging population and rising healthcare costs in many developed countries, this sector holds substantial growth potential. Pilgrimage tourism, a unique form of travel associated with visiting religious destinations such as Lourdes, Santiago de Compostela, and Częstochowa, also plays a significant role. Business tourism, which combines professional activities with leisure opportunities, such as attending conferences, trade fairs and business meetings that include recreational components, is another dynamic and growing area. Educational tourism is also expanding, driven by the desire to acquire new knowledge and skills. This includes language courses, school and university exchanges, specialized training programs, and academic field trips. Additionally, ecotourism has gained prominence as a form of sustainable tourism that emphasizes responsible interaction with both biological and cultural diversity (UNWTO, 2019).

The diversity of these tourism forms reflects the evolving needs, lifestyles, and values of contemporary societies, highlighting the complex and multifaceted nature of modern tourism. In the context of the sector's growing significance to the global economy, increasing competition, and shifting consumer expectations, analyzing the factors influencing the level and structure of tourism expenditures enables the development of more effective policies. These policies can optimize revenue, support sustainable growth, and foster meaningful tourism experiences that respect local environments and cultures (Mudarra-Fernández et all. 2018).

1.1 Economic Factors Affecting Tourist Expenditure

Decisions to engage in tourism, as well as the level of tourism-related expenditures, are strongly influenced by economic factors operating at both the microeconomic and macroeconomic levels. Key determinants of household consumption in this context include income levels, financial stability, occupational status, and the value of owned assets, commonly referred to as the wealth effect. At the same time, macroeconomic factors such as inflation, unemployment rates, and changes in fiscal policy significantly affect overall willingness to spend on discretionary goods and services, including tourism. These relationships are supported by both economic theory and empirical research (OECD 2020; Hall *et al.* 2021). Accordingly, periods of economic growth and improvements in material living conditions, particularly in highly developed countries, are typically accompanied by a marked increase in tourism expenditures (OECD, 2020).

The strong relationship between income levels and tourism expenditures is well-documented in empirical research. For instance, Massidda et all. 2022) found that tourists with middle and high incomes spend, on average, 21.4% and 46.2% more, respectively, than those with low incomes. Similarly, unemployed individuals spend approximately 34.2% less on tourism than those who are economically active. These findings align with Milton Friedman's (1957) permanent income hypothesis, which suggests that stability and predictability of income sources encourage greater consumption of discretionary goods, such as tourism.

The role of socioeconomic status in influencing tourism participation is further supported by Chen et all. (2021), who demonstrate that both income and education levels are significantly associated with the amount of tourism expenditure. Labor market status also plays a crucial role in determining not only the likelihood of participating in tourism but also the level of expenditure. Households in which the primary earner is out of the labor force are less likely to engage in tourist activities. In contrast, individuals with high occupational prestige are more likely to travel, particularly internationally, due to greater job security, access to paid leave, and generally higher levels of social protection, especially in highly developed countries (Bernini, Cracolici 2015). Higher levels of human and material capital are linked not only to more frequent travel but also to a preference for higher-quality services.

Chulaphana and Barahona (2021) also emphasize that increases in income and the positive reputation of a destination, often shaped by word-of-mouth recommendations, can significantly raise the average per capita level of tourist expenditure. The authors further highlight the influence of external factors such as relative prices in competing destinations, noting that higher prices in alternative locations may encourage greater expenditure within a given country. Conversely, high local prices and elevated levels of corruption serve as deterrents, reducing the overall value of tourism consumption.

In the microeconomic context, the so-called "wealth effect", defined as the impact of rising asset values, particularly real estate, on consumer behavior also plays an important role. As noted by Chen *et al.* (2021), in regions with relatively low income levels but rapid increases in property values, tourism expenditure may rise despite modest household income, illustrating the complex relationship between perceived wealth and consumer decision-making.

Tourist expenditure is influenced by both microeconomic determinants, such as income levels, occupational status, and the value of owned assets and macroeconomic factors, including gross domestic product (GDP) per capita, inflation, unemployment rates, and exchange rates. A high level of GDP per capita supports the development of tourism by increasing consumers' purchasing power (Cho, 2001), whereas a high unemployment rate,particularly in developed countries, tends to reduce the propensity to travel.

Research by Martins et all. (2017) highlights the varying importance of specific macroeconomic factors depending on a country's level of economic development. In high-income countries, global GDP per capita has the greatest influence on tourism demand, whereas in lower-income countries, relative prices (*i.e.*, the price differences between countries) play a more dominant role. In these lower-income economies, price fluctuations and exchange rate volatility exert a stronger impact on tourist expenditure. Moreover, price elasticity is significantly higher in these countries: on average, a price increase leads to a 3.7% decrease in tourism expenditure, compared to only 1.7% in high-income countries (Martins et all. 2017). These findings underscore the importance of tailoring tourism policies to reflect regional and income-related economic conditions.

As Kaczmarska (2014) notes, the development of the tourism sector is closely tied not only to the general economic condition but also to broader structural and cultural changes. She emphasizes that, in addition to real income growth, a more equitable distribution of income plays a critical role, enabling individuals to first meet their basic needs and, subsequently, pursue higher-order needs such as tourism participation. One widely used measure of income inequality is the Gini coefficient, which indicates how far a country's income distribution deviates from perfect equality. A value of 0 represents complete equality, meaning everyone receives the same income, while a value of 100 indicates maximum inequality, meaning all income is concentrated in the hands of a single individual (Eurostat, 2025). According to Eurostat (2025), the average Gini coefficient in EU countries in 2023 was 29.6. The highest levels of income inequality were recorded in Bulgaria (37.2), Lithuania (35.7), and Latvia (34.0), while the lowest levels (below 25) were observed in Slovakia, Slovenia, Belgium, and the Czech Republic. Another indicator closely tied to tourism is the proportion of the population that cannot afford a one-week vacation away from home. In 2023, this share averaged 28.5% across the European Union, dropping to just 11% in countries such as Luxembourg, but exceeding 40% in Romania, Bulgaria, Hungary, and Greece. These statistics highlight the persistent economic barriers to tourism in many member countries and underscore the importance of policies aimed at making the sector more inclusive.

Macroeconomic crises, including recessions, economic slowdowns, and global disruptions such as the COVID-19 pandemic, also have a profound impact on tourism expenditure. As noted by Hall *et al.* (2021), crises of this nature typically result in a decline in tourism activity due to falling incomes, financial uncertainty, and changing consumption preferences. Moreover, the pandemic exposed the structural vulnerability of the tourism sector to economic shocks and prompted a broader discussion about the need to reshape tourism development toward greater resilience and sustainability. According to Hall *et al.* (2021), without targeted policy and institutional interventions, there is a risk of reverting to an unsustainable model centered on cheap, mass travel, which could intensify the long-term economic and environmental consequences of tourism.

1.2 Demographic Factors Affecting Tourist Expenditure

The demographic structure of society is a key determinant of both the propensity to travel and the nature of tourism-related expenditures. Demographic analysis should be an integral component of market research and strategic planning for tourism sector development, particularly in the context of ongoing social changes and aging populations in developed countries (Bernini, Cracolici 2015; Chen at al. 2021). Variables such as age, education, occupational status, nationality, and place of residence, all play a significant role in shaping the profiles of tourism consumers and their expenditure preferences.

Age is one of the most frequently studied factors influencing travel consumption patterns (Bernini, Cracolici 2015). According to Eurostat (2025), individuals aged 55–64 recorded the highest average travel expenditure in 2023 (€524), while the 15–24 age group spent the least on average (€385). However, as Gómez-

Déniz and Pérez-Rodríguez (2019) argue, age does not act independently. Its impact is strongly mediated by other variables, such as occupational status, income level, and length of stay. Their regression analysis reveals that both age and employment status have a positive and statistically significant effect on tourism expenditures, with older and economically active individuals expenditure more. Additionally, their findings indicate that the youngest and oldest age cohorts are more sensitive to income changes, as fluctuations in income are more directly reflected in changes in tourism expenditure within these groups. In contrast, middle-aged individuals tend to display more stable consumption patterns in this respect.

Despite this income sensitivity, older adults demonstrate greater price flexibility. Owing to their greater availability of time, they are more inclined to take longer trips and are less affected by seasonal price fluctuations. Their purchasing decisions are often driven more by the availability and convenience of travel services than by price alone (Alegre, Pou, 2006). Consequently, while their total expenditure is still influenced by income, older travelers tend to plan and execute their trips more strategically and with less impulsiveness than younger individuals. In this context, length of stay, which is closely correlated with the level of expenditure, emerges as a crucial component of consumption patterns (Chen *et al.* 2021).

Bernini and Cracolici (2015) also emphasize the role of cohort effects. Older adults today are more likely to engage in tourism than previous generations at the same age, with motivations often tied to quality of life, health, and cultural engagement. This underscores the need to design tourism products tailored specifically to the needs and preferences of seniors. Recent Eurostat data (2025) further supports this, showing that, despite an overall decline in the number of tourist trips across the European Union, the 55+ age group was the only one to experience an increase in travel in 2023 compared to 2019. Although individuals aged 65 and older still account for a relatively small share of total tourism, they represented as many as 46 million tourists in 2023. However, it is worth noting that over half of Europeans in this age group did not travel at all during the same year, highlighting ongoing financial, health-related, and infrastructural barriers.

Education level remains one of the strongest predictors of both tourism participation and expenditure. Individuals with higher education levels tend to be more open to new experiences, travel more frequently, and generate higher expenditures (Bernini, Cracolici, 2015). This is attributable to a combination of factors, including greater cultural awareness, better access to information, and generally higher income and professional status. Marrocu at al. (2015) confirm that individuals with stable employment and high incomes are more likely to engage in high-standard tourism, thereby contributing more substantially to the tourism economy.

Nationality is another critical factor influencing tourism behavior. Cultural and economic diversity shapes not only the level of expenditure but also preferences for destinations and types of leisure activities (Bernini, Cracolici 2015; Brida, Scuderi 2013). Similarly, place of residence plays an important role, particularly among lower-income groups, where disparities in tourism infrastructure, travel costs, and regional cultural norms may contribute to significant differences in expenditure patterns (Chen at al. 2021).

Nevertheless, as noted by Duran-Román *et al.* (2020), variables like gender and education level do not consistently demonstrate statistical significance in every analytical model. This suggests the importance of contextual interpretation, taking into account regional characteristics, travel types, and specific tourist segments. Microeconomic analysis also shows that not all demographic variables carry the same weight across different quantiles of the expenditure distribution (Chen *et al.* 2021), reinforcing the complexity of consumer behavior in the tourism market.

1.3 Travel-Related Factors Affecting Tourist Expenditure

The literature on tourism expenditure highlights several travel-related variables, such as length of stay, size and composition of the travel group, previous tourism experience, mode of transportation, destination, purpose of travel, and form of service reservation (Brida, Scuderi 2013; Marrocu *et al.* 2015). One factor that positively and significantly influences the level of tourist expenditure is the length of stay, typically measured by the number of days or nights spent at a destination (Brida, Scuderi 2013). Importantly, this increase tends to be inelastic, meaning that as the length of stay grows, expenditure rises, but at a rate disproportionate to the number of days (Engström, Kipperberg 2015).The purpose of the trip also plays a crucial role in differentiating expenditure levels,which travelers who visit a single destination tend to spend more compared to those who embark on multi-destination trips. Additionally, travel experience serves as a predictor of expenditure, with first-time visitors statistically spending more than repeat tourists (Alegre, Cladera 2010). Active participation in various leisure activities such as cultural events, sports, or dining out systematically increases total expenditure (Engström, Kipperberg 2015).

Travel expenditure is additionally affected by factors associated with trip organization. The size of the travel group interacts with expenditure patterns. Larger groups often benefit from lower per capita costs, which can reduce average individual expenditure, particularly for budget travelers. Advance bookings, opting for organized packages, and choosing high-quality accommodations are associated with higher total costs. In contrast, tourists who opt for more economical accommodations or alternative transportation methods, such as hitchhiking or public transit, generally incur lower expenditures (Marrocu *et al.* 2015).

Analyses show less conclusive results for variables such as seasonality, distance between residence and destination, timing of trip planning, and visitor type. The influence of these factors often depends on the local context of the study as well as the profile of the tourist (Brida, Scuderi 2013). Some variables, including length of stay and number of places visited, affect both the level and structure of expenditure, whereas others impact only one of these aspects (Marrocu *et al.* 2015).

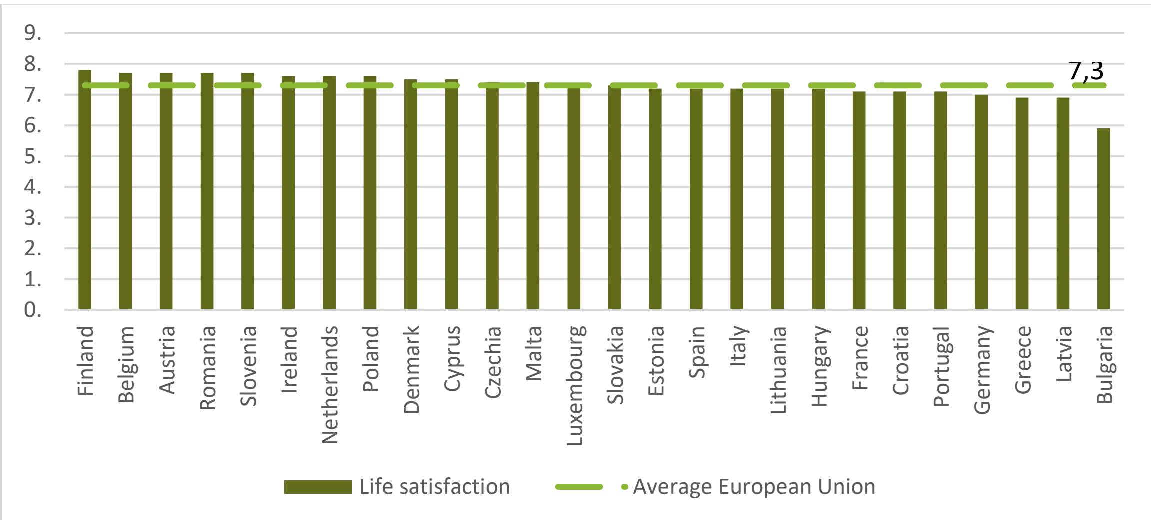
More comprehensive technical and environmental considerations also merit attention. The development of transportation and tourism infrastructure throughout the 20th and 21st centuries has significantly enhanced travel comfort, expanding the range and accessibility of destinations. Simultaneously, increasing tourism pressure on the environment has driven the adoption of sustainable development principles, which in turn have shaped tourism policies in many countries (Kaczmarska 2014).

1.4 Psychographic Factors Affecting Tourist Expenditure

Psychographic factors such as lifestyle, self-esteem, attitudes, values, and interests play a significant role in shaping consumer behavior in the tourism sector, including both the level and structure of tourist expenditures. Although these factors are more difficult to measure than traditional demographic or economic variables, an increasing number of studies confirm their substantial influence on tourism-related decisions (Brida and Scuderi 2013).

One key psychographic determinant of tourist expenditure is the subjective sense of satisfaction. Due to the complex and imprecise nature of this concept, D'Urso *et al.* (2020) proposed the use of fuzzy modeling techniques to better capture its uncertainty. As noted by Mudarra-Fernández *et al.* (2018), satisfaction levels influence tourists' willingness to participate in various activities offered at their destinations, particularly in the context of cultural tourism. Additionally, recommendations and reviews from other travelers play a crucial role by enhancing trust in the destination and its services, thereby increasing the willingness to spend (Chulaphana, Barahona 2021). In this context, it is useful to consider data on overall life satisfaction in European Union countries. As reported by Eurostat (2024), in 2023 the average life satisfaction in the EU stood at 7.3 out of 10, indicating the overall quality of life experienced by residents. This score varies depending on factors like age, education level, and individual or financial situations. Figure 3 illustrates that 15 of the 26 EU member countries recorded satisfaction levels equal to or above the EU average. Finland topped the ranking with a score of 7.8, while Belgium, Austria, Romania, and Slovenia followed closely with 7.7. On the lower end, Bulgaria reported the least satisfaction at 5.9, and both Latvia and Greece scored 6.9 (Eurostat 2024).

Figure 3. Levels of Life Satisfaction Among Residents of European Union Countries



Source: own presentation based on data provided by Eurostat (2025)

Traveler motivations, cultural preferences, and lifestyles, while challenging to incorporate explicitly into classical economic models, offer significant explanatory potential. Households that place greater importance on cultural and recreational experiences are more likely to allocate resources to travel. Growing environmental awareness and the pursuit of sustainable lifestyles have also increased interest in environmentally friendly forms of tourism (Massida *et al.* 2022). It is noteworthy that tourists who prioritize natural attractions spend on average 16.6 percent more, while those who value gastronomy spend up to 25 percent more than travelers for whom these aspects are less important. Furthermore, tourists motivated by comfort and relaxation, such as those taking sun and beach vacations, tend to have higher expenditure levels than those traveling for educational purposes or with budget constraints (Marrocu *et al.* 2015).

An example that highlights the influence of individual preferences is Thrane's (2002) study, which found that jazz festival attendees with a strong interest in music spent significantly more than other participants, both on concerts and additional attractions. Accommodation quality is equally important. Alegre and Cladera (2010) demonstrated that tourists motivated by high accommodation standards are more likely to revisit the same destination, emphasizing the critical role of quality in fostering tourist loyalty.

Finally, it is important to recognize that the development of tourism as a sector is closely linked to broader socio-economic phenomena. Cultural changes, reduced working hours, the expansion of paid vacations, as well as increasing cosmopolitanism and globalization, contribute to the growth in demand for tourism services and the diversification of consumption preferences (Kaczmarska 2014). Social and psychological factors, which evolve alongside societal development, shape not only motivations but also specific expenditure patterns, making psychographic analysis a key component of contemporary tourism economics.

2. Research Methodology

The purpose of this study is to identify the socio-economic determinants influencing the level of tourism expenditure in European Union member countries. This analysis adopts the per capita tourism expenditure index as a representative measure of tourism activity, as it adjusts for population size and thus facilitates comparisons across countries with varying demographic sizes. Tourism expenditures are defined, according to Eurostat (2025), as the total expenditures on transportation, accommodation, catering, and other travel-related services, excluding durable goods and valuables.

This analysis draws on data from cyclical household budget surveys conducted by Eurostat, which provide a high degree of comparability across EU member countries, as well as consistent methodology and broad data availability. Accordingly, the analysis includes 26 of the 27 European Union countries, with Sweden excluded due to the unavailability of complete data. The analysis is based on data of 2023, which is considered representative due to the stabilization of the socio-economic situation following the end of the COVID-19 pandemic.

According to the hypothesis, the determinants influencing the level of per capita tourism expenditure (measured by the HR indicator) vary depending on the degree of a country's economic and cultural development. To examine this variation, countries were divided into two groups. The first group (EU-9) includes countries with an average GDP per capita above the EU average: Belgium, Denmark, Germany, Ireland, the Netherlands, Austria, Finland, Malta, and Luxembourg. The second group (EU-17) consists of countries with a GDP per capita below the EU average: Czechia, Estonia, Croatia, Latvia, Lithuania, Hungary, Slovenia, Slovakia, Bulgaria, Poland, Romania, Greece, Spain, France, Italy, Portugal, and Cyprus.

Based on a review of the relevant literature, a set of variables potentially influencing the level of tourist expenditure in the analyzed countries was selected. A detailed description of these variables is presented in Table 1.

Table 1. Characteristics of the Analyzed Variables

Variable	Variable description
HR	Tourism expenditure per capita is an economic indicator that measures the average tourism-related expenditure per individual in a given country. It is calculated by dividing the total national tourism expenditure by the country's total population.
WG	The Gini coefficient measures the extent to which the distribution of income within a country deviates from a perfectly equal distribution. A coefficient of zero expresses perfect equality where everyone has the same income, while a coefficient of ten expresses full inequality where only one person has all the income.
SW	The indicator is the natural logarithm of the median age of the population, calculated based on Eurostat data. The median age represents the average age of the population, and its natural logarithm enables better analysis of demographic changes and international comparisons.

Variable	Variable description
CP	The annual average rate of change of the HICP represents the percentage change in the average level of consumer prices from one year to the next, that is, year-over-year inflation, calculated based on the annual average values of the Harmonised Index of Consumer Prices (HICP).
LS	Life satisfaction is a self-reported measure of well-being, reflecting an individual's overall assessment of their life as a whole. It is typically measured on a scale from zero (not at all satisfied) to ten (completely satisfied), based on responses to survey questions. Life satisfaction is influenced by various personal and contextual factors, such as age, income, employment status, health, and social relationships.
UR	The percentage of people living in predominantly rural areas. A predominantly rural area is defined as one where more than 50% of the population resides in areas classified as rural. That is, where population density does not exceed 150 inhabitants per km² (Zysk; Źróbek-Różańska 2015). Data for Malta were estimated based on information from the National Statistics Office (NSO) Malta. For Luxembourg, estimates were based on data from the National Institute of Statistics and Economic Studies of the Grand Duchy of Luxembourg (STATEC), applying criteria of population density below 300 inhabitants per km² and fewer than 5,000 residents in the area. For Cyprus, the source of data was the Statistical Service of Cyprus (CYSTAT).
DR	The GDP per capita index, expressed in Purchasing Power Standards (PPS), is presented relative to the European Union average, which is set at 1. If a country's index exceeds 1, it indicates that its GDP per capita is above the EU average; if the index is below 1, it means the GDP per capita is lower than the EU average. Data expressed in PPS, a common currency unit, allow for cross-country comparisons by eliminating price level differences, enabling a more accurate analysis of GDP volumes.
WW	The percentage of individuals with an education level above upper secondary education, tertiary education (levels 5–8), includes a variety of learning pathways such as bachelor's, master's, and doctoral programs, as well as various vocational and technical courses at the higher education level. This classification is based on the International Standard Classification of Education ISCED 2011

Source: Eurostat (2025)

The proposed model was estimated using the Ordinary Least Squares (OLS) method in the GRETL environment (version 2025a), and the robustness of the results was assessed through a series of diagnostic tests. Heteroskedasticity was initially tested using the White test; when the number of observations was insufficient to account for all interaction terms, a squares-only variant was applied. This analysis was further complemented by Breusch-Pagan tests, with heteroskedasticity-robust HC1 standard errors reported. The normality of the error terms was evaluated using the Doornik-Hansen test.

3. Research Results

To examine the impact of determinants on tourism expenditure levels in countries with varying socio-economic development, the following model was proposed and estimated using the Ordinary Least Squares (OLS) method. Based on the literature review, the cross-sectional model takes the form (see equation 1):

$$HR_i = \beta_0 + \beta_1 \cdot WG_i + \beta_2 \cdot SW_i + \beta_3 \cdot CP_i + \beta_4 \cdot LS_i + \beta_5 \cdot UR_i + \beta_6 \cdot DR_i + \beta_7 \cdot WW_i + \varepsilon_i \quad (1)$$

where the explained variable HR represents tourism expenditure per capita. The explanatory variables are listed in the Table 1. β_0, β_1,…,β_7 are the structural parameters and ε_i is the error term.
The research findings are summarized in Tables 2 and 3. For the EU-9 group (see Table 2), the model was initially estimated with several variables, some of which did not reach statistical significance at the 0.1 level. Only statistically significant variables are shown in the Tables.

The model demonstrates a strong fit, that approximately 91% of the variance in per capita tourism expenditure is explained by the model. Due to an insufficient number of degrees of freedom, the standard White test for heteroskedasticity could not be applied. Instead, a simplified version based solely on the squared fitted values was used, which did not indicate any issues with heteroskedasticity ($p = 0.342$). This finding was further supported by the Breusch - Pagan test ($p = 0.449$). Coefficient standard errors were estimated using the HC1 heteroskedasticity-robust correction. Table 2 shows that four variables were statistically significant at the 0.05 level: WG (Gini Index), SW (the natural logarithm of the median age of the population), LS (life satisfaction), and CP (Consumer Price Index).The results indicate that SW (45748,6) has the largest positive impact on tourism expenditure per capita, followed by WG, CP, and LS. Specifically, WG (27592.7) shows a positive effect, suggesting that higher income inequality is associated with increased tourism expenditure per capita in this group of countries. SW's positive coefficient indicates that countries with an older median population tend to spend more on tourism per capita. Similarly, CP and LS also positively influence tourism expenditure, with CP having the highest level of statistical significance among the four variables.

Table 2. Estimates of the model for the EU-9 group

Variable	Parameter	
const	-207,494**	
WG	27,592.7*	
SW	45,748,6**	
LS	3,144.55**	
DR	5,521.61***	
Determination coeff. R^2		0.912
Doornik-Hansen test stat. (p-value)		0.895

Source: own estimation.

The results presented concern the second group of EU countries Czechia, Estonia, Croatia, Latvia, Lithuania, Hungary, Slovenia, Slovakia, Bulgaria, Poland, Romania, Greece, Spain, France, Italy, Portugal, Cyprus (EU-17), as defined earlier in the study. After estimating the model, it turned out that three structural parameters were statistically significant at the 0.1 significance level. After removing non-significant parameters, the final form of the model was obtained, and the results are presented in Table 3.

Table 3. Estimates of the model for the EU-17 group

Variable	Parameter	
const	19,367.3*	
SW	-5,652.15**	
DR	2,006.53**	
WW	3,434.83**	
Determination coeff. R^2		0.730
Doornik-Hansen test stat. (p-value)		0.122

Source: own estimation.

The model demonstrates an explanatory power accounting for approximately 73% of the variation in tourism expenditure. This indicates that the chosen variables collectively provide a robust framework for explaining differences in tourism expenditures across countries. The White test for heteroskedasticity fails to reject the null hypothesis of homoscedasticity (LM statistic = 10.2613, p = 0.3297), indicating that the variance of the residuals is constant across observations. Similarly, the normality test for the error terms does not provide sufficient evidence to reject the null hypothesis that the error terms are normally distributed (Chi-square (2) = 4.20995, p = 0.1218).

The regression results indicate that three variables are statistically significant at the 0.05 level: SW (the natural logarithm of the median age), DR (GDP per capita), and WW (the proportion of the population with higher education). The coefficient for SW is negative (-5652.15), suggesting that an increase in the median age is associated with a decrease in tourism expenditure per capita. In contrast, DR has a positive coefficient (2006.53), indicating that higher GDP per capita corresponds to increased tourism expenditure. Similarly, WW exhibits a positive effect (3434.83), meaning that countries with a larger share of individuals with higher education tend to have higher tourism expenditure per capita.

4. Discussions

The analysis of the determinants of tourism expenditure levels in European Union countries revealed clear differences between countries with high and low GDP per capita, measured relative to the EU average. The findings support the hypothesis that the structure of factors influencing tourism consumption depends on a country's level of economic development. This study contributes to the broader field of economic research on consumer behavior, offering a novel perspective that incorporates historical and geographical context, as well as the heterogeneous economic advancement in Europe..

According to Eurostat data (2025), only nine EU member countries have a GDP per capita above the EU average (EU-9), while seventeen fall below this threshold (EU-17). This disparity results in variation in the factors influencing tourism expenditure. In EU-9 countries, higher tourism expenditure is associated with greater income, higher median age, increased life satisfaction, and, perhaps unexpectedly, greater income inequality measured by the Gini coefficient. In lower-income countries, education and income positively affect tourism expenditure, whereas median age negatively impacts it, as older population in these countries tends to demonstrate reduced engagement in tourism-related activities.

The study confirms a positive relationship between GDP per capita and tourism expenditure (Massidda *et al.* 2022). An increase in national income tends to stimulate higher levels of tourism consumption, regardless of a country's historical political background or geographical location. Research by Chulaphan and Barahona (2021) also demonstrates that the accumulation of material assets and income stability influence the propensity to consume. In countries with sustained economic growth, specifically among the EU-9 member countries, the findings support Friedman's (1957) hypothesis that income predictability and stability play a critical role in shaping consumption behavior, particularly with regard to non-essential goods such as tourism. Similarly, Cho (2001) argues that a higher GDP per capita enhances purchasing power, thereby supporting increased tourism activity.

In countries with a GDP per capita above the European Union average, higher levels of income inequality, as measured by the Gini coefficient, are associated with greater tourism expenditure. This may be explained by the fact that a relatively small segment of the population is responsible for disproportionately high levels of tourist expenditure, thereby raising the national average. In contrast, this variable is not statistically significant in the EU-17 countries, which may result from generally lower income levels and a smaller proportion of high-income individuals within the overall population.

The demographic structure also represents a significant influence on tourism expenditure. In EU-9 countries, a higher median age is positively associated with increased spending on tourism. This relationship can be attributed to the fact that older individuals in these countries generally possess greater financial security, including stable income sources, accumulated savings, and more discretionary time. Conversely, in EU-17 countries, older populations often face structural disadvantages such as limited access to social welfare, lower pension levels, reduced savings, and greater dependence on familial support. These conditions constrain their ability to participate in tourism-related activities.

Substantial disparities are also evident in the influence of educational attainment on tourism expenditure. Prior research (Bernini, Cracolici 2015; Marrocu *et al.* 2015) indicates that individuals with higher levels of education exhibit a greater propensity to engage in travel, demonstrate a preference for higher-quality services, and display increased openness to cultural experiences. The present analysis confirms this association in countries where GDP per capita falls below the EU average. In contrast, within the EU-9 group, the relationship between educational attainment and tourism expenditure is less pronounced, which may be attributed to the broader accessibility of tourism opportunities across different segments of the population.

Among the psychographic determinants, life satisfaction constitutes a significant factor. This association has been explored in prior studies by D'Urso *et al.* (2020) as well as Mudarra-Fernández *et al.* (2018). Their findings indicate that elevated levels of life satisfaction are positively correlated with greater participation in various activities, including tourism, especially within the domain of cultural travel. The present study confirms the impact of this variable on tourism expenditure in the EU-9 countries, whereas no statistically significant effect was identified within the EU-17 group.

Conclusions and Further Research

This study makes significant contributions to the tourism sector through its interdisciplinary approach, integrating insights from economics, demography, sociology, and geography. The analysis reveals pronounced disparities among European Union countries, which stem from both historical legacies and current socio-economic development levels. For example, countries such as Greece, Spain, Italy, and Portugal, despite their well-developed tourism infrastructure, have not achieved the level of economic convergence anticipated within the EU framework. Similarly, post-communist countries continue to confront challenges linked to systemic transformation. These factors contribute to their relatively lower levels of tourism activity. In contrast, Western and Northern European countries, benefiting from more substantial economic resources, generate higher levels of tourism expenditure.

An analysis of GDP per capita levels across European Union member countries reveals substantial economic disparities. This indicator exceeds the EU average in only nine countries, while the remaining seventeen fall below this benchmark. Such inequality has a direct impact on both the level and accessibility of tourism participation among citizens. Consequently, it is essential for EU policies to focus not only on reducing these disparities between countries, but also on addressing inequalities at the regional and sub-regional levels, considering the diverse socio-economic conditions that characterize different areas of the Union. The findings of this study underscore the necessity of formulating differentiated strategies oriented towards supporting economically less developed regions in achieving more equitable participation in the European tourism market. Moreover, the research provides empirical evidence that the structure of determinants influencing tourism expenditure varies considerably between the two country groups. Therefore, a uniform tourism policy across the European Union is unlikely to be effective. These insights offer valuable implications for the future orientation of EU tourism policy, emphasizing the importance of adopting a flexible, context-sensitive approach to strategic planning and implementation. Policy should be adapted to the specific economic, social, and demographic characteristics of individual countries and regions.

Furthermore, particular attention should be devoted to the aging population, whose proportion within the EU demographic profile continues to increase. The health, social, and emotional requirements of this group increasingly shape tourism demand. Nonetheless, substantial barriers persist that limit seniors' access to tourism, including financial, infrastructural, and health-related challenges, especially in countries with lower GDP per capita. Psychographic factors are also assuming an increasingly role in tourism expenditure research. Studies indicate that higher satisfaction with travel experiences enhances the likelihood of additional expenditure, which holds important implications for marketing and product development

At the same time, it must be acknowledged that tourism, despite its contribution to economic growth, remains highly vulnerable to crises, as clearly demonstrated by the COVID-19 pandemic. Therefore, it is critical to implement tourism development strategies that are not only economically beneficial but also resilient and sustainable.

An integrated analytical approach that combines demographic, economic, and psychographic dimensions is becoming indispensable for designing effective tourism development strategies. A deeper understanding of the determinants of tourism expenditure facilitates the creation of more targeted and inclusive tourism offerings. These can be adopted to the specific requirements of diverse social groups, including older adults, low-income families, and younger professionals. Consequently, it is crucial to develop inclusive infrastructure and services that enable greater participation in the tourism sector.

In conclusion, the advancement of the tourism sector within the European Union should be grounded in the principles of sustainable growth, regional adaptation, and social inclusivity. Adherence to these principles will be essential for fostering a resilient and equitable tourism system that promotes equal opportunities and supports the economic stability of the European Union as a whole.

Credit Authorship Contribution Statement

Alicja Grzenkowicz is the sole author of this article and is responsible for all aspects of the research, including conceptualization, methodology, data collection, analysis, and writing of the manuscript.

Declaration of Competing Interest

The author declares that she has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The author declares that she has used generative AI and AI assisted technologies in the writing process before submission, but only to improve the language and readability of her paper and with the appropriate disclosure.

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Insights from Malaysian World Heritage Sites on Heritage Sustainability

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Abstract: This study explores the role of domestic tourists in heritage sustainability, focusing on Malaysia's World Heritage Sites (WHS) since most literature focuses on local communities and international tourists.

Extending the Value-Attitude-Behavior (VAB) model with additional variables, this study examined domestic tourists' value on sustainability, attitude, norms, moral obligation, and participation behavior related to heritage sustainability. Subsequently, the moderator of the Big Five Personality traits was also applied in the research model.

The results found that value on sustainability significantly influenced the attitude, norms, and moral obligation of domestic tourists where social and subjective norms, through a vital bottom-up approach, are not merely beneficial but essential for ensuring the longevity of these heritage sites for future generations. Furthermore, openness, extraversion, extraversion, and agreeableness partially moderate the relationship between attitude, norms, moral obligations and heritage sustainability participation behavior in the VAB model.

This study provides a novel contribution in heritage sustainability studies particularly addressing the sustainability of WHS and using the VAB model and employing the MGA in analyzing the moderator of the Big Five Personality traits. Subsequently, the Important-Performance Analysis was also performed which identified that both social and subjective norms can drive significant behavioral changes among domestic tourists.

It is recommended that future research employ controlled variables such as age and gender to have a deeper understanding of consumer behavior. This paper presents a robust theoretical framework in behavioral research which serves as a solid foundation for further exploration in sustainability domains.

Keywords: domestic tourists; heritage sustainability; moral obligation; norms; value on sustainability; Value-Attitude-Behavior (VAB) model.

JEL Classification: Z32; Q01; Q26; R58; D91; Z13.

Introduction

The global heritage tourism market was valued at USD 604.38 billion in 2024, and the future looks promising with a projected expansion at a compound annual growth rate (CAGR) of 4.5% between 2025 and 2030 (Grand View Research, 2025). Heritage tourism and sustainability are deeply interconnected, as both aim to sustain cultural and natural landmarks while ensuring they remain relevant in the modern world. Tourism is vital to heritage sustainability, generating revenue through entrance fees, guided tours, and local businesses, which can be reinvested in targeted projects and programs. This financial support enables the conservation and preservation of heritage sites, ensuring they remain functional and accessible to future generations. Heritage is a legacy from the past, handed down through generations, shaping cultural identity, values, and traditions. It serves as a tangible and intangible link between locals and their historical roots, fostering a sense of belonging and continuity. However, ensuring its continuity requires active efforts beyond mere conservation and preservation of heritage sites. One critical approach is ensuring the sustainability of heritage, which extends beyond the physical upkeep of structures or artifacts. Heritage sustainability encompasses the long-term safeguarding of cultural and natural assets in ways that maintain their significance and relevance for present and future generations (Geçikli *et al.* 2024). This involves protecting the integrity of heritage sites and encouraging the meaningful engagement of communities, policymakers, and stakeholders in sustainability efforts. It is a dynamic process that integrates environmental, socio-cultural, and economic considerations to ensure heritage remains a living, evolving part of society. Sustainable heritage management requires inclusive strategies that empower individuals to participate in decision-making, benefit from heritage-based tourism, and develop a strong sense of stewardship. The need for inclusive strategies in heritage management should be stressed, as it ensures the active involvement of all stakeholders and fosters a sense of shared responsibility and ownership. This collective effort ensures that heritage sites do not become static relics of the past but continue to thrive as active symbols of identity, education, and shared memory (Rosetti *et al.* 2022; Roslan *et al.* 2021).

1. Research Background

In general, there are two categories of World Heritage Sites (WHS), which are urban heritage sites like George Town and Malacca and remote heritage sites like Kinabalu Park, Mulu National Park, and the Archaeological Heritage in Niah Caves and Lenggong Valley (UNESCO, 2024). While these sites differ in geographical context and visitation by the locals, they all face common challenges in sustaining their relevance and appeal to visitors. These tourists, who are familiar with the heritage resources due to their visits, play a crucial role in the future viability of these unique destinations. The sustainability of heritage sites is at a critical juncture, where the active participation of domestic tourists is essential for their continued prosperity (Pan *et al.* 2024; Rosetti *et al.* 2022). Their understanding and commitment to heritage sustainability significantly influence their value, attitudes, norms, moral obligations, and participation behavior, shaping efforts to ensure the survival of these sites (Xu *et al.* 2024). However, this journey towards sustainability is fraught with challenges, ranging from economic limitations to environmental pressures and social disruptions. Since the inscription as a WHS by UNESCO, these sites have experienced significant boosts in tourist visitations (Saleh *et al.* 2022). The influx of tourists brings numerous challenges, such as pollution, extensive development, damage, and vandalism in heritage sites (Hanafiah *et al.* 2021; Mtani *et al.* 2023). Without prompt intervention, the site's condition will likely deteriorate, diminishing its appeal to tourists and risking its potential delisting as a World Heritage Site. The potential loss of these unique sites' rich history and cultural significance should cause deep concern for all stakeholders (Hang & Arifin, 2021; Talib *et al.* 2022). It was noted that many locals are unaware of WHS's historical and cultural relevance, which contributes to their limited engagement and interest in visiting these sites (Hang & Arifin, 2021). Emphasising domestic tourists' role in visiting and sustaining heritage sites would foster a sense of shared responsibility and positive engagement. This lack of awareness leads to a disconnect between the public and these landmarks, diminishing the sites' role in fostering national identity and pride. Therefore, without understanding the value of these sites, public support for sustainability efforts is limited (Abdul Aziz *et al.* 2023).

Previous literature has predominantly focused on the conservation and preservation of UNESCO WHS, particularly emphasising the roles and perceptions of local communities residing near these sites (Abdul Aziz *et al.* 2023; Ibrahim *et al.* 2023). While such studies have provided valuable insights into community engagement and heritage sustainability, they have largely overlooked the perspectives of the broader Malaysian population, particularly domestic tourists, who play a significant role in the sustainability and economic development of these heritage sites (Blackie *et al.* 2023; Jang & Mennis, 2021). This data scarcity significantly impacts heritage managers, hampering their ability to develop evidence-based heritage sustainability strategies. Domestic tourists, comprising Malaysians who travel within the country, are key stakeholders in the heritage tourism ecosystem. Their value, attitude, and behavior to participate in sustainability efforts can directly impact the long-term longevity of heritage sites. Unlike international tourists, domestic visitors often have cultural, historical, or sentimental connections to these sites, influencing their engagement levels and perceptions of heritage value (Farhana Nasir *et al.* 2020; Kifworo *et al.* 2020). Moreover, domestic tourists contribute significantly to the local economy, supporting businesses, employment, and infrastructure surrounding heritage sites. Their visitation patterns, spending behavior, and participation in heritage-related activities are essential for sustaining tourism demand. This gap highlights the need for a more inclusive approach that examines how Malaysians, beyond immediate heritage site communities, perceive and engage with heritage sustainability initiatives. Hence, this study seeks to investigate the key variables influencing domestic tourists' behavior to address this gap. Active participation by domestic tourists through a bottom-up approach is essential to inspire and empower individuals to become trusted guardians and stewards of local heritage sites while promoting the historical WHS legacies to the younger generation. It is crucial to inspire the grassroots population so that participation in heritage sustainability becomes an integral part of their daily life.

There are three main areas where this study adds to the corpus of existing knowledge. First, this research makes a novel contribution to investigating Malaysian domestic tourists' values by analysing their attitudes and norms that influence their behavior in heritage sustainability activities. Most literature mainly examines the behavior of local communities and has not examined all Malaysian WHS in totality (Mtani *et al.* 2023; Phua & Tan, 2023). Next, the variables from the Value-Attitude-Behavior (VAB) model and the Theory of Planned Behavior (TPB) were integrated to offer a comprehensive analysis of critical factors such as attitude, norms (including personal, social, and subjective norms), and moral obligation (Bhattacharyya *et al.* 2020; Engel *et al.* 2020; Kim & Hall, 2021). Lastly, this study is also among the limited literature on heritage sustainability that incorporates the moderating role of the Big Five Personality traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism) in the Value-Attitude-Behaviour (VAB) model (Kim & Hall, 2022; Srivastava *et al.* 2021). Studies also indicate that individual personality traits shape behaviour, namely in the tourism industry, whereby there is a growing body of research that examines the psychological characteristics of individuals in this context (Li *et al.* 2024). Therefore, the research questions are: (a) How does the value of sustainability influence attitude, norms, and moral obligation? (b) How do attitude, norms, and moral obligation mediate the relationship between value on sustainability and heritage sustainability participation behavior? (c) What are the levels of moderating effects of the Big Five Personality traits in the relationship between attitude, norms, moral obligation, and heritage sustainability participation behavior? This approach provided valuable insights into domestic tourists' behavior and made a novel contribution to studying consumer behavior, specifically in heritage tourism. Thus, this research addressed individuals' motivations on a deeper level, such as forming their behavior specific to heritage sustainability.

2. Literature Review

2.1 Value-Attitude-Behavior Model

The hierarchy of value, attitude, and behavior used in the Value-Attitude-Behaviour (VAB) model emphasises that an individual's values serve as the cornerstone around which their attitudes and behaviors are built. According to Homer and Kahle (1988), a person's values determine their attitudes, which are thought to be more unpredictable and erratic. Subsequently, a person builds on their ideals and attitudes to exhibit actual behavior. The VAB model was tested in studies examining the interrelationships among value, attitude, and behavior of natural food consumers. Values are core concepts considered strengths or shortcomings, moral or immoral, or worthy of sacrifice. They are more resistant to change than beliefs, and a person usually needs to undergo a transformative life experience to change their values (Lee, 2019). Human action and behavior are significantly shaped by their intrinsic values, which are formed early in life (Kabir & Hassan, 2024). Some studies highlight that a person's core values start developing in their mother's womb and are shaped after birth through interaction with family, education, community, and society at large (van den Heuvel, 2022).

Attitudes are immediate reactions toward a conviction or an item and are usually more easily and regularly changed. A person's behavior or belief is based on past experiences and not automatically formed based on logic or facts, influencing their beliefs on political, economic, and religious issues. Behavior or belief also serves as reference points through which individuals interpret their surroundings (Kim & Hall, 2022). Studies indicate that attitude alone does not affect behavior, but behavior is affected by other factors like personal and social norms (Kim *et al.* 2020; Kim *et al.* 2021b; Van Tonder *et al.* 2023). Subsequently, researchers integrated different theories, such as combining the VAB model with the Value-Belief-Norm (VBN) model to examine the characteristics of personal value, moral obligation, and subjective norm on pro-environmental behavior (Bhattacharyya *et al.* 2020; Engel *et al.* 2020). The VAB model has been extensively used in numerous fields such as active sports, sustainable transport, green purchase, sustainable crowdfunding, veganism, sustainable fine dining, tourist biosecurity behavior, and many more (Brouwer *et al.* 2022; Fatoki, 2023; Hu *et al.* 2023; Kabir & Hassan, 2024; Kim *et al.* 2021a; Kim & Hall, 2021, 2022; Kwon & Namkung, 2022; Liu *et al.* 2023; Palmieri *et al.* 2024). Therefore, researchers have constantly studied the interplay and linkages between value, attitude, norms, moral obligation, and behavior variables.

2.2 Theory of Planned Behavior

The Theory of Planned Behavior (TPB), developed by Ajzen in 1985, is a psychological framework that establishes a connection between beliefs and behavior. This theory is an extension of the Theory of Reasoned Action, which was developed by Ajzen and Fishbein in 1980. TPB asserts that three fundamental factors: attitude, subjective norms, and perceived behavioral control collectively influence an individual's intentions to engage in a particular behavior (Ilagan *et al.* 2024; Nekmahmud *et al.* 2022; Salifu *et al.* 2024; Xie *et al.* 2024). According to Ajzen and Fishbein (1974), people form beliefs about an object by associating it with various characteristics, qualities, and attributes. Based on these beliefs, they develop favourable or unfavorable attitudes toward the object, depending on whether they associate it with positive or negative characteristics. Subjective norms refer to a person's beliefs about complying with what others think he or she should and should not do, which is an internal norm. Perceived behavioral control reflects an individual's beliefs regarding possessing the necessary resources and opportunities to perform the target behavior. It captures the extent to which individuals judge themselves as having the capacity to perform a specific behavior, reflecting their sense of how simple or complex the performance of that behavior (Bajar *et al.* 2024).

Meta-analytic reviews suggest that TPB is a valuable model for predicting a wide range of behaviors, and this was mainly because of the high correlation between intention and behavior (Md. Akhir *et al.* 2022). As new information is available on factors influencing an individual's attitude and subjective norms, it is more likely to alter or even reduce the intention-behavior gap (Ajzen & Fisbbein, 1974). Studies also suggest that both TPB and VAB indicate that a consumer's attitude towards a specific behavior is strongly influenced by positive behavioral intention, and individuals are highly likely to act on that intention, which translates to behavior (Angın *et al.* 2024; Tajeddini *et al.* 2021). TPB proposes that behavioral intentions are the immediate antecedents of actual behavior. Therefore, this study does not use the intention variable but evaluates the relationship between attitude, personal norm, social norm, subjective norm, and moral obligation with heritage sustainability participation behavior. Previous studies have referred to both personal and subjective norms as internal norms, while social norms and moral obligations are considered external norms (Bajar *et al.* 2024; Kim *et al.* 2021c).

2.3 Heritage Sustainability Participation Behavior

This study employed consumer behavior theory, which is the VAB model, to study domestic tourists' behavior in heritage sustainability. Participation behavior encompasses locals and broader entities such as government organizations, NGOs, state authorities, and other stakeholders (Foroughi *et al.* 2023). This study focuses on the participation behavior of domestic tourists in sustaining WHS in Malaysia since there was a lack of studies in this area. Through group activities, participation in heritage management improves and fortifies domestic tourists' bonds. Communal activities create a strong connection between the general public and the government while promoting social cohesiveness, inclusion, and trust. Studies by Eppich (2019) and Phua and Tan (2023) supported the idea that participation in heritage management cultivates a sense of ownership and responsibility, ensuring the continued survival of heritage sites. Kifworo *et al.* (2020) emphasized the role of domestic tourists as a critical factor in maintaining and safeguarding heritage for future generations. Similarly, Oladipo *et al.* (2022) emphasized the active participation of local communities. This type of behaviour is becoming more widely acknowledged as a crucial aspect of consumer behavior that goes beyond conventional buying habits (Li & Romainoor, 2024). It was seen that consumer behavior has historically concentrated on how customers behave and participate in creating and distributing goods and services (Palmieri *et al.* 2024). Nevertheless, domestic tourists' active engagement in heritage sustainability offers an enhanced and elevated context in understanding consumer behavior.

3. Hypothesis Development

3.1 Value on Sustainability

The importance that people place on behaviors, strategies, or initiatives that promote long-term sustainability initiatives is known as the value of sustainability (El Faouri & Sibley, 2024; Kim & Hall, 2021). It forecasts how a customer will feel and act in relation to environmental initiatives. Numerous investigations have delved into the interplay between values, attitudes, and behaviours within the sustainability and pro-environmental framework (Chang *et al.* 2020; Cheung & To, 2019; van Tonder *et al.* 2020; Zhou *et al.* 2025). Firstly, these studies indicate how values significantly affect attitudes and personal and social norms, which motivate individuals to adopt sustainable practices. Personal norms influence individual behavior, including selecting environmentally friendly products and endorsing sustainability programmes. Subsequently, social norms shaped by cultural and societal factors contribute to behavioral sequences. When personal values resonate with societal expectations, individuals are more prone to participate in sustainable actions (Kim & Hall, 2022). Further to this, subjective norms, which refer to the perceived social pressures to engage in green behavior, are also driven by pro-environmental values (Dorce *et al.* 2021; Wang *et al.* 2022). Essentially, individuals are more likely to adopt environmentally friendly behaviour when they perceive that those around them (family, peers, society) expect or approve of such actions. Lastly, moral obligation was crucial in shaping personal values towards green behavior (Floriano & de Matos, 2022; Lin *et al.* 2022). This concept suggests that individuals who feel a moral duty to protect the environment or contribute to sustainable development are more likely to align their values with sustainability. Moral obligations reinforce the idea that sustainability is not just a choice but a responsibility, strengthening commitment to environmentally conscious behaviour. Therefore, based on these literatures, the hypotheses were developed:

H_1. Value on sustainability has a positive effect on attitude toward heritage sustainability participation behavior.

H_2. Value on sustainability has a positive effect on personal norms toward heritage sustainability participation behavior.

H_3. Value on sustainability has a positive effect on social norms toward heritage sustainability participation behavior.

H_4. Value on sustainability has a positive effect on subjective norms toward heritage sustainability participation behavior.

H_5. Value on sustainability has a positive effect on moral obligation toward heritage sustainability participation behavior.

3.2 Attitude

A fundamental element of many behavioral models, attitude refers to people's positive or negative views about any aspect of reality (Kim & Hall, 2021). In the VAB model, attitudes frequently serve as the "bridge" that converts individual ideals into practicable actions, emphasising their crucial function in forecasting and shaping sustainable behavior. The 1988 study by Homer and Kahle confirms that behaviour and values are not directly related. Value, on the other hand, has a direct impact on attitude, which in turn determines behavior. Numerous pro-environmental research has further investigated this association, indicating the critical significance of attitude as a mediator in the VAB model (Brouwer *et al.* 2022; Kwon & Namkung, 2022). According to Brouwer *et al.* (2022), anti-speciesism values are a major predictor of favourable attitudes about vegan diets, encouraging vegan behavior. Similarly, Kwon and Namkung (2022) discovered that values pertaining to meaningful experiences and information-seeking had a favourable impact on brand attitude in the coffee industry, encouraging customer participation and civic engagement. The following hypothesis was put up in this paper based on these studies:

H_6. Attitude mediates the relationship between value on sustainability and heritage sustainability participation behavior.

3.3 Norms

In the VAB model, norms were also discovered to be significant predictors of behavioral intentions and actions, particularly in the context of sustainability and pro-environmental behavior (Kim & Hall, 2022; Van Tonder *et al.* 2023). These norms encompass personal, social, and subjective dimensions, each representing a distinct layer of influence. Personal norms refer to an individual's internalised moral obligation to engage in or refrain from certain behaviours, grounded in their value system and self-expectations (Al Mamun *et al.* 2025; Elgammal *et al.* 2024; Kim *et al.* 2024). Unlike social or subjective norms, personal norms are intrinsically motivated and are not necessarily influenced by external societal expectations. They are often shaped by long-held beliefs and ethical considerations, which are crucial in guiding consistent behavioral choices that align with one's sense of responsibility or moral duty. On the other hand, social norms represent the perceived behavioral expectations within a particular community or society. In pro-environmental contexts, social norms typically reflect shared cultural or societal values regarding sustainability, conservation, and environmental responsibility. These norms influence individuals by reinforcing what is considered socially acceptable or desirable behaviour within a given group (Champine *et al.* 2023). Subjective norms, as conceptualized in the Theory of Planned Behavior, refer to a person's perception of social pressure from significant others such as family, friends, or peers to perform or avoid certain behaviors, coupled with a motivation to comply with these expectations (Ajzen, 2020).

Subjective norms and personal norms are operationally distinct. While subjective norms focus on actions others would prefer and wish people to take, personal norms highlight people's moral principles, which may guide behavior (Moser, 2015; Paul *et al.* 2016). Therefore, the subjective norm was operationalized in the context of this study to include views that customers' significant others believe they should assist others in need with environmentally friendly purchasing decisions and would prefer and want them to act in this manner (Paul *et al.* 2016). Studies have also explored the mediating role of these norms in shaping the relationships among values, attitudes, and behaviour within the VAB framework. The study by Kim and Hall (2022) and Van Tonder *et al.* (2023) highlighted the importance of the variables of personal, social, and subjective norms in studies such as understanding active transport behavior and green customer citizenship behaviors. According to Champine *et al.* (2023), descriptive social norms that portray sustainable behavior as generally acceptable have successfully promoted eco-friendly behaviors by giving the impression that other people share these values. This was mainly to promote enhanced social engagement when dealing with problems with biodiversity loss. In this light, several hypotheses have been proposed:

$H_{7\text{-}9}$. Norms mediate the relationship between value on sustainability and heritage sustainability participation behavior.

3.4 Moral Obligation

A person's internalised sense of duty or responsibility to act in a way that is consistent with both their personal ideals and society's ethics is known as their moral obligation. Based on an internal sense of "rightness" or "wrongness," it represents one's ethical commitment to act or refrain from doing (Bhattacharyya *et al.* 2020; Wu *et al.* 2021). Moral duty is motivated by outwardly acceptable ethical standards and a sense of accountability, as opposed to subjective norms, which are internally developed and reflect perceived social pressures to act in a particular way. For example, Lin *et al.* (2022) revealed that environmental concerns and moral obligations are critical for motivating pro-environmental behaviors. This illustrates that people are more likely to adopt sustainable practices when driven by a combined sense of moral duty and awareness of environmental issues. This transformative interplay suggests that moral obligation, when combined with awareness and environmental concern, has the power to turn values into action. Floriano and de Matos (2022) conducted a study on consumers of sustainable fashion in Brazil and found that customers' views toward sustainable fashion were strongly impacted by their moral obligation and their awareness of the adverse effects of unsustainable fashion practices. Consumers were more inclined to support sustainable items when they believed they had a moral obligation to choose environmentally friendly options, emphasising individual accountability's significance in purchasing decisions. The following hypothesis was put forth after these researchers agreed that moral obligation is an essential mediator in the VAB relationship:

H_{10}. Moral obligation mediates the relationship between value on sustainability and heritage sustainability participation behavior.

3.5 Big Five Personality Traits as Moderators

The five-factor model of personality can be used to classify all personality traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism (Giango *et al.* 2022). Personality is an important part that motivates an individual's beliefs, values, and attitudes, whereby fundamental differences in personality influence environmentally friendly behavior. This study included the Big Five Personality traits as moderators for several reasons, even though prior research has shown conflicting results about their moderating influence. Firstly, because they are linked to social responsibility, commitment, and receptivity to new ideas, personality traits like agreeableness, conscientiousness, and openness are strongly associated with pro-sustainability behavior (Ahmed *et al.* 2022; Poškus, 2020; Yaban & Gaschler, 2025). Further, conscientiousness, extraversion, agreeableness, and neuroticism were found to have partial moderating effects on the VAB model in a study on crowdfunding and the Sustainable Development Goals (SDGs) (Kim & Hall, 2021). These characteristics can influence crowdfunding intentions for sustainable projects. Similarly, international tourists with higher levels of openness, conscientiousness, and extraversion are more inclined to favour biosecurity practices when travelling during the pandemic (Kim *et al.* 2021b). It was also revealed that individuals with higher attributes, such as openness and extraversion, frequently show higher alignments between their values and behavior, especially in pro-environmental areas where they may significantly regulate behavior in value-driven circumstances (Srivastava *et al.* 2021). Based on the existing literature, the following hypotheses were formulated:

H_{11}. The levels of openness positively moderate the relationships between attitude, norms, and moral obligation with heritage sustainability participation behavior.

H_{12}. The levels of conscientiousness positively moderate the relationships between attitude, norms, and moral obligation with heritage sustainability participation behavior.

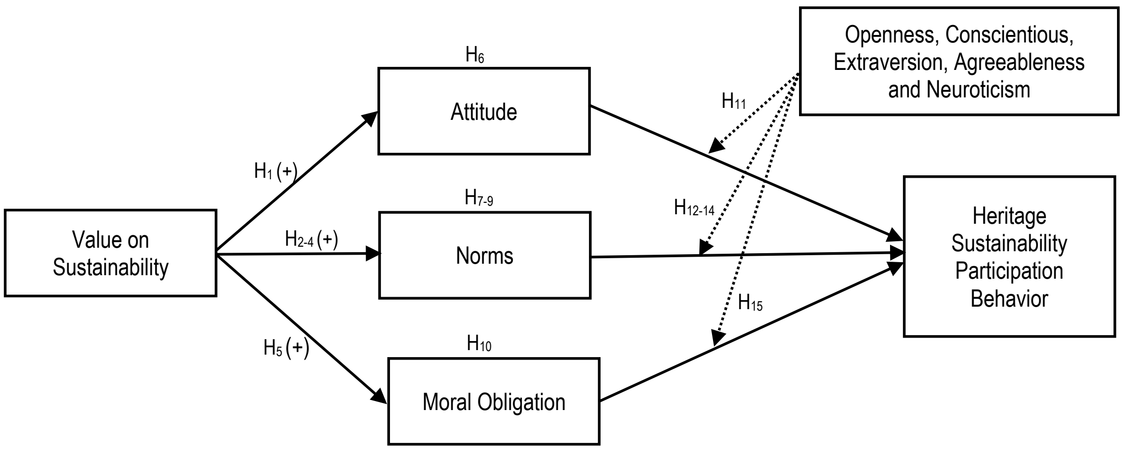
H_{13}. The levels of extraversion positively moderate the relationships between attitude, norms, and moral obligation with heritage sustainability participation behavior.

H_{14}. The levels of agreeableness positively moderate the relationships between attitude, norms, and moral obligation with heritage sustainability participation behavior.

H_{15}. The levels of neuroticism positively moderate the relationships between attitude, norms, and moral obligation with heritage sustainability participation behavior.

The theoretical and empirical reviews were then used to conceptualize the research model of this study, and this is presented in Figure 1 (Bhattacharyya *et al.* 2020; Kim & Hall, 2021; Lee *et al.* 2019; Van Tonder *et al.* 2023; Walsh *et al.* 2021; Wang *et al.* 2022). It comprised seven first-order constructs: (1) value on sustainability as an exogenous construct or independent variable, (2) attitude, (3) personal norms, (4) social norms, (5) subjective norms, (6) moral obligation as mediators, and (7) heritage sustainability participation behavior as an endogenous construct or dependent variable. The Big Five Personality traits (openness, conscientiousness, extraversion, agreeableness, neuroticism) act as moderators in the VAB model. The hypothesis shows that value on sustainability positively influences attitude, norms (internal and external norms) and moral obligation, as shown in H_1 to H_5. Subsequently, attitude, norms, and moral obligation mediated the relationship between the value on sustainability and heritage sustainability participation behavior expressed in H_6 to H_{10}. Lastly, the moderators of the Big Five Personality traits are concluded in H_{11} to H_{15}.

Figure 1. Research Model of Study



Source: Own Elaboration

4. Methodology

This research employed a quantitative method to understand domestic tourists' heritage sustainability participation behavior comprehensively. The questionnaire for this research was divided into two major parts: the respondents' demographics and eight research constructs that included 59 items. Notably, the value on sustainability, attitude, personal norms, and social norms was estimated by four questions each from the study by Kim and Hall (2021) (*e.g.*, 'Heritage sustainability is vital to save of heritage sites', 'Participating in heritage sustainability activities is an affirmative behavior', 'I feel an obligation to participate in heritage sustainability activities', 'Most people who are important to me think I should participate in heritage sustainability activities'). Subjective norm was examined with six questions from the studies by Cheng and Tung (2014), Megeirhi *et al.* (2020), and Wang *et al.* (2023) (*e.g.* 'It is expected of me to support heritage sustainability activities'). The four questions on moral obligation were adapted from studies by Floriano and de Matos (2022), Lin *et al.* (2022), and Wu *et al.* (2021) (*e.g.* 'I feel a moral obligation to protect the WHS'). Lastly, the 25 questions relevant to examining the Big Five Personality traits were obtained from previous studies (Kim *et al.* 2021b; Kim & Hall, 2021) (*e.g.* 'I get excited about new ideas', 'I tend to implement my plans', 'I talk to a lot of other people at parties'). See more details in Table 1.

Table 1. Summarization of Constructs Used for the Research Model

Role	Construct	Item	Source
Antecedent	Value on Sustainability	1. Heritage sustainability is vital to save our heritage sites. 2. Heritage sustainability is important for the environment. 3. I believe that heritage sustainability should be done to limit the impacts of climate change. 4. Heritage sustainability is valuable in lessening heritage deterioration.	Kim and Hall (2021)
Mediator	Attitude	1. Participating in heritage sustainability activities is affirmative behaviour. 2. Participating in heritage sustainability activities is beneficial behaviour. 3. Participating in heritage sustainability activities is an essential behavior. 4. Participating in heritage sustainability activities is legitimate behavior.	Kim and Hall (2021)
	Personal Norms	1. I feel an obligation to participate in heritage sustainability activities. 2. Regardless of what other people do, because of my own values/principles, I feel that I should participate in heritage sustainability activities. 3. I feel that it is important to participate in heritage sustainability activities. 4. I am more likely to participate in heritage sustainability activities compared with other sustainability projects.	Kim and Hall (2021)
	Social Norms	1. Most people who are important to me think I should participate in heritage sustainability activities. 2. Most people who are important to me would want me to participate in heritage sustainability activities. 3. Most people who are important to me support my participation in heritage sustainability activities. 4. Most people who are important to me are proud of my participation in heritage sustainability activities.	Kim and Hall (2021)
	Subjective Norms	1. It is expected of me to support heritage sustainability activities. 2. People whose opinions I value would prefer that I support heritage sustainability activities in my country. 3. I would be influenced by government guidance to participate in efforts to support heritage sustainability activities in my country. 4. I would be influenced by local tourism planning organizations to participate in heritage sustainability activities in my country. 5. I would be influenced by family members to participate in heritage sustainability activities in my country. 6. I would be influenced by other residents to participate in efforts to support heritage sustainability activities in my country.	Chen and Tung (2014); Megeirhi *et al.* (2020); Wang *et al.* (2023)
	Moral Obligation	1. I feel a moral obligation to protect the WHS. 2. I should protect the WHS. 3. It’s important that people in general protect the	Floriano and de Matos (2022); Lin *et al.* (2022); Wu *et al.* (2021)

Role	Construct	Item	Source
		WHS. 4. Because of my own values, I feel an obligation to behave in an environmentally friendly way.	
Dependent Variable	Heritage Sustainability Participation Behavior	1. I participate in heritage sustainability activities. 2. When I participate in heritage sustainability activities, I engage in ecologically friendly activities. 3. When I participate in heritage sustainability activities, I engage in socially friendly activities. 4. When I participate in heritage sustainability activities, I engage in economically friendly activities. 5. When I participate in heritage sustainability activities, I expend effort on the environment. 6. When I participate in heritage sustainability activities, I make an effort on society. 7. When I participate in heritage sustainability activities, I make an effort for the economy. 8. When I participate in heritage activities, I am interested in projects for sustainability.	Kim and Hall (2021)
Moderator	Openness	1. I get excited about new ideas. 2. I enjoy thinking about a lot of things. 3. I enjoy hearing new ideas. 4. I enjoy looking for a deeper meaning. 5. I have a vivid imagination.	Kim and Hall (2021)
	Conscientiousness	1. I tend to implement my plans. 2. I pay attention to detail. 3. I am always well prepared. 4. I tend to abide by my plans. 5. I do my work perfectly.	Kim and Hall (2021)
	Extraversion	1. I talk to a lot of other people at parties. 2. I feel comfortable with people around me. 3. I tend to initiate conversations. 4. I make friends easily. 5. I do not mind being paid the center of attention.	Kim and Hall (2021)
	Agreeableness	1. I sympathize with the feelings of others. 2. I am concerned about others. 3. I respect others. 4. I believe that others have good intentions. 5. I trust what people say to me.	Kim and Hall (2021)
	Neuroticism	1. I get stressed out easily. 2. I worry about many things. 3. I fear the worst. 4. I am filled with doubts. 5. I fall into panic easily.	Kim and Hall (2021)

Source: Chen and Tung (2014); Floriano and de Matos (2022); Kim and Hall (2021); Lin et al. (2022); Megeirhi et al. (2020); Wang et al. (2023); Wu et al. (2021).

The demographics of the respondents included profiling the respondents to understand their background, lifestyle, and characteristics. The next step was to find out if the respondents had visited any of the Malaysian World Heritage Sites to qualify them as domestic tourists to proceed with answering the research construct questions. The questions on the research constructs were assessed based on the 7-point Likert Scale (Magano *et al.* 2024). Upon receiving approval from the Human Ethics Committee, the pilot test for this study was systematically administered to a diverse cross-section of the sample to ensure that the entire survey runs smoothly, and that the data analysis can be done effectively. The pilot test was done on a small sample for this study and used 50 participants, whereby further feedback was received from them after conducting this test. This process allowed for testing internal consistency and reliability among measurement items. Using Smart PLS 4.0, it was discovered that the Cronbach Alpha for all the constructs was above 0.70, indicating a high correlation between the items in the constructs (Nekmahmud *et al.* 2022; Saleh *et al.* 2022; Sarstedt *et al.* 2020). The high

Cronbach Alpha values indicate that the items in the constructs are reliable and consistent, thereby validating the research instrument. The questionnaire was also amended based on their feedback to ensure the respondents could answer the questions easily.

The data was collected online and face-to-face, targeting 500 Malaysian domestic tourists using purposive sampling. The researchers appointed two research assistants to speed up the data collection process. The respondents were given an online questionnaire link to fill in targeted public areas. They were also asked to recommend family, friends, and colleagues, who were then given the online link to fill out. In total, 700 questionnaires were handed out, and the total number of responses received was 599, which is a response rate of 86%. It was determined that 99 of the 599 surveys could not be used because the participants left the survey after the qualifying questions or provided incomplete responses. The remaining 500 surveys were therefore utilized to do additional analysis. This constitutes a legitimate response rate of 71%, which is regarded as high (Saunders *et al.* 2019).

5. Common Method Bias

This study implemented various procedural measures to mitigate the impact of common method bias. To alleviate evaluation anxiety, the participants were informed that there were no correct or incorrect answers to the questionnaire items. Additionally, they were guaranteed secrecy during the whole research procedure. The exogenous variables were separated from the endogenous variables in the questionnaire to enhance the validity of the results. The outcome suggests that no individual component was responsible for most of the exogenous and endogenous variables' covariance. Therefore, multicollinearity was deemed not problematic because the variance inflation factor (VIF) for all items was within the acceptable threshold below 5 (Hair *et al.* 2021). The unrotated first factor at 31.53%, which is the variance, accounted for Harman's one-factor test and was within the satisfactory range of below 50% (Nekmahmud *et al.* 2022). Thus, the current analysis demonstrated that common method bias is not a significant worry and is unlikely to exaggerate the connections between the measured variables (Hu *et al.* 2023).

6. Research Results

Data was collected from each state in Malaysia based on the individual state population ratio to guarantee an equitable representation of the population from each state. The respondents consisted of 289 females, making up 57.8%, and 211 males, accounting for 42.2% of the total. Among the respondents, the majority were between the ages of 30 and 39 (196 respondents, 39.2%), had at least a bachelor's degree (330 respondents, 66.0%), and were married (276 respondents, 55.6%). Most respondents reported a household income ranging from RM3,001 to RM8,000 (195 respondents, 39.0%) and RM8,001 to RM15,000 (203 respondents, 40.6%). The study also revealed that most participants worked in the service sector (158 respondents, 31.8%). Selangor, Johor, and Sabah were the three states with the highest number of respondents. Subsequently, the data from the respondents' visits to Malaysian WHS were analyzed and found that most respondents had visited George Town and Malacca while only a small portion had visited the other Malaysian WHS.

Following this, the measurement model was assessed to ensure the validity and reliability of the constructs. The factor loadings for each construct were > 0.70 except for Items 7.23, 7.24, and 7.25 (on neuroticism), which were < 0.50. The Cronbach's alpha and Dijkstra-Henseler's rho_A for all items were> 0.70, indicating that the reflective constructs exhibited reliability and were within acceptable levels except for neuroticism (Benitez *et al.* 2020). The convergent validity was then assessed. All constructs' average variance extracted (AVE) was found to be above 0.50, except for neuroticism. Therefore, as recommended by other studies, this construct was removed from further assessment (Ahmed *et al.* 2022; Damti & Hochman, 2022). The discriminant validity of the constructs was also examined using the Heterotrait-Monotrait ratio (HTMT), which was acceptable and below the threshold of 0.85 (Hair *et al.* 2021; Henseler & Schuberth, 2020). These results are shown in Table 2.

The findings of the direct hypotheses testing showed that value on sustainability had the most significant impact on attitude (ß = 0.628, t = 20.04; p < .005), followed by personal norms (ß = 0.530, t = 13.65; p < .005), moral obligation (ß = 0.470, t = 12.51; p < .005), subjective norms (ß = 0.439, t = 9.73; p < .005), and social norms (ß = 0.414, t = 8.25; p < .005). The findings validated every theory, hence bolstering the theoretical framework proposed in this study. Therefore, the hypotheses H_1, H_2, H_3, H_4, and H_5 were supported, which is shown in Table 3.

Table 2. Reliability and Validity of Measurement Model

Constructs	HTMT Test Values											
	VALUE	ATT	PN	SN	SUBJ	MO	AGREE.	CONS.	EXTRA.	NEURO.	OPEN.	BEH.
VALUE												
ATTITUDE	0.661											
PERSONAL NORMS	0.557	0.655										
SOCIAL NORMS	0.424	0.519	0.777									
SUBJECTIVE NORMS	0.456	0.507	0.700	0.721								
MORAL OBLIGATION	0.494	0.574	0.613	0.545	0.602							
AGREEABLNESS	0.384	0.421	0.364	0.247	0.443	0.044						
CONSCIENTIOUNESS	0.329	0.338	0.440	0.319	0.482	0.350	0.562					
EXTRAVERSION	0.257	0.289	0.421	0.456	0.474	0.273	0.421	0.619				
NEUROTICISM	0.082	0.042	0.089	0.062	0.055	0.064	0.154	0.070	0.061			
OPENNESS	0.254	0.382	0.382	0.306	0.446	0.385	0.490	0.712	0.456	0.086		
BEHAVIOR	0.334	0.467	0.558	0.613	0.579	0.438	0.318	0.345	0.449	0.071	0.385	
Cronbach's alpha > 0.7	0.952	0.928	0.933	0.957	0.945	0.922	0.861	0.946	0.952	0.932	0.948	0.966
Rho_A > 0.7	0.955	0.932	0.934	0.957	0.946	0.940	0.878	0.974	0.960	0.979	0.952	0.968
AVE > 0.5	0.874	0.824	0.833	0.886	0.784	0.810	0.637	0.822	0.838	0.404	0.828	0.811

Source: Output from PLS-SEM 4.0

Table 3. Direct Hypotheses Testing Results

Hypo	Relationship	Path coefficient	T statistics (|O/STDEV|)	P values	CI 5.0%	CI 95.0%	Decision
H_1	Value → Attitude	0.626	20.038	**0.000**	0.576	0.576	Supported
H_2	Value → Personal Norms	0.530	13.646	**0.000**	0.465	0.592	Supported
H_3	Value → Social Norms	0.411	8.245	**0.000**	0.331	0.495	Supported
H_4	Value → Subjective Norms	0.436	9.732	**0.000**	0.363	0.512	Supported
H_5	Value → Moral Obligation	0.468	12.512	**0.000**	0.407	0.531	Supported

Note: Statistically significant values are marked in bold.
Source: Own Elaboration from PLS-SEM 4.0

Subsequently, the indirect or mediation effects for the hypotheses H6 to H10 were tested. It was found that attitude, social norms, and subjective norms had significant mediations effects on heritage sustainability participation behavior that is value on sustainability → attitude → heritage sustainability participation behavior ($t = 2.729$; $p = 0.003$), value on sustainability → social norms → heritage sustainability participation behavior ($t = 3.511$; $p = 0.000$), and value on sustainability → subjective norms → heritage sustainability participation behavior ($t = 3.008$; $p = 0.001$). However, it was observed that value on sustainability → personal norms → heritage sustainability participation behavior ($t = 0.705$; $p = 0.240$) and value on sustainability → moral obligation → heritage sustainability participation behavior ($t = 0.487$; $p = 0.313$) were not significant. Therefore, hypotheses H6, H8, H9 were supported, whereas H7 and H10 were not supported. The results of the mediation effects showed that social norms had the strongest mediation effects followed by subjective norms and attitude which is illustrated in detail in Table 4.

Table 4. Results of Mediation Effects

Hypo	Relationship	Path coefficient	T statistics (|O/STDEV|)	P values	CI 5.0%	CI 95.0%	Decision
H_6	Value on Sustainability → Attitude → Heritage Sustainability Participation Behavior	0.085	2.729	**0.003**	0.036	0.139	Supported
H_7	Value on Sustainability → Personal Norms → Heritage Sustainability Participation Behavior	0.026	0.705	0.240	-0.034	0.086	Not Supported
H_8	Value on Sustainability → Social Norms → Heritage Sustainability Participation Behavior	0.133	3.511	**0.000**	0.073	0.199	Supported
H_9	Value on Sustainability → Subjective Norms → Heritage Sustainability Participation Behavior	0.096	3.008	**0.001**	0.043	0.148	Supported
H_{10}	Value on Sustainability → Moral Obligation → Heritage Sustainability Participation Behavior	0.012	0.487	0.313	-0.027	0.056	Not Supported

Note: Statistically significant values are marked in bold.
Source: Own Elaboration from PLS-SEM 4.0

Next, the muti-group analysis (MGA) was employed to test the high and low moderation effects of the Big Five Personality traits in the VAB model. The moderating variables of the Big Five Personality traits, which are openness, conscientiousness, extraversion, and agreeableness, were found to partially moderate the relationships in heritage sustainability participation behavior. In summary, domestic tourists with high and low openness and conscientiousness, low extraversion, and high agreeableness positively moderate heritage sustainability participation behavior. The results of the moderating effects are displayed in Table 5.

Based on the importance-performance analysis (IPA), it was found that the total effects for value on sustainability had the highest value (0.353), indicating the highest importance. This is followed by social norms (0.325), subjective norms (0.220), attitude (0.136), personal norms (0.049), and moral obligation (0.026). In terms of performance, moral obligation had the highest score (82.822), followed by attitude (80.473), value on sustainability (79.433), subjective norms (75.324), personal norms (74.687), and social norms (72.493). Therefore, the value on sustainability was located in the high importance, high-performance quadrant, indicating that this variable is performing well. Social and subjective norms were located in the high-importance, low-performance quadrant, indicating the need to drive strategic changes in this area to foster behavioural changes among domestic tourists. Also, personal norms and moral obligation were located in the low-importance, high-performance quadrant, indicating the 'possible overkill' of these factors. Table 6 and Figure 2 illustrate these results further.

Table 5. Moderating Effects of the Big Five Personality Traits

Hypothesis/Path Coefficient	Original (_High)	Original (_Low)	p value (_High)	p value (_Low)	Results
Openness (H_{11})					Partially Supported
Openness → Participation Behavior	-0.031	0.045	0.498	0.677	
Openness x Attitude → Participation Behavior	-0.049	-0.268	0.269	**0.042**	
Openness x Personal Norms → Participation Behavior	-0.057	-0.032	0.270	0.841	
Openness x Social Norms → Participation Behavior	-0.071	-0.143	0.398	0.210	
Openness x Subjective Norms → Participation Behaviour	0.229	-0.130	**0.000**	0.341	
Openness x Moral Obligation → Participation Behavior	0.177	0.298	**0.001**	**0.005**	
Conscientiousness (H_{12})					Partially

Hypothesis/Path Coefficient	Original (_High)	Original (_Low)	p value (_High)	p value (_Low)	Results
					Supported
Conscientiousness → Participation Behavior	0.044	0.126	0.474	**0.040**	
Conscientiousness x Attitude → Participation Behavior	-0.065	0.027	0.331	0.733	
Conscientiousness x Personal Norms → Participation Behavior	-0.024	-0.088	0.691	0.461	
Conscientiousness x Social Norms → Participation Behavior	-0.067	0.155	0.362	0.295	
Conscientiousness x Subjective Norms → Participation Behavior	-0.023	0.061	0.752	0.582	
Conscientiousness x Moral Obligation → Participation Behavior	0.137	-0.078	**0.037**	0.306	
Extraversion (H_{13})					Partially Supported
Extraversion → Participation Behavior	0.050	0.287	0.305	**0.035**	
Extraversion x Attitude → Participation Behavior	0.043	0.211	0.459	0.110	
Extraversion x Personal Norms → Participation Behavior	0.045	0.135	0.487	0.262	
Extraversion x Social Norms → Participation Behavior	-0.165	-0.477	0.120	**0.001**	
Extraversion x Subjective Norms → Participation Behavior	0.019	0.248	0.795	0.092	
Extraversion x Moral Obligation → Participation Behavior	0.091	-0.096	0.189	0.499	
Agreeableness (H_{14})					Partially Supported
Agreeableness → Participation Behavior	0.077	-0.105	**0.047**	0.580	
Agreeableness x Attitude → Participation Behavior	-0.042	-0.059	0.349	0 .747	
Agreeableness x Personal Norms → Participation Behavior	-0.058	0.140	0.428	0.607	
Agreeableness x Social Norms → Participation Behavior	-0.015	-0.013	0.873	0.948	
Agreeableness x Subjective Norms → Participation Behavior	0.145	-0.055	**0.050**	0.777	
Agreeableness x Moral Obligation → Participation Behavior	0.043	0.065	0.428	0.751	

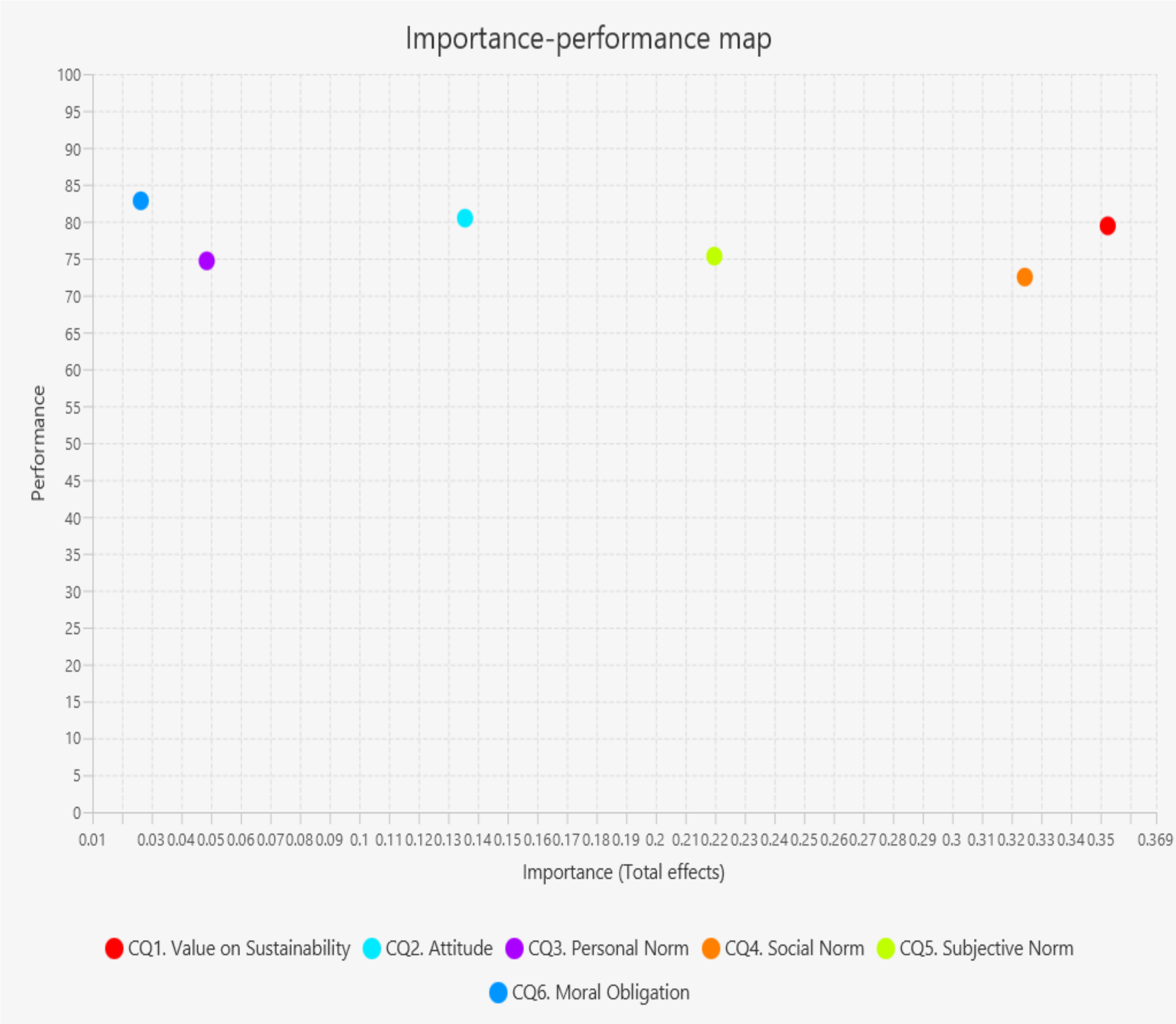
Note: Statistically significant values are marked in bold.
Source: Own Elaboration from PLS-SEM 4.0

Table 6. Importance-Performance Analysis

Constructs	Importance	Performance
Value on Sustainability	0.353	79.433
Attitude	0.136	80.473
Personal Norms	0.049	74.687
Social Norms	0.325	72.493
Subjective Norms	0.220	75.324
Moral Obligation	0.026	82.822

Source: Own Elaboration from PLS-SEM 4.0

Figure 2. Importance-Performance Matrix



Source: Output from PLS-SEM 4.0

7. Discussions

Based on previous studies, value was not directly related to behavior. However, value indirectly affects behavior through attitude (Bhattacharyya *et al.* 2020; Kim *et al.* 2021b). Also, as the VAB model indicates, value can influence behavior indirectly via attitude. Past studies also suggest that the VAB model cannot fully explain consumer behavior and should be expanded further (Jacobs *et al.* 2018). Therefore, this is confirmed in this study which integrates both the VAB and TPB and extends preceding research by incorporating other internal and external norms in explaining heritage sustainability participation behavior (Anuar *et al.* 2020; Ma & Chang, 2022; Walsh *et al.* 2021; Wang *et al.* 2022). Value on sustainability significantly influences attitude, personal norms, social norms, subjective norms, and moral obligation, with attitude having the most substantial path coefficient value, followed by personal norms, moral obligation, subjective norms, and social norms. These results correlate with previous research from Cheung and To (2019) together with Kabir and Hassan (2024), who found that consumers with positive environmental values exhibit a favorable attitude towards environmental issues and eco-social advantages. Similarly, the significant relationship between the value of sustainability and personal and social norms was supported by the study by Kim and Hall (2022), and Wang *et al.* (2022). This study also reinforces the findings by Fatoki *et al.* (2023) and Nekmahmud *et al.* (2022), where subjective norms have a highly positive relationship in the VAB model together with the positive influence on moral obligation as revealed in the study by Floriano and de Matos (2022).

The results further found that attitude, social norms, and subjective norms are significant mediators, whereas personal norms and moral obligation do not mediate the relationship between value on sustainability and heritage sustainability participation behavior. Based on the path coefficients, the strongest mediator was social norms, followed by subjective norms and attitudes. These findings concur with previous studies on positive mediation by attitude and social and subjective norms (Kim *et al.* 2021b; Kim & Hall, 2021; Kwon & Namkung, 2022). There are also contradicting studies indicating that social norms do not necessarily indicate or influence customer loyalty and positive behaviour (Tajeddini *et al.* 2021). However, the studies by Bhattacharyya *et al.* (2020) and Chen and Tung (2014) reinforce the positive relationship of subjective norms as a mediator in the VAB model. It was also found that the Big Five Personality traits of openness, conscientiousness, extraversion, and agreeableness partially moderate the relationship between attitude, personal norms, social norms, subjective norms, and moral obligation with heritage sustainability participation behavior, which is supported by previous research (Kim *et al.* 2021b; Kim & Hall, 2021). Therefore, personality traits influence domestic tourists' willingness and ability to participate in heritage sustainability efforts. This can be associated with behaviors that support conservation and preservation efforts through communal initiatives.

The IPMA matrix highlighted that significant behavioral changes among domestic tourists can be achieved by focusing on social and subjective norms (Fakfare, 2021; Hu *et al.* 2024). These findings underscore the influential role of normative pressures in shaping individual intentions and actions. For instance, when there is a strong societal emphasis on valuing and preserving cultural and natural heritage, individuals and organisations are more likely to internalise and reflect these values in their behaviours (Lee *et al.* 2021; Yi *et al.* 2024). This alignment often results in a greater willingness to engage in sustainability initiatives, ranging from responsible tourism practices to active participation in heritage conservation and preservation programmes. In the context of heritage sustainability, subjective norms which relate to the perceived expectations of significant others such as family, friends, or community leaders can serve as a strong motivational force (Sulivyo *et al.* 2024; Wang *et al.* 2019). When individuals believe people, they respect approve of heritage sustainability behaviours, they are more inclined to act accordingly, not only to gain social approval but also to avoid disapproval or criticism. This personal and relational dimension of normative influence complements social norms, which operate at a broader cultural or societal level, establishing what is commonly accepted or expected within a group or community (Zhu *et al.* 2022). Together, social and subjective norms can create a powerful feedback loop. Social norms help establish the cultural framework and shared values around heritage conservation, while subjective norms reinforce these values on a more personal level, encouraging behavioural consistency. This interplay fosters a community culture in which heritage sustainability is not only a collective goal but also a socially endorsed and personally meaningful practice (Javed *et al.* 2025).

8. Conclusions and Further Research

8.1 Theoretical Implications

This research makes a significant and novel contribution to the underexplored domain of heritage sustainability participation behavior by integrating two prominent behavioral frameworks which is the Value-Attitude-Behavior (VAB) model and the Theory of Planned Behavior (TPB). By doing so, it offers a comprehensive and theoretically robust model that incorporates both internal norms (*i.e.* personal norms and moral obligation) and external norms (*i.e.* social norms and subjective norms). This dual-norm approach provides a more holistic understanding of the drivers behind individuals' engagement in heritage sustainability practices, a perspective that has been largely overlooked in prior studies. Importantly, this study goes beyond conventional behavioral models by incorporating the Big Five Personality traits as moderating variables within the VAB framework, an area that remains under-researched in the context of heritage tourism and sustainability. By examining how personality traits influence the relationship between values, attitudes, and behavior, the study bridges a critical gap in the literature and highlights the psychological underpinnings that shape participation behaviour in heritage-related initiatives. From a theoretical standpoint, this research expands existing models by emphasising the dynamic interplay between attitude, personal norms, social norms, subjective norms, and moral obligation. It underscores the importance of fostering broader societal values, belief systems, and identity-driven motivations, particularly in domestic tourism settings, to encourage meaningful engagement in heritage sustainability.

Furthermore, the application of PLS-SEM combined with muti-group analysis (MGA) allows for a nuanced and granular analysis of how different personality types respond to various psychological and normative constructs. This methodological advancement enhances the precision of behavioral predictions and offers valuable insights into segmentation strategies based on personality profiles. Specifically, the comparative analysis of high and low groups across constructs such as attitude, personal norms, social norms, subjective norms, and moral obligation enables a deeper understanding of heterogeneity in domestic tourist behavior thereby supporting more targeted and effective policy and intervention strategies. Collectively, the research not only contributes a novel theoretical framework for examining heritage sustainability participation behaviour but also provides empirical evidence and practical recommendations for policymakers, heritage managers, and tourism stakeholders. It advocates for more personalised and psychologically attuned outreach strategies that align with individuals' core values, social contexts, and personality dispositions that ultimately foster stronger and more sustainable community participation in heritage sustainability.

8.2 Practical Implications

This research provides a strategic roadmap for policymakers to harness individuals' belief systems to cultivate cohesion and support for heritage sustainability efforts. Governments can encourage long-term community participation by fostering a more profound sense of awareness and appreciation for heritage. One practical approach is implementing human development and social programmes, such as integrating heritage education into the school curriculum, promoting intergenerational storytelling, and organizing awareness campaigns at family and community levels. These initiatives can shape personality traits like openness and conscientiousness, which are linked to a greater sense of responsibility and engagement in heritage sustainability. In addition, targeted campaigns, community and municipality engagement programmes, and partnerships with local organisations can emphasise the cultural, economic, and social benefits of sustaining heritage sites. Public-private collaborations, such as corporate sponsorships for restoration projects and incentives for local businesses to invest in heritage tourism, can further strengthen these efforts. By aligning policies with community values and fostering a sense of ownership over heritage assets, governments can create a sustainable and inclusive model for sustainability.

This suggests that well-designed government interventions not only shape individual and societal behaviours but also have the potential to foster a collective commitment to heritage sustainability. The recent designation of Niah Caves as a UNESCO World Heritage Site in July 2024 further underscores Malaysia's rich cultural and natural heritage. This recognition, combined with Malaysia's strong economic performance in recent years, highlights the role of heritage sites in driving economic growth, tourism, and national identity. There are five other sites in Malaysia on the World Heritage tentative list, including the FRIM Forest Reserve Park in Selangor, the Gombak Selangor Quartz Ridge, Taman Negara in Pahang, Royal Belum Forest in Perak, and the Sungai Buloh Leprosarium. These sites are being evaluated as World Heritage Sites, showcasing Malaysia's rich cultural and natural heritage. This study also proposes the need to actively promote heritage sites in remote areas to gain more engagement, visibility, and visitation by domestic tourists. By leveraging these assets, Malaysia can enhance its global reputation while ensuring its historical and cultural treasures are sustained for future generations.

8.3 Limitations and Further Research

There were limitations in obtaining a representative sample of the Malaysian population due to constraints such as geographical accessibility, language barriers, and variations in understanding the term' sustainability'. As a result, the study employed a purposive sampling method, which may limit the generalizability of the findings. Future research could address this limitation by expanding the study to other locations, particularly WHS or heritage buildings facing similar challenges in Malaysia. Additionally, research could be extended to other developing countries in Asia-Pacific, such as Indonesia, Thailand, or Vietnam, to explore cross-cultural perspectives on heritage sustainability. The proposed research model can also be applied to other domains within heritage tourism, such as ecotourism, virtual tourism, or cultural heritage tourism, to assess its broader applicability. Furthermore, this study employed a cross-sectional data collection method, which helped identify the directional relationships among variables but did not allow for strong causal inferences. To address this, future studies could adopt a longitudinal approach to examine how these relationships evolve over time and establish stronger causal linkages.

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Credit Authorship Contribution Statement

Geetha Krishnapillai: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Data curation, Validation, Writing – review and editing, Visualization;
Filzah Md Isa: Supervision, Validation, Writing – review.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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Mental and Hedonistic Determinants Shaping Physical Activity Engagement among Generation Z

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Abstract: Consumers may exhibit various attitudes toward specific products, services, or activities. Regarding physical activity, a distinction can be made between a passive attitude, characterized by a lack of interest in sports and recreation, and an active attitude, manifested by participation in various forms of physical activity. This attitude is reflected in certain consumer behaviors in the sports market. The research question in this article is whether an interest in sports and recreation among Generation Z representatives translates into their actual physical activity. Additionally, moderating factors affecting this relationship, particularly the level of knowledge about sports and the availability of sports infrastructure and events, are analyzed. The purpose of the article is to identify and determine the impact of selected determinants that incline Generation Z representatives to engage in physical activity. The study was conducted using a survey method with the CAWI technique on a sample of 433 respondents representing Generation Z. Data were collected in the fourth quarter of 2024 in three metropolitan areas in Poland. The analysis of the results indicates that an interest in sports is a factor that encourages young people to engage in physical activity, which is strengthened by knowledge about sports. However, the availability of sports infrastructure and sporting events does not have a significant impact on the actual level of physical activity among Gen Z. In promoting sports participation among members of Generation Z, disseminating knowledge about physical activity is crucial. Shaping awareness and consumer attitudes proves to be more effective than merely increasing the availability of sports infrastructure or organizing sporting events.

Keywords: sports participation; physical activity; knowledge; consumer attitudes; Generation Z.

JEL Classification: L83; D12; I12; Z20.

Introduction

Generation Z as a social group is characterized by certain attitudes and consumer behavior, which in many cases differ significantly from those of representatives of other market segments (Kenebayeva, 2020; Wahyuningsih et al., 2022). This observation also applies to their approach to physical activity, which is one of the key forms of leisure time that impacts both physical and mental health. Modern technological conveniences, such as personal transportation, streaming platforms, and mobile apps, widely used by Generation Z, may pose a significant threat to their regular physical activity (Roblek et al., 2019; Woessner et al., 2021).

In this article, considerations regarding the factors determining the engagement in physical activity by Generation Z representatives are undertaken. In the theoretical part, the discussion is based on the assumptions of the Stimulus-Organism-Response (S-O-R) theory, which posits that an individual's attitude or behavior (Organism) can change in the form of a reaction (Response) under the influence of external factors (Stimulus) (Mehrabian & Russell, 1974). This specific stimulus-response relationship can help explain the influence of certain determinants on young people's readiness to engage in sports and recreational activities. This theory was adopted as the theoretical basis for conducting empirical research, the results of which are presented in the later part of the article.

The primary research problem of this study is to determine whether the declared interest in sports and physical recreation by young people from Generation Z actually translates into their real engagement in physical activity. Knowledge about sports, considered a mental factor, and the availability of sports infrastructure and events, viewed as a hedonistic factor, were adopted as moderating determinants of this relationship. Therefore, the purpose of the article is to demonstrate whether there is a correlation between the interest in sports by Generation Z representatives and the actual undertaking of physical activity, as well as to determine the strength of influence of the mentioned determinants that may moderate this relationship.

1. Sports and Physical Activity Among Generation Z - A Literature Review

1.1. Challenges Associated with Physical Activity

Generation Z is referred to as those born between 1995 and early 2010 (Chaturvedi et al., 2020). This generation is also referred to as Generation C, digital natives, postmillennials and centennials. It is the first generation to grow up exclusively in the digital world and is fully immersed in digital communications (Axcell & Ellis, 2023). Understanding the behavior patterns of this generation is particularly important as it constitutes the largest generational group in the world (32% of the population), and its purchasing power is five to six times higher than that of previous generations (Djafarova & Foots, 2022).

Generation Z has never experienced life without the internet. It is worth noting that growing up in a time of rapid technological development, however, comes with a number of civilization risks. First and foremost, social media and smart systems reduce the need to move and engage in activities outside the home (Roblek et al., 2019). Modern technologies decrease physical activity levels by eliminating the need for movement in areas such as transport, entertainment, and the digitization of work and education. Increasing use of private transport means (e.g. Uber, electric scooters) reduces spontaneous physical activity, including walking. Streaming platforms increase the number of hours spent sitting, and this lifestyle correlates with obesity and other civilizational diseases (Woessner et al., 2021). Furthermore, research indicates that the use of social media intensifies anxiety and dissatisfaction with one's appearance, leading to self-esteem issues, and prolonged screen use negatively affects sleep quality and mental health (Krumsvik, 2024). Although Generation Z declares an interest in a healthy lifestyle, their practical choices are not always consistent with these declarations. Growing health awareness often does not translate into undertaking real health-promoting actions (Agustina et al., 2024).

1.2. The Importance of Physical Activity

Numerous studies confirm that physical activity is an important determinant of health, with numerous social, psychological and physiological benefits. Regularly engaging in physical activity during leisure time translates into a higher quality of life (Peleias et al., 2017) and has a positive impact on the mental health of adults (Aguilar et al., 2022). In addition, a correlation can be observed between good grades among schoolchildren and the physical exercise undertaken (Snelling et al., 2015). Participation in extracurricular sports activities is associated with higher academic grades among higher education students (Muñoz-Bullón et al., 2017). It has also been confirmed that regular sports participation and volunteer activities have an indirect impact on reducing depressive symptoms in teenagers (Bang et al., 2020). Additionally, physically active young people are characterized by greater social resilience than those who do not engage in sports (Duman & Kuru, 2010). Recent longitudinal evidence shows that physical activity in early adolescence, particularly when practiced through organized sports, protects against the later onset of psychiatric disorders, underscoring its long-term role in safeguarding youth mental health (Lundgren et al., 2025). Moreover, employees who regularly engage in physical activity bring tangible benefits to the organizations they work for (Calderwood et al., 2016). A study conducted in Taiwan showed that female college graduates who participated in physical activities obtained higher initial salaries in the job market (Chiu, 2020).

Research conducted at Sheffield Hallam University on the social and economic impact of sports and physical activity showed that every pound invested in this area in England generates a socio-economic return of 4.20 pounds (Sport England, 2025). At the same time, lack of physical activity ranks fourth on the list of the most common causes of death worldwide (Williams-Burnett & Kearns, 2018). The World Health Organization (WHO) recommends that all adults engage in at least 150–300 minutes of moderate-intensity aerobic physical activity weekly to maintain health and well-being. Understanding the behavior patterns of young adults regarding active recreation and their perceptions of different ways of spending free time enables the implementation of effective strategies promoting an active lifestyle. As numerous studies confirm, this translates into improved physical and mental health and increases the overall quality of life.

On one hand, Generation Z representatives are particularly vulnerable to technology addiction and the negative health consequences of a sedentary lifestyle. On the other hand, this generation is characterized by a high awareness of the importance of health, physical activity, and proper nutrition in human life. They perceive sports as a tool serving health (Kiráľová & Hamarneh, 2019). Such a paradox, makes the problem of Generation Z's engagement in physical activity a particularly interesting research area.

1.3. Determinants of Physical Activity

Physical activity is shaped by a broad range of factors that can either encourage participation in physical activity or serve as barriers to regular participation. It is influenced by both individual traits and external conditions in which individuals' function. Craggs et al. (2011) divided the determinants of physical activity into external and internal. Internal determinants included biological and psychological factors such as gender, age, self-esteem, sense of behavioral control, and motivation. External determinants, on the other hand, included socio-cultural and environmental factors, including family and peer support, availability of sports infrastructure, and neighborhood safety. In a similar study, McNeill et al. (2006) divided the determinants of physical activity into three groups: individual, social, and environmental. Individual factors included motivation (intrinsic and extrinsic) and self-efficacy, social factors concerned social support and peer pressure, while environmental factors included neighborhood quality and availability of infrastructure conducive to activity. The authors demonstrated that environmental factors, such as neighborhood quality and availability of sports facilities, have a direct impact on physical activity. Amireault et al. (2013) reached slightly different conclusions, showing that external factors, such as access to gyms or social support, are significant but do not determine long-term engagement in physical activity. Internal factors, especially self-efficacy and the intention to continue physical activity, are crucial. A study conducted in Mexico, Spain, and Saudi Arabia on motivational factors for physical activity showed that intrinsic motivation and identified regulation are the most important and universal drivers of engagement in exercise. At the same time, the findings highlight that cultural context should be considered when designing programs aimed at promoting physical activity (Prieto-González et al., 2025).

In this article, the authors divided the determinants of sports participation into:

- internal, where such constructs as interest in sports and knowledge about sports were considered;
- external, where such construct as available infrastructure and sports events were considered.

Interest in sports, taken as an attitude, refers to the degree to which an individual identifies with sports and physical activity as an essential part of their lifestyle. Individuals with a high level of interest in sports not only recognize physical activity as beneficial but also support initiatives related to its promotion and organization. This attitude is also manifested by actively following information about sports and a willingness to share knowledge and opinions about its health and social benefits. Thus, interest in sports also includes a cognitive and social aspect.

Knowledge about sports is a construct that encompasses awareness and understanding of the rules governing physical activity and its impact on health and body condition. It covers both general recommendations for the optimal amount of movement during the week and physiological mechanisms, such as the impact of physical activity on aging processes, mental health, or fat burning. This knowledge also includes the importance of regeneration in the training process and the individual's subjective belief that they have enough information to consciously make decisions regarding their healthy lifestyle and regular physical activity.

Available infrastructure and sports events are external factors that can significantly facilitate or hinder physical activity. It includes both the physical availability of sports and recreational facilities at the place of residence, their quality and functionality, as well as economic factors such as the cost of using sports infrastructure. Additionally, the presence of organized forms of physical activity in schools, universities, or workplaces, as well as the availability of spectator sports events, can be a motivating factor to engage in physical activity.

It is also worth mentioning that engaging in physical activity is defined by the authors as regularly participating in various forms of physical activity, both as part of planned workouts and daily choices that encourage greater activity. This includes the use of workout plans, either available online or developed by a personal trainer, as well as fitness apps and activity-tracking devices that support self-monitoring and motivation to move. Moreover, engaging in physical activity is reflected in conscious decisions to increase spontaneous physical activity, such as choosing stairs instead of an elevator or preferring active ways of spending free time, such as walking, cycling, or jogging. A key indicator of regular physical activity is also participating in sports or exercises at least three times a week, which indicates a consistent effort to maintain a healthy lifestyle.

In the conducted literature review, a research gap was identified concerning the limited number of publications dedicated to how Generation Z spends their leisure time actively. Understanding the behavior patterns of young consumers enables entities offering physical activity services to build a competitive advantage and also represents a social benefit. The aim of this article is to demonstrate whether there is a correlation between interest in sports and actual engagement in physical activity among Generation Z, as well as to determine the strength of the influence of the mentioned determinants that may moderate this relationship.

2. Stimulus-Organism-Response (S-O-R) Theory

The Stimulus-Organism-Response (S-O-R) theory, which originates from the basic stimulus-reaction schema, plays a crucial role in understanding how external stimuli affect human internal experiences, leading to specific reactions. Initially introduced by Mehrabian and Russell (1974) and later expanded by Jacoby (2002), this concept focuses on the mediatory role of human internal experiences, which mediate between stimuli and reactions (Arora, 1982).

According to the S-O-R theory, an external signal (Stimulus) can influence the internal state of an individual (Organism) and result in specific behavior (Response). S-O-R emphasizes that the environment, with its diverse attributes, acts as a stimulus (S), affecting the psychological states of individuals (O), which in turn influences their behaviors and attitudes (R) (Habachi et al., 2024). In this context, the Stimulus (S) is an external factor that leads to a change in the individual's internal state. The Organism (O) refers to the internal processes through which individuals transform stimuli into perceptions, emotions, or experiences, while the Response (R) is the individual's final actions in reaction to the Stimulus (Li et al., 2012). As a result, this leads to specific approaches or avoidance of certain attitudes or behaviors, considered as psychological responses (Fang et al., 2017).

Understanding the processes underlying the S-O-R theory allows for better analysis and prediction of human behavior in various contexts. To date, this theory has been used in studies on consumer behaviors addressing issues such as the impact of online reviews on purchase intention (Zhu et al., 2020), consumer attachment to smartwatches (Cho et al., 2019), user-generated content regarding travel intentions among Generation Z (Yamagishi et al., 2023), factors influencing the use of fitness apps (Teng & Bao, 2022), user participation in online health communities (Zhou et al., 2023), factors determining football fans' loyalty (Rahman et al., 2024), gamification, engagement, and loyalty among users of sports apps (Habachi et al., 2024).

Despite the relatively extensive literature utilizing the S-O-R theory in consumer behaviors, little attention is paid to the role of stimuli that encourage physical activity, especially in relation to Generation Z representatives. Therefore, it can be stated that there is a research gap in this field, which the authors of this article attempt to at least partially fill.

3. Theoretical Assumptions for the Research Model

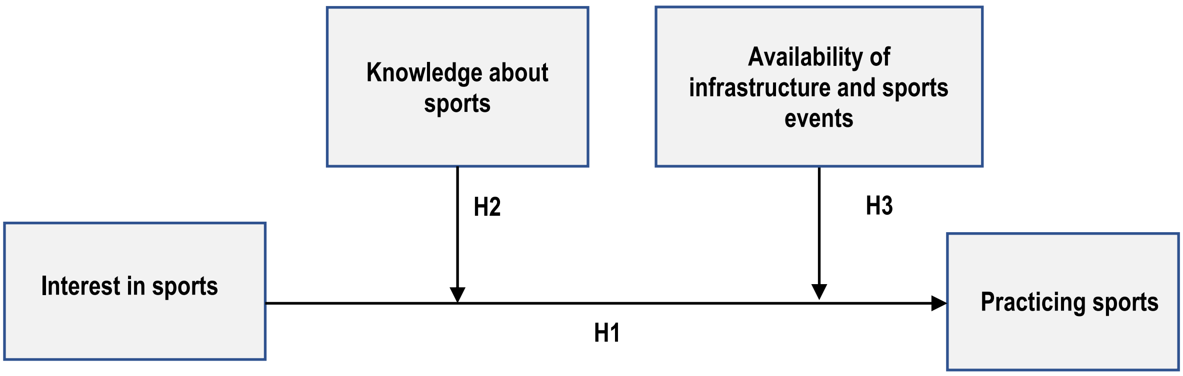
In the most general terms, consumers towards sports and physical recreation can adopt two opposing attitudes: passive, meaning lack of interest, or active, meaning interest in this sphere of everyday life. Interest in sports may or may not lead to sports participation, so making such an assumption requires its empirical verification. Referring to the S-O-R theory on which the research model is built, a three-part construct was developed, where the Organism is recognized as interest in sports and physical recreation, the Response as actual participation in this physical activity, and the Stimulus consists of two moderating variables.

The first relates to the mental sphere of the consumer and is associated with their level of knowledge about sports and physical recreation. Knowledge shapes consumer awareness and can influence the attitudes they adopt towards specific objects or phenomena (Cheah & Phau, 2011). In this understanding, knowledge is considered an internal determinant that shapes consumer attitudes and behaviors in the market. In the field of social sciences, knowledge about sports has been the subject of scholarly discussion, among others, in the context of its informal acquisition through digital technologies (Ye & Zhang, 2024), the relationship between coaches and athletes and their influence on the learning processes of students engaged in sports (Rey et al., 2022), and the connection between the knowledge possessed and the skills of football team players (Williams & Davids, 1995). The literature review conducted did not lead the authors of this article to publications where other researchers analyzed the relationship between knowledge about sports and physical recreation and consumer attitudes. Therefore, exploring the impact of the moderating variable of consumer knowledge about sports on the relationship between interest in sports and participation in sports is considered a new and unexplored area of research.

The second variable relates to hedonistic values, exemplified in the conducted studies by the availability of sports infrastructure and the opportunity to participate in sporting events. Both sports infrastructure and sporting events serve as an external determinant that can be a stimulus provoking specific attitudes and behaviors in consumers interested in physical activity. Atkinson et al. (2005) showed that the availability of appropriate sports infrastructure and an environment conducive to physical activity are positively correlated with residents' sports participation. In another study, a strong correlation was observed between the number of available swimming pools and participation in swimming classes, which may indicate that an increase in the number of swimming pools probably increases interest in this sports activity (Wicker et al., 2012). A friendly and properly arranged environment is a determinant factor for the level of physical activity among residents of a given destination. Many studies confirm that easy access to parks is associated with increased physical activity (Bedimo-Rung et al., 2005; Sallis et al., 2016; Kärmeniemi et al., 2018; Tcymbal et al., 2020). In the past, the poor quality of sports facilities was considered one of the reasons for the lack of interest in physical activity among consumers (Powell et al., 2006). Nowadays, as demonstrated by Clavel San Emetario et al. (2019), the quantitative and qualitative development of the fitness sector is considered one of the main factors successfully promoting behaviors related to physical activity in leisure time.

Factors that increase the accessibility of sports also include sporting events, both large-scale, where the consumption of sports manifests in watching the competitions of athletes (spectator sports), and those concerning amateur sports, such as running events, orienteering marches, or cycling competitions (participant sports) (Ramchandani et al., 2017; Lera-López et al., 2012). From the literature review, it is clear that despite numerous publications referring to the role of sports infrastructure or sporting events in promoting a healthy lifestyle, the impact of these factors on the strength of the relationship between interest in sports and participating in them has not been previously studied. As a result of the literature studies that were conducted, a research model was developed, which illustrates the relationships of interest to the authors of this article (Fig. 1).

Figure 1. Research Model



Source: Own elaboration.

Based on the presented model, the following three research hypotheses were proposed:
H1: Interest in sports has a positive impact on participating in sports;
H2: Knowledge about sports strengthens the relationship between interest in sports and participating in sports;
H3: The availability of sports infrastructure and events strengthens the relationship between interest in sports and participation in sports.

4. Method and Research Procedure

A survey was conducted using the CAWI technique to verify the proposed research hypotheses. The sample consisted of Generation Z representatives, i.e., individuals born between 1995 and 2010. A non-probabilistic sampling method was used to reach the respondents, utilizing the selection of typical units. Data were collected in the fourth quarter of 2024 in three metropolitan areas: Tricity, Poznań, and Warsaw, with some respondents residing in these large agglomerations, while others came from smaller towns and localities. In the introduction to the questionnaire, respondents were informed about the purpose of the study and the authors conducting the research and were assured of anonymity and voluntariness in providing responses.

A total of 432 correctly completed questionnaires were collected. Among the participants, 40% rated their physical activity as high or very high, 47% as moderate, and only 17% as low or very low. Nearly 75% of the respondents stated that taking care of their health is an important or very important priority for them, which may indicate their relatively high level of health awareness.

In examining the previously defined constructs, four original indicators were used for each. This decision was made because a review of the literature did not lead the authors to identify indicators that would be useful in this study. For this purpose, the authors, who have many years of research experience in the sports market, utilized their specialized knowledge and experience. Items for all constructs were measured on a five-point Likert scale (where 1 meant "strongly disagree" and 5 "strongly agree").

Interest in sports was measured using four items (e.g., "I keep up-to-date with information about sports and physical activity"), with a Cronbach's alpha of 0.679. The availability of infrastructure and events was examined through four items, for example, "At my school, university, or workplace, there is an opportunity to engage in organized forms of physical activity" (Cronbach's alpha = 0.680). The remaining two constructs were formative. Participation in sports was measured using four items (e.g., "I engage in sports or physical activity at least three times a week") with a low level of correlation between items ranging from 0.154 to 0.307. Knowledge about sports was measured using four items, for example, "Long (at least 30 minutes) and moderate physical effort is more conducive to burning fat than intense, short exercises." The correlation between items was low and ranged from 0.055 to 0.243.

The study utilized Hayes' double moderation model (model 2). A bootstrapping procedure with 5,000 resamples was applied. Data analysis was performed using the PROCESS algorithm (ver. 4.2) as an add-on to SPSS (ver. 29). Before proceeding with the analysis, variables were centered to reduce multicollinearity, which is a recommended action in the context of moderation research.

5. Research Results

To test the hypothesized moderating effects of two constructs, namely knowledge about sports and the availability of sports infrastructure and events on the relationship between the other two constructs, i.e., interest in sports and participation in sports, an analysis was conducted using Hayes' PROCESS algorithm (Model 2). The results indicate that the model as a whole is statistically significant $F(5, 424) = 37.77$, $p < 0.001$ and explains 30.82% of the variance in the dependent variable (participation in sports). In the field of social sciences, such a result is considered satisfactory (Ozili, 2023). Predictor variables, i.e., interest in sports, knowledge about sports, availability of infrastructure and sports events, and their interactions, explain a significant portion of the variability in the level of sports participation.

The results concerning the main effects are presented in Table 1. They indicate a strong, positive relationship between interest in sports and participation in sports ($B = 0.6316$, $p < 0.001$). Of the other two predictors, a direct significant effect was observed for knowledge about sports ($B = 0.2126$, $p = 0.0102$), while no significant direct impact of the availability of infrastructure and sports events on sports participation was observed ($B = -0.0239$, $p = 0.6191$), where the confidence interval includes the value 0.

Table 1. Moderation Analysis Results (Main Effects)

Variable	B (Coefficient)	SE (Standard Error)	t	p	Lower Interval (LLCI)	Upper Interval (ULCI)
Constant	-0.0287	0.0373	-0.7701	0.4416	-0.1019	0.0445
Interest in sports	0.6316	0.0520	12.1482	<0.001	0.5294	0.7338
Knowledge about sports	0.2126	0.0824	2.5792	0.0102	0.0506	0.3747
Availability of infrastructure and events	-0.0239	0.0480	-0.4975	0.6191	-0.1182	0.0705
Constant	-0.0287	0.0373	-0.7701	0.4416	-0.1019	0.0445

Source: Own elaboration based on empirical research.

The effects of the interaction between the two moderating variables are presented in Table 2. The results indicate that the interaction between knowledge about sports and the relationship between interest in sports and participating in sports is statistically significant (B = 0.3038, p = 0.0042). Such results mean that the influence of interest in sports on participating in sports increases as knowledge about sports increases.

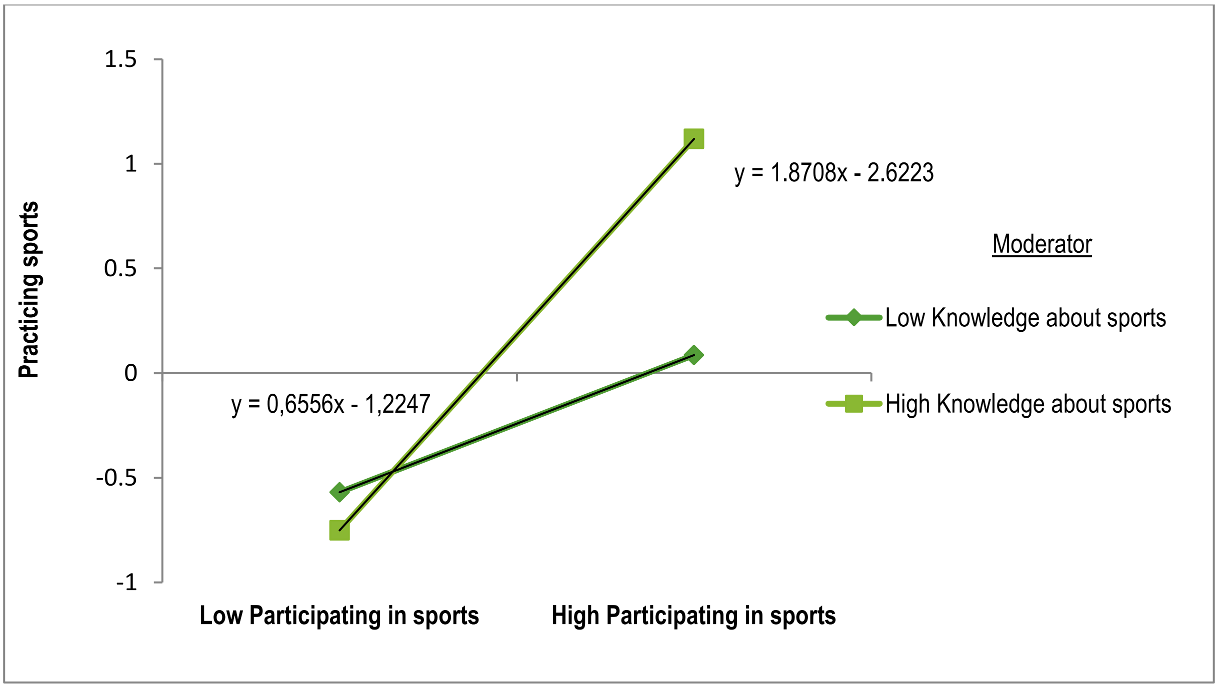
Table 2. Moderation Analysis Results (Interaction Effects)

Interaction	B (Coefficient)	SE (Standard Error)	t	p	Lower Interval (LLCI)	Upper Interval (ULCI)
Interest in Sports × Knowledge about Sports	0.3038	0.1056	2.8782	0.0042	0.0963	0.5113
Interest in Sports × Availability of Infrastructure and Events	0.0032	0.0639	0.0493	0.9607	-0.1225	0.1288

Source: Own elaboration based on empirical research.

To better illustrate the observed interaction, its results are presented graphically in Figure 2. Although interest in sports translates into a higher level of sports participation among both individuals with low and high levels of knowledge, the relationship is stronger among those with higher knowledge. This is illustrated by the shallower slope of the line for the group with lower knowledge levels, as shown in Figure 2.

Figure 2. Moderating Effect of Sports Knowledge



Source: Own elaboration based on empirical research.

The increase in explained variance due to the observed interaction is statistically significant ΔR^2 = 0.0135, p = 0.0042, although it is relatively small, accounting for 1.35% of the explained variance.

The second moderating variable, i.e., the availability of sports infrastructure and events, did not have a significant impact on the strength of the relationship between interest in sports and participation in sports (B = 0.0032, p = 0.9607). This means that regardless of the perceived availability of infrastructure and sports events, the relationship between interest in sports and participation in sports remains unchanged.

6. Discussions and Limitations

The study indicates that efforts to promote sports and physical activity among Generation Z should primarily focus on increasing their knowledge about sports, i.e., target the mental sphere. It appears that providing this consumer segment with access to modern sports infrastructure and events that appeal to hedonistic values is less effective in shaping habits of sports participation and recreation. This conclusion somewhat weakens previous findings of other studies that have shown a positive correlation between the availability of sports infrastructure and the physical activity of various consumer groups. The study conducted by the authors sheds new light on the conditions shaping the relationship between interest in sports and its practice. Previously, stimuli of a hedonistic nature, providing pleasure, joy, and opportunities for distinction and expression, were considered leading in the process of shaping consumer attitudes and behaviors in the sports market. However, the significance of the mental sphere of consumers seems to have been overlooked or marginalized, although it may play a much larger role than previously thought.

The authors of the article are aware of the limitations of the study, both in terms of its exploratory and cognitive nature. Primarily, although the study was conducted on a relatively large sample of respondents, they were only selected from a few chosen locations. It is important to remember that the respondents' answers were subjective, and issues such as the level of knowledge or access to infrastructure and sports events could have been assessed realistically or perceived individually. The type of physical activity practiced by respondents could also have influenced their responses. Some sports activities, such as running, Nordic walking, or cycling, do not require as extensive infrastructure as swimming, sport shooting, or climbing.

Generation Z representatives, although they represent a strictly defined, generally accepted age group, still constitute a heterogeneous community. To gain greater certainty in the conclusions drawn from the study results, they should be confronted with the demographic or psychographic characteristics of this generation. The relationships examined in this study also take the form of feedback. Longitudinal studies, including Granger causality tests or experimental research, would be useful in checking this direction of influence.

Conclusions and Further Research

The research findings make a significant contribution to the current state of knowledge on the determinants that motivate young people to participate in sports and physical activity. In particular, the results demonstrate that knowledge plays a crucial role in shaping physical activity among Generation Z members, even more so than factors such as the availability of sports facilities. This highlights a novel perspective on how to effectively encourage this generation to participate in sports.

Although it is commonly believed that Generation Z members are often driven by hedonistic impulses and seek values associated with pleasure, conspicuous consumption, and self-expression, the conducted research has shown that at least in some areas this is not the case. Factors located in the mental sphere, such as the knowledge analyzed, more than those related to convenience or the availability of facilities or sports events, incline them to an active lifestyle based on sports and physical recreation. The results of the presented studies do not undermine or diminish the role of sports infrastructure, which has been repeatedly emphasized in scientific publications as a determinant of interest in physical activity, but they highlight the importance of knowledge, which until now has not been the subject of research in this area and was not associated with greater motivation to engage in sports activities. This discovery not only has cognitive value that may contribute to further, in-depth research but also practical value. It turns out that institutions responsible for the development of physical culture and sports, both at the central and local levels, in addition to investing in sports infrastructure or subsidizing sports events, should pay more attention to information policy and shaping knowledge about sports among Generation Z.

Credit Authorship Contribution Statement

Zygmunt Waśkowski: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization
Liwia Delińska: Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization
Tomasz Wanat: Methodology, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have used generative AI in the writing process before submission, but only to improve the language and readability of the paper and with the appropriate disclosure.

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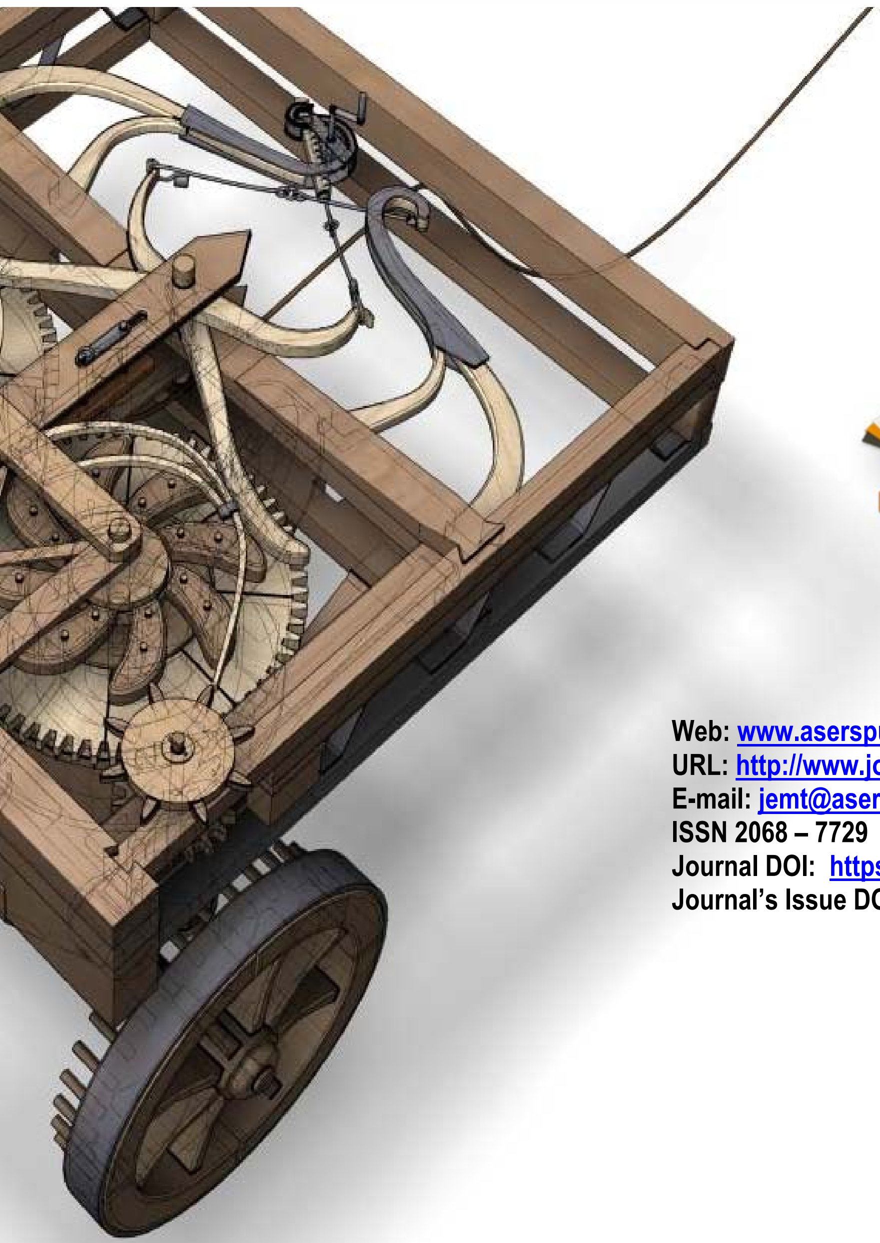

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