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Awareness and Perception of Electromobility among Young Consumers: Survey Results

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ABSTRACT

Objective: The purpose of the article is to analyse the knowledge, opinions, and attitudes of young consumers regarding electromobility.

Research Design & Methods: The analysis is based on a computer assisted web interviewing survey conducted among young consumers attending the Krakow University of Economics. The results were analysed using frequency distribution analysis and a chi-squared independence test. We used Cramér's *V* to determine the degrees of association among the variables.

Findings: The study shows that the surveyed group of respondents exhibits a moderate level of knowledge about electromobility and the environmental impact of electric vehicles. According

to the respondents, the most substantial barrier to electromobility is the availability of charging stations and the cost of purchasing electric vehicles.

Implications/Recommendations: The present study addresses part of a research gap found in the literature concerning young consumers' knowledge and opinions about electromobility.

Contribution: The research contributed to new insights about the knowledge, attitudes and opinions of young consumers about electromobility.

Article type: original article.

Keywords: electromobility, sustainable transport, environmental awareness, sustainable development.

JEL Classification: O13, O18, Q42, Q56.

1. Introduction

The growing public interest in electromobility is driven by such factors as excessive greenhouse gas emissions, local pollution (Bjerkan, Nørbech & Nordtømme, 2016), or the struggle for national energy security as the energy market evolves (Niedziółka, 2024, p. 12). Energy security is among the pivotal policy issues in the European Union because the green transition and energy dependency of its member states are critical components of international politics (Nyga-Łukaszewska & Napiórkowski, 2023, p. 209). Electromobility is a road transport system where the driving energy is electricity (Alogdianakis & Dimitriou, 2023). Whether or not electromobility will be achieved hinges on technological challenges and social changes, such as the attitude of the public towards the electrification of private and public transport (Grauers, Sarasini & Karlström, 2013; Degirmenci & Breitner, 2017; Lin & Wu, 2018). Electrification of private and public transport is a vital part of zero-emission transport, whereas sustainable transport and environmental protection are priorities of the transport policy (Zawieska, 2019). The growth in electromobility is motivated by the search for independence from oil, leading to reduced vehicle-derived pollution (Wodnicka & Malinowski, 2023). Nevertheless, many studies and governmental analyses disregard the social aspect, such as consumers' attitudes towards a complete electrification of private transport (Liao, Molin & van Wee, 2017; Lin & Wu, 2018).

Sales of passenger cars (including electric cars) have been growing in the European Union. In 2023, passenger cars sold in the EU by fuel type amounted to petrol at 35.3%, diesel at 13.6%, battery electric vehicles (BEV) at 14.6%, plug-in hybrid electric vehicles at 7.7%, hybrid electric vehicles at 25.8%, and APV other than electric at 3.0%. The same data for Poland show petrol car sales at 41.7%, diesel at 9.9%, BEV at 3.6%, plug-in hybrid electric vehicles at 2.8%, hybrid electric vehicles at 39.4% and APV other than electric at 2.6% (Statista, 2023).

The most important stimuli for electromobility include tax credits, subsidies, preferential rates for owners of electric vehicles, and fee exemptions. The main threats (barriers) to its growth include greater electricity demand, high variability in electric vehicle prices, high initial cost of purchase, potential restrictions on financial support for electric vehicle owners, and stagnation in charging infrastructure development (Bondar *et al*., 2023).

2. Legal Framework for Electromobility Growth in the European Union and Poland

Transition to a low-emission (carbon-neutral) economy is a priority for the European Union. The European Commission intends for Europe to become carbon neutral by 2050 through the decarbonisation effort (Kud, 2019, p. 147). It may prove to be an infeasible goal because four states (Czechia, Hungary, Estonia, and Poland) did not back the idea at a 2019 meeting because of the excessive costs it would cause to their economies. The European Commission, Council of the European Union, and European Parliament agreed on reducing CO_2 emissions from passenger cars and light commercial vehicles on 27 October 2022. The accepted proposal provides for zero-emission road mobility by 2035 (reduction of exhaust gas emissions by 100% compared to 2021) (European Parliament, 2023).

The relevance of electromobility and electric vehicles in Poland grew after the Ministry of Energy published its Plan for Electromobility Development in Poland – Energy for the Future in 2016 (Gov.pl, 2024). The Responsible Development Strategy until 2020, extendable until 2030 (RDS) adopted by Poland is a response to the European Union policy declared in Directive 2014/94/EU (adopted with Resolution No. 8 of the Council of Ministers of 14.02.2017, Official Gazette of the Government of the Republic of Poland item 260). Particular implementing programmes for the strategic goals of the RDS were: Plan for Electromobility Development in Poland. Energy for the Future (adopted 16.03.2017), National Framework for the Policy of Development of Alternative Fuel Infrastructure (adopted 29.03.2017) (European Commission, 2017), Act on electromobility and alternative fuels (adopted 11.01.2018, Polish Journal of Laws of 2020, item 908), and Act establishing the Low-emission Transport Fund (adopted 6.06.2018, Polish Journal of Laws of 2018, item 1356, as amended).

The purpose of the article and the study it reports is to analyse respondents' knowledge, opinions, and attitudes regarding electromobility. The goal was pursued with a structured questionnaire survey. The focus of the analysis was to investigate the knowledge of young consumers and the factors affecting their opinions and attitudes regarding electromobility.

The paper poses the following research hypotheses: (H1) respondents exhibit low levels of knowledge regarding the impact of battery electric vehicles (BEV) on

the environment, and (H2) the respondents believe that the cost of purchase of new electric vehicles and availability of charging stations are the biggest barriers to the development of electromobility.

The next research step is to analyse the decisions resulting from the attitudes of the respondents. The study attempts to answer three main research questions:

Q1: What is the level of knowledge of electromobility among the analysed group of respondents?

Q2: What is the opinion on electromobility among respondents?

Q3: What are respondents' behaviour patterns regarding the use of electric public transport?

3. Literature Review

Our literature study of surveys on electromobility in Poland revealed a diversity of respondent characteristics, survey periods, and research methods (Table 1).

Table 1. Review of Surveys on Electromobility in Poland

Author (Year)	Research Tool, Respondent Profile (Sample Size), Study Period
Gis, Menes & Waśkiewicz (2016)	Original survey questionnaire drafted at INFAS A.G., household representatives (370), 2013–2014
Kud (2019)	Original survey questionnaire, residents of Podkarpackie voivodeship, Poland (522), 2019
Polish Alternative Fuels Association – PAFA (Polskie Stowarzyszenie Paliw Alternatywnych, 2020)	Questionnaire by the PAFA, adult drivers (1,213), 2020
Lewicki *et al*. (2021)	Original survey questionnaire (online CAWI), adult private owners and drivers of ICE vehicles (1,000), 2020
Kowalska-Pyzalska *et al*. (2022)	Telephone survey (CATI) and online CAWI survey, adults who purchased a vehicle in the last 6 months or intended to buy one in the next 12 months (1,002), 2020
Sobiech-Grabka, Stankowska & Jerzak (2022)	Original survey questionnaire (drafted using Survio), adult residents of cities with more than 50 thousand people (198), 2021
Adamczyk *et al*. (2024)	Original survey questionnaire (online), adults (413), 2021–2022

Source: own study, based on literature research.

Gis, Menes, and Waśkiewicz (2016) discussed the problem of private electromobility in the context of car user studies. Having analysed the responses, the authors concluded that it was necessary to disseminate knowledge on the economic aspects of electric vehicle use. Most respondents shared that they were not planning to buy

an electric vehicle in the future, considering their financial capabilities. Apart from the initial cost, the respondents highlighted limited range and high unit operating cost as the main drawbacks. One essential and alarming observation was that the respondents unquestioningly believed that the popularity of electric vehicles affects environmental well-being. Apart from financial reasons, the respondents considered the accessibility of public charging points for electric vehicles as a relevant factor.

In Kud's (2019) research, the author investigated the perception of barriers to electromobility in the context of environmental attitudes of residents of Podkarpackie voivodeship (Poland). The study confirmed the hypothesis that the perception of electromobility depends on the environmental attitude. The respondents considered high vehicle prices, shortage of charging stations, short range, poor information availability, lack of financial incentives, non-existent used vehicle market, and technical problems as the primary barriers for the growth of electromobility.

The *New Mobility Barometer 2019/2020* report by Polish Alternative Fuels Association (Polskie Stowarzyszenie Paliw Alternatywnych, 2020) offers numerous interesting conclusions from its survey. Electric vehicles were popular among men and women to a similar degree. They were most appreciated by young and middle-aged people living in single-family houses. The good reputation of electric vehicles stemmed mostly from lower operating costs and environmental considerations. The study demonstrated an insufficiency of appropriate sources of information about electric vehicles. It was the main cause of the low level of knowledge about electric vehicles, mainly maintenance, operating costs, and use, according to the respondents. Users of electric vehicles believed that their major flaws included price and range.

Lewicki *et al*. (2021) evaluated consumer attitudes towards electromobility. They attempted to identify the primary determinants of electric vehicle purchasing decisions in Poland. Most respondents were not interested in buying an electric vehicle on the five-year horizon if a Polish manufacturer appeared on the market. Most respondents pointed out high prices and lower operating costs compared to internal combustion engine (ICE) vehicles. Nearly half of the respondents answered that the home electric socket was the best charging method, and almost one-third expected a battery replacement service.

An article by Kowalska-Pyzalska *et al*. (2022) presented results of an analysis of consumer preferences regarding alternative-fuel vehicles. The respondents counted safety, price, availability of charging stations, and technical service as critical characteristics of alternative vehicles. Based on their results, the authors called for efforts to support the development of such vehicles. They recommended that manufacturers focus on improving the safety and range of electric vehicles. Governments, on the other hand, should consider higher subsidies and improve charging infrastructure.

Respondents in a survey by Sobiech-Grabka, Stankowska, and Jerzak (2022) considered the price, appearance, segment/class, equipment, and advantages of electric drive as the main determinants for purchasing an electric car. The study identified the need for long-term information campaigns to advertise the benefits of electric vehicles in such areas as performance, technology, or positive environmental impact.

In a study by Adamczyk *et al*. (2024), the respondents expected lower purchase prices, lower charging costs, better charger accessibility, and longer range from the electric vehicle market. The study further emphasised the poor level of knowledge among the Polish public regarding the adverse impact of electric vehicles on the environment.

The literature discussed so far directly pertains to the results of survey-based research on electromobility in Poland. However, the literature review also reveals a growing interest in analysing this issue from alternative perspectives. The challenges of electromobility have been examined in relation to organisational (Lewicki, 2018b), economic (Lewicki, 2018a), technical, infrastructural, and social barriers (Zaniewska-Zielińska, 2018), as well as the lack of coherence between environmental goals and the country's energy policy (Tomaszewski, 2019). Selected determinants of electromobility development, such as pro-environmental trends, operating costs, and technological availability, have been discussed in the study by Janczewski (2017). Motowidlak and Górniak (2022) attempted to identify the most critical factors for the development of electromobility within the context of sustainable mobility systems. The benefits and challenges associated with implementing electric transport in Poland were the focus of Wierzbowski's (2019) analysis. Meanwhile, Hoffmann (2023) highlights the legal and social challenges related to the development of electromobility in Poland.

4. Design and Research Methodology

We investigated the knowledge, attitudes, and opinions concerning electrification with an original survey questionnaire. The survey and the entire research process followed the principles of anonymity and voluntary participation. This way, the respondents were not limited in expressing their opinions. The survey population consisted of first- and second-cycle students at the Krakow University of Economics. The method of collecting surveys was consistent with convenience sampling and is not applicable to all young consumers in Poland as the general population. It was a pilot study conducted from February to September 2023. The layout of the results reflects the questionnaire structure.

The survey utilised an original questionnaire (*Twenty-first Century Consumer Challenges and Threats: Electromobility*). The survey method was CAWI (computer-

-assisted web interviewing). This method was selected because it offers higher potential to reach more respondents. The survey questionnaire was delivered electronically (as a Google form) to respondents who opted in. The questionnaire included 19 questions in four sections:

– section 1: background information,
– section 2: respondents' knowledge of electromobility,
– section 3: respondents' opinion about electromobility,
– section 4: respondents' attitudes towards electromobility.

The results were analysed across three domains: knowledge, opinions, and attitudes, as per the sections of the questionnaire. The background section concerned the respondents' sex, residence, education (technical vs. non-technical), and socio-professional status.

The survey questionnaire contained single- and multiple-answer questions. The results were analysed using frequency distribution analysis and a non-parametric chi-square test. The degree of association among the dependent variables was determined with Cramér's *V*. The analyses were conducted in Statistica 13.1 (StatSoft Polska).

5. Research Results

5.1. General Remarks

The survey resulted in 380 correctly completed questionnaires (100% return rate, $N = 380$). Table 2 presents the sample profile by respondents' sex, residence, education (technical vs non-technical), and socio-professional status.

Table 2. Profile of the Sample ($N = 380$)

Specification		Structure	
		Number	Percentage
Sex	female	221	58.2
	male	159	41.8
Residence	rural area	104	27.4
	town with up to 500,000 residents	101	26.6
	city with over 500,000 residents	175	46.1
Education	year 1	199	52.4
	year 2	79	20.8
	year 3 and over	102	26.8

Table 2 cnt'd

Specification		Structure	
		Number	Percentage
Technical profile	yes	112	29.5
	no	268	70.5
Economic activity status	economically active	227	59.7
	economically inactive	153	40.3
Total		380	100

Source: own study.

Most of the sample were women (58.2%), while men constituted 41.8%. The two dominant groups were residents of cities with over 500,000 people (46.1%) and first--year students (52.4%). Over 70.5% of the respondents were non-technical students. Most of the sample were economically active (59.7%). Figure 1 shows the mobility profile of the respondents.

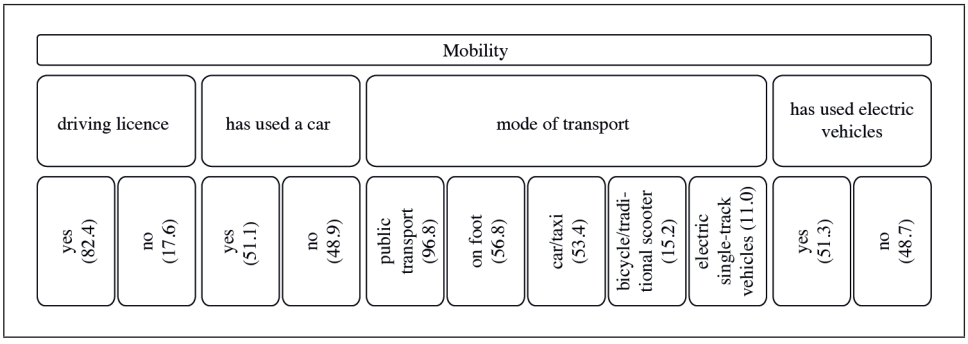

Fig. 1. Respondent Mobility (in %)

Notes: Mode of transport – maximum three answers.

Source: own study.

The vast majority of the respondents had a driving licence when completing the questionnaire (82.4%), but only half of the participants were active car users (51.1%). Most used petrol cars (62.4%). More than half of the respondents confirmed that they had driven an electric vehicle at least once (51.3%). Among them, 68.9% indicated an electric scooter, while 37.9% reported driving an electric car. The main transport mode for the respondents was a bus (79.7%), with a car coming in second (37.9%), demonstrating increased mobility.

5.2. Self-assessment of Knowledge and Awareness of Electromobility

The frequency distribution of answers to the multiple-answer question about the comprehension of the notion of electromobility is presented in Table 3.

Table 3. How Respondents Understand Electromobility

Definitions	Symbol	Total (%)
The notion concerns both technical and operational aspects of electric vehicles, technology, and charging infrastructure	A	60.0
Electromobility concerns social, economic, and legal matters linked to the design, production, purchase, and use of electric vehicles	B	50.3
All issues related to the use and operation of electric vehicles	C	49.7
Electromobility concerns economic matters related to the development of electric and hybrid vehicles	D	30.0
The notion concerns only the technical aspects of electric and hybrid vehicles	E	15.8
All issues related to the use and operation of ICE vehicles	F	6.1

Source: own study.

The respondents correctly interpreted the notion of electromobility. Over half of them (60%) selected answer A. The same applies to B (50.3%) and C (49.7%). Women selected A more often (61.5%) than men (57.9%). Answers C and E were more often selected by men (C: 57.9%, E: 17%) than women (C: 43.9%, E: 14.9%) (Fig. 2).

Residents of rural areas more often chose answer A (63.5%) than people living elsewhere. Residents of cities with over 500,000 people most often chose answers C (55.4%) and E (17.7%). Second-year students most often chose answers A (68.3%) and C (53.2%), while answer E was most common among third-year and older students (21.6%). The type of studies was relevant because students of technical fields selected mostly the right answers, A (62.5%) and C (52.7%). There was not much distinction between economically active and inactive students. Answer A was selected by 58.8% of economically active and 60.8% of economically inactive students. Answer C was selected by 51.6% of active and 48.5% of inactive students. Answer E was selected by 15.7% of economically active and 15.9% of economically inactive students. Variables "having a driving licence" and "having a car" offer some interesting insights. In both cases, people without a driving licence and without a car gave more correct answers. It demonstrates that knowledge of electromobility is not always linked to these characteristics.

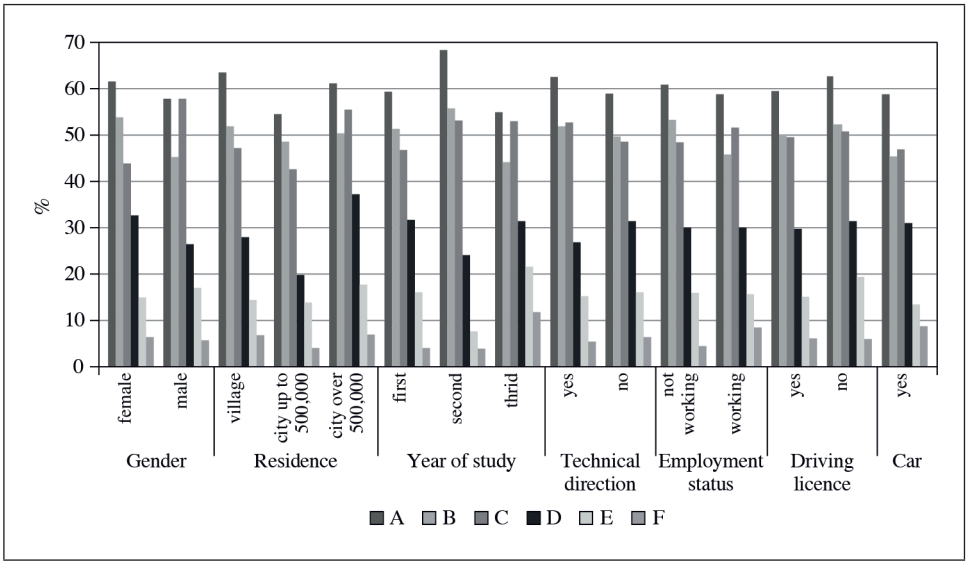

Fig. 2. Understanding of Electromobility by Socio-demographic Characteristics (in %)
Source: own study.

Table 4. Results of Chi-square Independence Test for Knowledge about Electric/Hybrid Vehicles and Socio-demographic Features

Specification	Socio-demographic Characteristics[a]						
	Sex	Residence	Year of study	Education	Economic activity	Driving licence	Car
Chi-square value	9.483	0.081	7.209	10.569	7.079	4.054	8.480
p value	0.002	0.960	0.027	0.001	0.008	0.044	0.004
Cramér's *V*	0.156	–	0.138	0.165	0.135	0.105	0.148

[a] Categories as in Figures 1 and 2.

Source: own study.

The independence test indicated that knowledge of electromobility is independent only of the place of residence (Table 4). The test confirmed the association for the other socio-demographic variables. Values of Cramér's *V*s indicate a moderate association.

5.3. Respondents' Opinions about Electromobility

The frequencies of answers concerning the benefits of and barriers to electromobility development and respondents' opinions in this regard are shown in Figure 3.

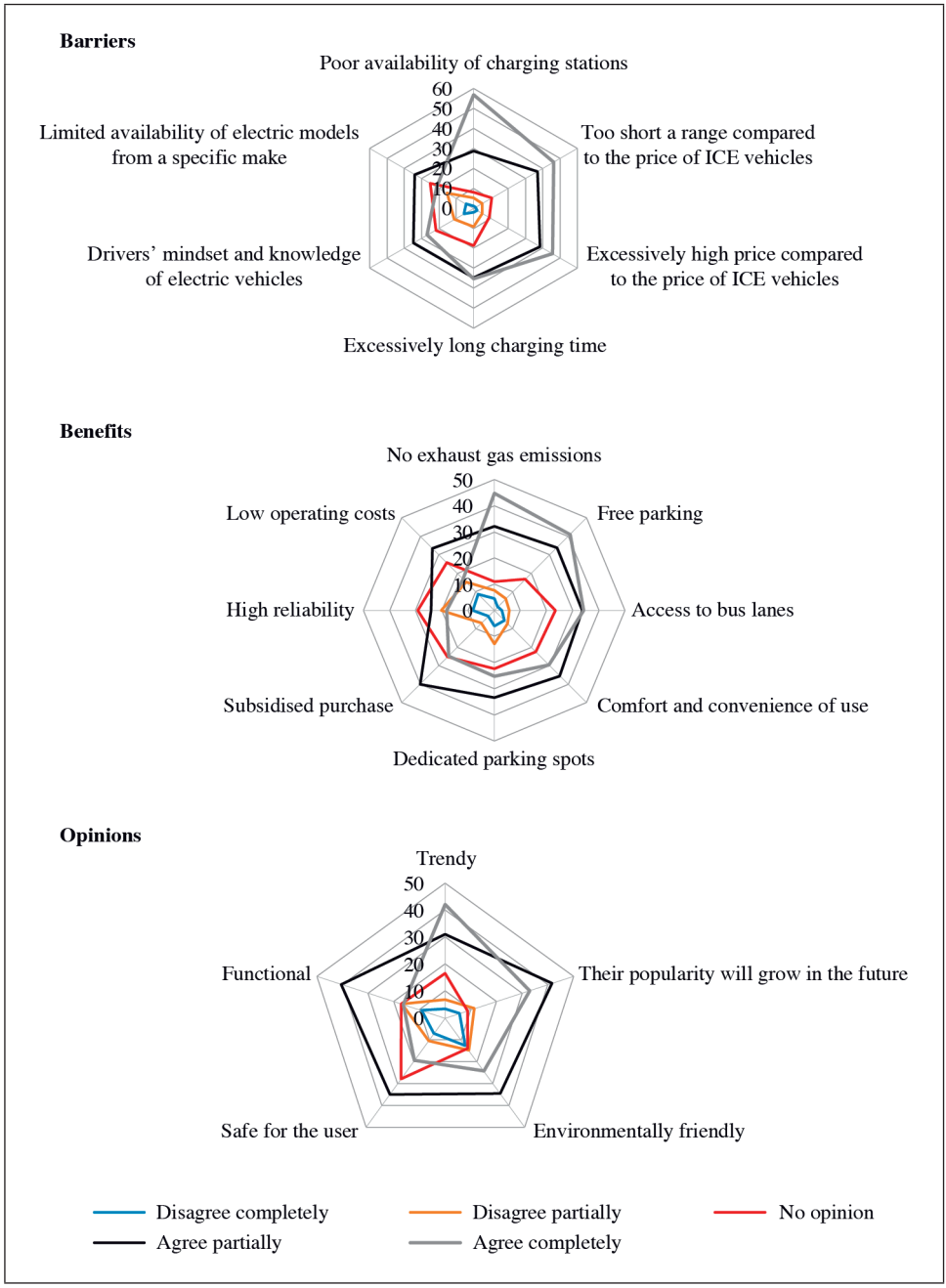

Fig. 3. Respondents' Opinions about Electromobility (in %)

Source: own study.

A group of 42% of the respondents believed that the popularity of electric vehicles was driven by the electromobility fad. One-third of the respondents (33%) agreed that electric vehicles would grow more popular in Poland. Nearly two-thirds agreed (59% "agree completely" and "agree partially") that electric vehicles were environmentally friendly. The respondents agreed that the most significant barrier to electromobility is the insufficient availability of charging stations (56.8%), which is improving but not fast enough considering the demand and volumes of electric cars sold. Short range compared to ICE vehicles was another barrier pointed out by the respondents (46.3%). It is because although the range is increasing, it is insufficient in light of the availability (number) of charging stations.[1] The last major factor detrimental to the growth of electromobility listed by the respondents was excessive prices compared to ICE vehicles (45.5%). Nevertheless, considering answers "agree completely" and "agree partially," one can identify other barriers critical to the growth of electromobility and the popularity of electric vehicles in Poland. These include "excessively long charging," "drivers' mindset and knowledge about electric vehicles," or "limited availability of specific models of cars." Most of the respondents unambiguously listed the three most prominent benefits of electric vehicles: no exhaust gas emissions (44.7%), free parking (41%), and access to bus lanes (34.2%). The respondents explicitly considered these advantages as critical for the development of electromobility in Poland. One can suppose that those participants who were sceptical about these answers exhibit a negative attitude toward the competitive advantage of electric vehicles compared to conventional (ICE) vehicles.

5.4. Respondents' Attitudes towards Electromobility

Respondents' attitudes to purchasing and using electric vehicles are shaped by the administrative environment, financial factors, and their knowledge and opinions. The structured responses to the propositions testing attitudes towards electromobility among respondents are presented in Figure 4. The first observation regarding the attitudes towards factors affecting electric vehicle purchasing decisions is that they unanimously ("agree completely") concerned the availability of charging stations, safety, purchase cost, charging time, and user comfort. Their answers confirm the respondents' accord in the belief that their opinions and attitudes towards purchasing an electric vehicle and developing electromobility in Poland were shaped mostly by the availability of charging stations (64.7% "agree completely" and 25.5% "agree partially").

[1] There were 108,331 electric passenger cars and 6,490 charging points in Poland in March 2024 (PZPM, 2024, data from 1 April 2024).

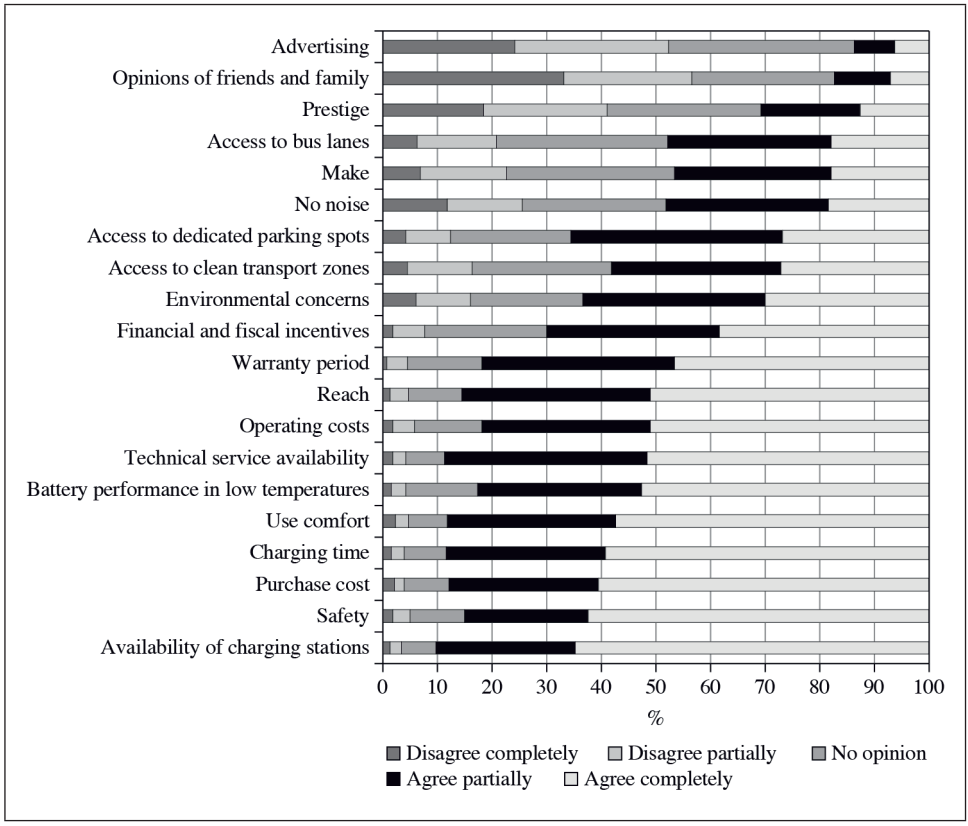

Fig. 4. Respondents' Attitude towards Determinants of Purchasing Decisions Concerning Electric Vehicles (in %)

Source: own study.

More than half of the respondents agreed completely that such factors as the impact of low temperatures on battery performance (52.6%), availability of service points (51.6%), operating costs (51%), and range on a charge (51%) are critical for purchasing decisions. Negative opinions about purchasing decision determinants ("disagree completely" and "disagree partially" in total) concerned advertising (52.4%), opinions of family and friends (56.6%), and prestige related to such vehicles (41%).

Moreover, such factors as operating costs and the impact of low temperatures on battery performance increase the cost of ownership due to relatively short battery life and replacement. The respondents showed interesting attitudes regarding the range of electric cars that would be acceptable to them if they were to buy one (Table 5). The largest group (24.2%) indicated an interval of 501–600 km. A lower

range of 401–500 km was chosen by 21.3% of the respondents, while a mere 13.7% chose 601–700 km. It should be noted that this preference depends on the individual needs of the respondents and the distances they cover.

Table 5. Respondents' Attitude towards Determinants of Purchasing Decisions Concerning Electric Vehicles

Specification		Structure	
		Number	Percentage
Range per charge (km)	101–200	4	1.1
	201–300	27	7.1
	301–400	47	12.4
	401–500	81	21.3
	501–600	92	24.2
	601–700	52	13.7
	701–800	40	10.5
	over 800	37	9.7
Charging method	home charging station	242	63.7
	public charging station	120	31.6
	battery replacement	18	4.7
Total		380	100

Source: own study.

Nearly two-thirds of the respondents (63.67%) preferred a home charging station, while 31.6% indicated public charging stations. Only 4.7% of the respondents believed that the best method of "charging" a car would be to replace the battery, which is beyond any doubt another innovative solution that could convince customers to buy an electric vehicle.

6. Discussion

Climate change drives more rapid efforts to curb pollution. Actions taken by European Union member states clearly define their horizon and identify the private and public transport sectors as needing a thorough transformation. A large part of the EU budget is earmarked for initiatives for electromobility to build new infrastructure, develop transport systems, and upgrade fleets. The implementation of EU laws by the Polish government provides for the same or even stricter emission reductions. In a way, the faulty deployment of electromobility solutions in Poland (especially in public transport) mainly involves subsidies for electric buses and urban infrastructure (such as charging stations). This is because the primary energy

carrier used in electricity generation in Poland is fossil fuels, which drives the need for electromobility and renewable energy sources (Wierzbowski, Filipiak & Lyzwa, 2017).

The present study employs an original survey questionnaire to investigate factors affecting electromobility development according to respondents' beliefs and attitudes. The respondents' relevant knowledge level was verified as well. The data were analysed in terms of answer frequency distribution. Independence hypotheses were also verified for selected variables. The analysis demonstrates that the respondents consider the electrification of public and private transport as a positive and prudent effort.

The present survey is consistent with the conclusions of other researchers (including Gis, Menes & Waśkiewicz, 2016; Kud, 2019; Lewicki *et al*., 2021; Sobiech-Grabka, Stankowska & Jerzak, 2022) that the purchase price of electric vehicles remains too high and offers no competitive advantage over ICE vehicles. Therefore, further efforts to boost electromobility in Poland and the electrification of private transport should focus on the demand side and improving the knowledge and awareness of consumers. It could include purchase incentives. However, they are not a long-lasting solutions and do not improve consumer knowledge.

The respondents consider the charging method a critical determinant of electromobility development. Nearly 64% indicated a home charging station, which is consistent with other studies (Lewicki *et al*., 2021). It may be because respondents living in single-family houses have unrestricted access to self-generated electricity. Nearly 32% of the respondents prefer public charging stations, which is also consistent with other studies (Kud, 2019; Kowalska-Pyzalska *et al*., 2022; Adamczyk *et al*., 2024). The third type of charging method is battery replacement, indicated by nearly 5% of the respondents. This method was reported by Lewicki *et al*. (2021) as preferred by nearly one-third (32%) of the respondents. It shows the need for improved charging methods in terms of procedures and duration. Only 20% of the respondents in the study conducted by Lewicki *et al*. (2021) indicated public charging stations. The reason was insufficient public charging station infrastructure.

Operating costs are another factor affecting electric vehicle purchase decisions among the respondents. The present survey did not back the results of other researchers in this regard because the respondents' perceptions varied. The largest group (33.4%) agreed partially that low operating costs are the primary advantage of electric vehicles and electromobility. In a study by Gis, Menes and Waśkiewicz (2016), the respondents indicated that "electric vehicles offer lower operating costs compared to conventional cars" (7.8%). The authors believed this perception of the financial factor stemmed from unverified intuitions. According to *New Mobility Barometer 2019/2020* by Polish Alternative Fuels Association (Polskie Stowarzyszenie Paliw Alternatywnych, 2020), young and middle-aged people are

the most open to electric vehicles (66.1%). This group considers operating costs an argument for buying an electric vehicle (75.6%) as they perceive them to be low. In a study by Lewicki *et al*. (2021), most respondents (64.0%) indicated that the operating costs of electric vehicles were lower than for ICE vehicles. Other studies corroborate this attitude (Szumska, Jurecki & Pawelczyk, 2019). It may stem from consumer ignorance regarding the high operating costs of electric vehicles, such as battery replacement or repairs.

Another important aspect of electromobility perception among the respondents is its environmental impact. Most believed electromobility to be environmentally friendly and green (nearly 59.0% agreed with this statement completely or partially). The result is consistent with other studies in this field, which also found a positive association between the intent to use electric vehicles in private and public transport and environmental benefits. In a survey by Gis, Menes and Waśkiewicz (2016), 18.1% of the respondents believed that "electric drive systems will help reduce air pollution" and "will help reduce fossil fuel consumption" (17.1%). The authors pointed out that it manifested a naive perception of electric vehicles in the context of their environmental impact. Respondents in a study by Adamczyk *et al*. (2024) indicated that BEVs generated less pollution than ICE vehicles (63.9%). The researchers interpreted these results as an example of poor knowledge of the adverse environmental effects of electric vehicles as compared to ICE vehicles. Sobiech-Grabka, Stankowska and Jerzak (2022) identified a need to disseminate knowledge and information about the advantages of electric vehicles in such domains as their advantageous environmental impact.

Convincing the public to accept the idea is critical for the success of electromobility. Local actions may prove to be the most effective. Considering socio-economics, present and potential users of electric vehicles can be more easily motivated to take desired actions by offering them advantageous conditions for adopting such solutions. For example, Scandinavian countries have numerous benefits for electric car users. They can use bus lanes, register battery electric vehicles and fuel cell electric vehicles for free, park and use motorways for free, and receive tax credits, including a complete VAT credit.

7. Conclusions

The study aims to analyse and assess respondents' knowledge, opinions, and attitudes regarding electromobility. The results contribute to the theoretical analysis of electromobility knowledge and verification of factors affecting the use of electric vehicles in Poland to a certain degree. The respondents were interested in the technical novelty of electric vehicles and the idea of electromobility, which calls for further research in the area and demonstrates the need for accurate information about the knowledge, opinions, and attitudes of the investigated social

group. On the other hand, the study clearly identified the need for electromobility awareness-building among young consumers.

The study confirms developmental barriers to electromobility identified in the literature as the insufficient number of charging stations, excessive prices of electric vehicles, and short range on a charge. The analysis demonstrates that financial aspects remain more important than environmental concerns for the respondents. They also believe that adopting a dense public charger system is among the crucial conditions for electromobility growth in Poland. Moreover, respondents' perception of electromobility and environmental beliefs are associated with their place of residence and financial standing.

Public informational campaigns and education from an early age are vital to consumer electromobility awareness-building in Poland. The primary motivator for the investigated group regarding purchasing an electric vehicle is the financial and economic situation. Developmental barriers indicated by the respondents can be divided into two groups. The first includes short range, poor (insufficient) public charging infrastructure, and high prices. The other encompasses such barriers as excessive charging time, driver mindset and knowledge of electric vehicles, and limited availability of electric models from a specific make.

All the research questions have been answered. The study shows that surveyed group of respondents exhibit sufficient knowledge of electromobility, and their choices are still driven by financial capabilities to a significant extent. The respondents believe that electric cars are "in" and that their popularity will grow. Virtually all of them travel mostly by public transport. More than half also travel on foot and by car or taxi.

The two hypotheses have been confirmed. The level of knowledge of the environmental impact of electric vehicles is moderate among respondents, which means educational effort is needed. Furthermore, the most significant barriers to the development of electromobility in Poland, according to the respondents, are the availability of charging stations and the purchase cost of electric vehicles, as proposed in the other hypothesis.

The present study among young consumers in Poland forms part of a pilot study scheme on a sample of 380 respondents. This fact determines the need for further, in-depth research and analyses, for example, using time-series variation, consumer preferences distribution by age groups, or comparing purchasing trends during the COVID-19 pandemic. Therefore, the present study is far from exhausting the topic. Instead, it illustrates the complexity of the problem and attempts to address a research gap found in the literature concerning consumer attitudes and knowledge of the development of the electric vehicle market in Poland.

Authors' Contribution

The authors' individual contribution is as follows: Chrystian Firlej – research concept, literature review, data collection (survey design, sample, study implementation), material development; Krzysztof Adam Firlej – research concept, data collection (survey design, sample, study implementation), material development; Lidia Luty – research concept, methodology, data and results analysis, material development; Bartłomiej Kabaja – research concept, discussion of results, conclusions, practical implications, and final editing.

Conflict of Interest

The authors declare no conflict of interest.

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