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Factors Influencing the Electric Car Purchases in the Visegrad Countries: Comparative Analysis of the Influencing Key Factors

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Abstract: The climate protection goals and regulatory **mechanisms** of the world's leading economic powers are accelerating the transition towards electric cars. The most important cornerstone of the successful transition to electric based mobility and product sale is that the value expected and the value perceived by the customer are matched. For understanding these values, it's unavoidable to examine that what kind of factors are influencing the decision making process of the potential e-car buyers. This study focuses on the influencing factors examined in the Visegrad (V4) countries with the methodology of the systematic literature review (SLR). The research question is: *"What are the key factors affecting consumers' decisions to purchase electric vehicles in Hungary, Poland, the Czech Republic, and Slovakia?"* Beside of the research question, the following hypothesis is validated: *"The same influencing factors play a role in the electric car purchasing decisions in the Visegrad countries."* The analysis also use the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM) as theoretical lens for analyzing customer decision making process. Based on the research results, it can be concluded that in the Visegrad countries, the electric car purchase process is primarily influenced by the purchase price, the inadequacies of the charging infrastructure and the insufficient range of electric vehicles. Environmental awareness is present in the decision-making process, but it plays only secondary role. Despite the fact that there are numerous differences (e.g. country size, GDP, e-car purchase support policy, purchasing power parity etc.) between the Visegrad countries. As having conclusion, the observations enable us to formulate hypotheses regarding the key influencing factors of electric car purchase decision making process. It also helps us to understand these influencing factors and based on them, all of the stakeholders like car manufacturers and dealers, political decision makers, local governments etc. could modify their strategies and take actions to promote the transition to electric vehicles.

Keywords: customer preferences, electric car adoption, electric car purchases, electromobility, Visegrad countries

JEL Classification: D7, D11, D46, D91, O33, O52

1. Introduction

The world's leading economic powers are increasingly emphasize areas, which are related to climate protection and for ensuring it, they set very ambitious goals to significantly reduce harmful emissions. This is facilitated by various regulatory measurements such as stricter emission standards (e.g.: carbon-dioxide reduction), different support systems (e.g.: for charging infrastructure and e-car purchase) and other greener future investments (e.g.: sun solar system, battery storage). These measures also have a significant impact on the automotive industry, especially in the direction of drive-train technology development. A vehicle with a traditional internal combustion engine will be gradually overshadowed in the coming years as the rise of electric vehicles will accelerate in parallel. Electric cars have become an increasingly important part of the global mobility and car industry (Chan & Wong, 2004, pp. 24-33.). Another study also highlight that the electrification of the vehicle segment has been acknowledged as a crucial part in tackling the challenges of global climate change (Haghani et al., 2023, p.15.). The transition to e-mobility is imminent in global car markets. In 2024, global sales of electric cars have reached 17.1 million units worldwide, which means a 25% increase compared to the previous year (Rho Motions Benchmark Company, 2025). This transition is driven primarily by the ongoing ever-tightening harmful emission limits and the changing climate protection

targets. In the European Union (EU), the transportation sector is the primary “consumer” of different fossil fuels. This segment is responsible for nearly one-quarter of the EU’s total greenhouse gas emissions (Eurostat, 2025). The EU has set particularly ambitious goals to its member states. From 2035, vehicles with conventional internal combustion engines will not be allowed to be put on the car market and by 2050, the EU aims to achieve complete climate neutrality in all areas. One of the key areas of these global efforts is the decarbonization of the transport sector (as the part of the solution), where the electric based transportation and mobility play a key role (European Commission, 2019).

The topic is highly relevant because in order to reach the successful transition to electric based transportation, it’s important that the value expected and the value perceived by the customer are matched during the electric car purchasing process and usage. For better understanding of these values, it can’t be avoided to deeply analyze the influencing factors of the potential e- car buyers in their decision-making process. These are the well-known influencing factors like the price of the e-car, available charging infrastructure, support policy, cheaper fuel costs etc. This study focuses on the influencing factors in the Visegrad countries (V4) including Hungary, Poland, the Czech Republic and Slovakia. As these countries are part of the European Union, the pollution reduction targets, climate protection goals and all of the legal measurements of the EU have an enormous effect on these countries’ operation, including transportation and mobility reforms.

2. Research objectives

The objective of this comparative analysis is to perform a comprehensive and scientifically well-established study that analyses the influencing factors in the decision-making process. The research has basically four closely related objectives. As the primary objective, the study seeks to explore and systematize all relevant scientific studies, publications, surveys that relate to the electric vehicle market, consumer attitudes and social and economic determinants of electromobility in each Visegrad country. This step is necessary in order to create a well-founded picture of the existing scientific discourse and place this empirical study on a reliable basis. As a second objective (based on the earlier studies), the research aims to introduce all of the factors that affect the willingness to purchase electric cars on a country-by-country basis. These factors include economic incentives, environmental attitudes, infrastructural conditions, regulatory frameworks, technological development and social factors as well. The detailed factor analysis allows for a systematic comparison of the similarities and differences between the Visegrad countries. Thirdly, the research aims to test a hypothesis regarding the factors influencing the electric car purchase process in the Visegrad countries. Validating the hypothesis would contribute to deciding whether the Visegrad countries have a similar market and social characteristics in the field of electromobility or whether relevant differences can be observed at the national level. The fourth objective is to formulate proposals for external and internal stakeholders, e.g. charging infrastructure operators, governmental decision makers, car manufacturers and dealers in order to accelerate the spread of the electric based mobility.

3. Research question and hypothesis

In order to understand the key motivators, it’s crucial to understand all of the influencing factors which can be measured. As the base of the study, the central research question is the following:

“What are the key factors affecting consumers’ decisions to purchase electric vehicles in Hungary, Poland, the Czech Republic, and Slovakia?”

The relevance of the question lies on the fact that the Visegrad countries have similar social-economic structures and a common historical background, while all four countries (as part of the European Union) face similar challenges in the issue of “green” transition, sustainable transportation and mobility.

Accordingly, the research aims to explore the factors that show common patterns or even differences behind consumer attitudes and decisions towards electric vehicles. Analyzing these influencing factors as a V4 country-by-country and regional comparison, it makes possible to determine whether the Visegrad region is characterized by a homogeneous consumer decision-making structure or whether there are differences in certain influencing factors. After having a research question, it's important set up a hypothesis:

“The same influencing factors play a key role in the electric car purchasing decisions in the Visegrad countries.”

This assumption is based on the well-known facts listed by the research question. Testing the hypothesis, the research also seeks to answer whether these similarities are sufficient to validate the same purchasing patterns or whether different institutional, costumer's psychological factors dominate the costumer's decision-making process.

4. Methodology

In the past years, lots of studies and opinion pool surveys were executed regarding electric cars, which shows the significance of this topic as well. To compare and analyze these findings from the last few years, the systematic literature review (SLR) has been chosen as methodology. The SLR is a scientific research method that aims to collect, evaluate and synthesize the existing scientific literature, sources related to a specific research question or hypothesis in a comprehensive and objective manner. Basically the SLR follows a strict protocol system. Sources are selected based on predefined search strategies, using inclusion and exclusion criteria and a profound critical appraisal too (Creswell, 2009, pp.98-110.).

During the first stage of SLR, search engines and academic databases were identified. The main sources were Google, Google Scholar, Web of Science, Science Direct. These platforms are well-known standard and academic search platforms, providing a wide range collection of scientific literature. The records was limited to the years between 2020–2025 in order to finding the latest studies. The initial searching process has taken place between 5 January 2025 and 5 May 2025. To ensure a targeted and a comprehensive literature assessment associated with the topic's frameworks, the following keywords have been used: *electric car adoption, electric car purchasing factors, electric car consumer behavior, electromobility customer*. Initial title screening identified altogether 1241 potentially relevant papers, studies, articles.

The second stage of the SRL process has involved a screening process in order to remove all of the potential duplicates. The duplicates were removed from the records, then all of the titles and abstracts were read carefully, resulted in finally identifying 321 potential records. Further screening process was performed based on exclusion criteria. 1.criteria: Studies, papers and surveys, which apply to the Visegrad countries. After this elimination, 89 article remained for further investigation. In order to reduce the number of studies, papers and surveys, a 2. criteria were applied. Records unrelated to electric car purchase influencing factors, customer behavior, electric car adoption were eliminated.

Through this screening process, the records were reduced to the 3 most relevant in each V4 country, altogether 12 records. These 12 records have performed all the given criteria, so these records being included in this systematic review. The stages for preparing the SLR method are presented in Figure 1. The stages can be followed with the PRISMA flow diagram (Page et al., 2021, pp.3-5)

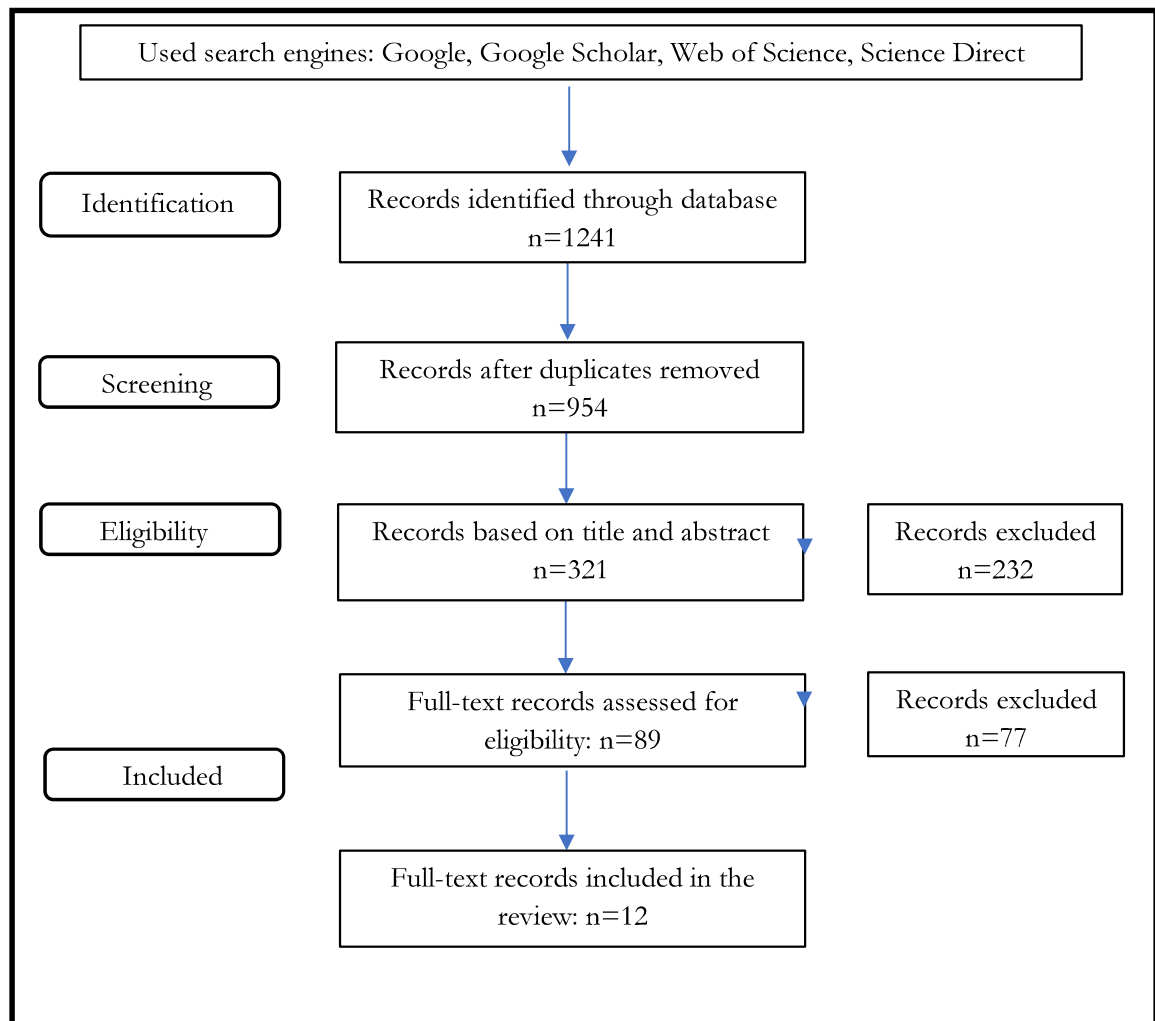


Fig. 1: SLR Prisma diagram

Source: own edition based on Page et al., 2021

5. Theoretical framework and literature review on influencing factors of electric car purchase in the Visegrad countries

As it was indicated, altogether 12 studies, papers, surveys were included in this study. This section introduces the theoretical frameworks and the literature review country by country as selected through the SLR.

5.1. Theoretical frameworks

5.1.1. Positive and negative factors by Secinaro et al. (2022)

According to Secinaro et al. (2022) customer choices regarding electric vehicle purchase process are influenced by 3 positive and 3 negative factors:

Positive factors include:

1. Policy makers' incentives: Government-provided financial incentives, tax allowances or reduction and subsidies aimed to encouraging the adoption of electric vehicles.

2. Environmental (protection) Consciousness: Increasing the general public recognition and knowledge of the environmental advantages by using electric vehicles as a mobility tool.
3. New technology: Advantages of very advanced and innovative technologies of using electric cars.

Negative factors include:

1. Electric car charging issues: General worries regarding the charger accessibility, not appropriate charging speed and overall inconvenience of the e-car charging infrastructure.
2. Price: High initial EV price, especially when it's compared to conventional cars.
3. EV effectiveness and energy efficiency: Customer doubts regarding the efficiency of electric vehicles. (Secinaro et al., 2022, pp. 399–416.)

5.1.2. Further theoretical frameworks: Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM)

The further theoretical basis of this research is provided by the integration of the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM). These scientific theories provide eligible explanatory power for examining consumer decisions regarding the electric vehicles purchases in the Visegrad countries.

The TPB model is based on the work by Ajzen (1991). The researcher assumes that behavior is directly determined by behavioral intention, which is based on three basic components. These are the followings: the attitude toward the behavior, the subjective norm and the perceived behavioral control. Attitude refers to an individual's overall positive or negative evaluation of a given behavior. Subjective norm refers to the perceived strength of expectations and social pressure by others like family, friends, professional and altogether the social environment. Perceived behavioral control reflects how easy or difficult an individual finds it to perform a given behavior in light of the available resources and possible constraints to them (Ajzen, 1991, pp.179-211.). In the context of electric car purchase, these components represent consumers' overall view of whether it is "good" or "bad" to buy an electric car (including different considerations like economic, environmental and usage). Furthermore the social expectations associated with electric car ownership (like modern view, prestige, environmental friendly image) and the extent to which consumers feel capable of purchasing and using an electric car in terms of price, income, charging infrastructure, range and other technological aspect, like technological knowledge.

The TAM model is based on Davis's (1989) research, which focuses specifically on the adoption of new technologies. Complementing the TPB, it further emphasizes the influencing role of technology-specific perceived values in the customer's decision-making process. According to the model by Davis (1989), consumer intention to use new technology is primarily influenced by two key factors. The first is the perceived usefulness (PU) and the other one is the perceived ease of use (PEOU). Perceived usefulness expresses the extent to which an individual believes that a given technology improves their performance, efficiency or effectiveness. Beside this, the perceived ease of use refers to the effort amount that is required to use the technology (Davis, 1989, pp. 319-340.). In the case of buying and using an electric vehicle, perceived usefulness (PU) could mean the following: expected "fuel"-cost savings, parking discounts, tax allowances, driving experience, environmental benefits, status significance etc. Perceived ease of use aspect can show us how consumers find the everyday use of the electric cars, including factors like charging convenience, range adequacy, charging time, battery durability, range decrease in winter environment, etc. The TPB and the TAM approaches are particularly suitable for analyzing electric car purchase decision

making process in the Visegrad countries because it's capable for presenting the structural constraints, social influences and technology-specific aspects as well.

5.2. Literature review country by country

For the better illustration, the summaries of the analyzed studies and surveys are structured by country. This section is the base of the comparison presented in the next result and discussion section.

5.2.1. Slovakia

According to the study of Rovňák et al. (2022), the main obstacles to the widespread use of electric vehicles are the high purchase price, the lack of adequate charging infrastructure, range and operational limitations, a lack of information and knowledge about electric cars, concerns about limited electricity and raw material supplies. In the study, respondents think that the biggest obstacles to the wider use of electric vehicles are the high price, the lack of charging stations, the short battery life and low awareness. The key factors - in the purchasing decision process beside of the above mentioned obstacles - are environmental (contributes to environmental protection), economic (e.g., tax incentives) and other technical advantages (Rovňák et al., 2022, pp. 275-277.).

According a survey prepared by Zábajník, S. et al., (2022), the Slovak respondents tend to consider the usual decision-making factors (price, maintenance costs, lack of infrastructure) when purchasing an electric car but environmental considerations do not play an important role in consumer preferences. Based on the study, this can be explained to a certain extent by the disposable income. It's unlikely that environmental considerations such as environmental protection will come to the fore in the decision-making preferences of Slovak consumers. The study emphasizes that environmental protection as a factor will not play a significant role in such decisions for a long time to come. In the same time for the Slovak consumer, the product as the electric car still represents an exceptional image, which could provide a specific status for its owner (Zábajník et al., 2022, pp.132-140.).

Based on the Khalilov & Tábořecká (2024) study, the results highlight that two main factors like the price and the income play a significant role in the Slovakian people decision making process. The study confirms that mainly the financial barriers influence the Slovak customer's attitudes when it comes to purchasing an electric cars (Khalilov & Tábořecká, 2024, pp. 105-109.).

It can be concluded that in Slovakia, the price of electric vehicles is by far the most important factor in the customer's decision, which is closely followed by the availability of charging infrastructure, then the EV's technological limitations like the short battery life. Environmental considerations are a low priority, while the status symbol associated with owning an electric vehicle plays a significant secondary role.

5.2.2. Czech Republic

According the study from Vins & Kosova (2020), which was conducted among university students. Based on survey, it can be concluded that environmental considerations play a significant role in the process of purchasing electric cars among university students. The conclusion also validate that they would prefer environmentally friendly cars rather than internal combustion engine cars. Their intention to purchase electric car is limited by the insufficient charging infrastructure and range. Interestingly, price is not such an important factor for the young generation (Vins & Kosova, 2020, pp.6-8.).

Based on the study executed by Jaderná et al. (2025), it can be revealed that the most important criterion in the decision-making process for purchasing is the economic aspect. This aspect includes the purchase price as well as the operating and service costs. On the other hand, respondents consider the environmental

criteria for least important factor. Among the user criteria, charging and driving characteristics were rated as the highest. The research results clearly show that economic considerations are the most important factors to Czech consumers (Jaderná et al., 2025, pp.18-21.).

According to the study of Zámečník et al. (2021), the Czech consumers consider electric vehicles to be expensive and less convenient than conventional vehicles due to their range and current inadequate charging infrastructure. According to the survey, the decision-making mechanisms are influenced by price, range, inadequate charging infrastructure, small size of the vehicle, fear of battery degradation and low speed. Interestingly, environmental aspect does not play an important role in Czech consumers' decisions. The study shows that the environmental factors are not a significant factor that would outweigh higher costs and convenience considerations (Zámečník et al., 2021, pp.3-4.).

The influencing factors map is mixed in the Czech Republic. Environmental considerations are important among university students, while price is less important, but economic considerations (including purchase price and operating costs) dominate among the general population. Charging infrastructure and range remain relevant barriers. Environmental criteria are generally less important to the wider public, who also consider other practical factors such as vehicle size and battery degradation.

5.2.3. Poland

According to the study from Bednarz et al. (2023), the survey - involves a large number of respondents (3,170)- clearly shows that the factors influencing Polish consumers' decisions to purchase electric vehicles can be divided into two groups. The first group consists of internal factors (price, range, charging time, price), which are more important than the external factors in the second group (fuel prices, charging network development, social norms). Furthermore, among the internal factors, range is the primary consideration when purchasing electric vehicles in Poland. As the study indicates, this Polish research results are similar to previous research conducted in Germany, where the price and range of electric cars are the two most important factors in the decision-making process. The study also mentions that another commercial opinion polls conducted earlier in Poland, where the price of electric vehicles was the most important factor for consumers, closely followed by range and other operating costs. Other less important factors include the car manufacturer's brand, the use of environmentally friendly solutions and the lower emissions from EVs (Bednarz et al., 2023, pp. 175–192.).

According to the study of Gądek-Hawlena & Bęben (2023), electric cars are considered to be expensive and having insufficient range, which factors are being the main deterrents in the purchasing process. Among those, who intends to buy a new electric car, respondents' spending levels are far below the price range of these cars. According to respondents, the current range of electric cars is between 200 and 300 km, which they think is insufficient. More than 70% of the respondents think that the number of charging stations in Poland are insufficient for providing an uncompromised freedom of movement by car. Polish customer prefers charging at home, but considers the infrastructure available at work, in parking lots and in shopping centers to be just as convenient as charging at home. Other influencing factors include the possibility of using free parking spaces or entering clean traffic zones in Polish cities. Interestingly, respondents think that electric cars are not cheaper to maintain and are no less prone to breakdowns than vehicles with internal combustion engines. Half of participants didn't meet with the state EV incentives and subsidy programs before. But Polish people who heard about them, consider these incentives and subsidies to be extremely important when it comes to buying an e-car (Gądek-Hawlena & Bęben, 2023, pp. 161-180.).

According to the study executed by Bartosik et al. (2025), the following have emerged as the main obstacles to the widespread adoption of electric vehicles: high initial purchase prices, inadequate countrywide charging infrastructure, high concerns about the range and charging time. Besides the obstacles, Polish electric car customers consider numerous factors when establishing their decision-making process. These factors are

the EVs initial price, all of the maintenance costs related to the operations, current availability of charging infrastructure, technological innovations related to electric vehicles and the environmental considerations too. An important finding was made regarding environmental considerations. More than 80% of respondents believe that electric based vehicles (like hybrid and fully electric) have a little effect on the fight effort against climate change. When considering to purchase a new car, Polish consumers generally rank environmental sustainability to be a low priority factor in the decision-making process (Bartosik et al., 2025, pp. 5-14.).

Summarizing the Polish influencing factors, the initial price and range must be highlighted, which are consistently the two most important factors in purchasing decisions for electric vehicles. Charging time and the availability of charging stations also rank highly within the factors among Polish people. Regarding the environmental considerations like air pollution and battery, it remains a low priority factor because many Polish consumer are really skeptical about the role of electric vehicles when it comes to protecting the environment. The car brand reputation, access to clean traffic zones or free parking areas have a weak influence on the decision-making process in Poland.

5.2.4. Hungary

A questionnaire survey executed by Vereckei-Poór & Törőcsik (2022), presented that consumer's opinion regarding electric vehicles for the most part is positive. The majority of the Hungarian respondents find electric cars attractive and do not consider their use to be a limitation on convenient mobility. Furthermore, respondents believe that EVs are no more polluting than conventional vehicles, but rather consider EVs to be environmentally friendly and an integral part of the fight against global warming. This perception is reinforced by the view that sustainability is a top priority among EV users. However, the study highlights the well-known factors that hinder the wider adoption of EV technology, such as the most important one is the high purchase price, which makes these vehicles more accessible to higher-income segments of society. The importance of subsidies is also highlighted, but the charging infrastructure is not addressed in their study (Vereckei-Poór & Törőcsik, 2022, pp.57-66.).

Based on the research results of Németh & Kovács (2022), it can be concluded that a significant proportion of Hungarian respondents are open to purchasing electric vehicles, but only a small part of current car buyers actually decide to purchase them. The primary reasons are the EVs high purchase price and the limited range. Hungarian respondents would like to see an electric vehicle that would allow them to travel at least ten times the average daily distance on a single charge, while also having a lower purchase price and low operating costs. According to the study, the three already known areas remain a significant problem, when it comes to deciding to buy an EV: initial high EV price, charging network is not properly developed and the insufficient range of EVs. With the exception of the high purchase price, Hungarian respondents think that electric cars have more favorable characteristics than traditional internal combustion engine vehicles in many respects, although consumer attitudes continue to be strongly skeptical and averse to the technology. According to the survey participants, electric transportation in its current form contributes only slightly to reducing environmental pollution. The survey results show that respondents are aware of the higher initial purchase cost of electric cars, but are uncertain about the lower operating costs (Németh & Kovács, 2022, pp.7-17.).

Based on a representative public opinion survey from Ipsos Hungary executed in 2021, the following influencing factors were identified: the high price of the electric car, costumer's environmental awareness, financial incentives, the development of the charging infrastructure, openness to the electric based mobility, brand image. Further important factors like consumer perceptions related to vehicle maintenance costs, reliability and safety, lower fuel cost and judgments about future value retention. (Ipsos, 2021).

In Hungary, high purchase prices are once again the most significant obstacle, followed by concerns about the range. Charging infrastructure is mentioned as a limiting factor, but it's not considered as urgent as in Poland or Slovakia. Environmental friendliness is viewed more positively than in other Visegrad countries, especially among supporters of electric vehicles, although many believe that electric vehicles only reduce pollution to a small extent. Other factors, such as brand image, safety and maintenance costs also influence Hungarian consumer's decision-making process, but only slightly.

6. Results and discussion

6.1. Results from the comparative analysis of the influencing factors

The results are similar to the classification of Secinaro et al. (2022), customer choices regarding electric vehicle purchase process are mainly influenced by 3 positive and 3 negative factors in all of the Visegrad countries. Based on the comparative analysis conducted in the Visegrad countries clearly shows that economic and usage-related considerations dominate the decision-making process for purchasing electric vehicles, while environmental and pollutant emission considerations generally remain secondary when it comes to buying EVs.

The most significant common influencing factors in all Visegrad countries are the high purchase prices, inadequate charging infrastructure in terms of quantity and quality and concerns about the range. Subsidies, financial incentives and disposable income levels also play a key role in determining consumer attitudes. The purchase price, operating - service costs and the residual value override environmental considerations in each country. This is consistent with the fact that the income level of the V4 countries still lags behind the Western European average, which makes large investments (like buying an e-car) particularly sensitive. It was surprising that environmental awareness exists, but it's unable to offset financial and infrastructural barriers, so environmental protection is given low priority in decision-making process, except in Hungary. Hungary slightly differs when it comes to environmental considerations, these factors rank higher than in the other V4 countries (Table 1).

Table 1 Comparison of V4 Countries

Most important influencing factors	Slovakia	Czech Republic	Poland	Hungary
High purchase price	.	.	.	.
Charging infrastructure	.	.	.	.
Range limitations	.	.	.	.
Maintenance costs			.	.
Subsidies and financial incentives	.		.	.
Car brand reputation and image			.	.
Environmental considerations (low priority)	.	.	.	

Source: own edited

Also based on the comparative analysis, the research hypothesis was validated. It's true that almost the same influencing factors play a key role in the electric car purchasing decisions, there is no significant difference

in the Visegrad countries in the light of the three most important influencing factors. In the cross-country comparison matrix, the seven most important factors are presented, which factors appear in least two countries.

6.2. Regional summary in the light of the TAM-TPB framework

In the TAM and TPB framework, economic and usage considerations related to electric cars largely determine the content of PU and PEOU. Beside this, income level, available infrastructure, social expectations and norms influence the attitudes, the subjective norms and the perceived behavioural control. In light of these approaches, the empirical results from the four countries show both common regional patterns and clear differences as well.

When examining the four Visegrad countries together, a common regional pattern emerges within the TAM - TPB framework. Among the TAM variables, perceived usefulness (PU) and perceived ease of use (PEOU) are primarily determined by the price, range, charging time and the state of the charging infrastructure. In the consumer decisions, therefore the "value" of EVs is primarily reflected in economic (purchase price, operating costs) and practical (range, charging convenience) dimensions, while environmental benefits are in most cases only a secondary, complementary layer within the PU structure. In Slovakia and Poland, the "environmental PU" is particularly weak as a significant proportion of respondents do not believe that EVs contribute significantly to climate protection. In contrast in Hungary and among Czech university students, the perception of environmental benefits is stronger. Among the TPB components, perceived behavioral control (PBC) is limited in all four countries, which is mainly explained by income level and the development of charging infrastructure. Many consumers not only do not want to buy an EV, but still cannot consider it as a realistic option when taking into account their financial and infrastructural situation. Subjective norms mostly provide only moderate support for electric cars. The social environment does not compel consumers to choose low-emission transportation solutions, that's why electric cars only appear on the horizon as an "interesting alternative" to the conventional internal combustions engines car. Hungary is a partial exception and in a group of Czech university students as well, where environmental sensitivity and social acceptance of EVs are stronger than in the rest of the region. In light of the TAM - TPB models, where the PU and PEOU are low due to high prices, uncertainty due to range and the inadequate charging network. The PBC is also limited, even the relatively positive attitudes or environmental norms are not sufficient to trigger widespread adoption of electric cars. This explains why, despite the declared openness and more favorable attitudes among Hungarian and Czech university students, there remains a persistent gap between intention and actual purchase. In contrast, the Slovak and Polish cases show that if belief in environmental benefits is weak (meaning low environmental PU), the intention to purchase EVs becomes particularly vulnerable. When this is combined with economic and infrastructural barriers, it could lead to that electric vehicles remaining in the background when it comes to the decision-making process.

6.3. Potential socio-economic background factors

One of the most important background factor is the country's energy mix. In Poland, electricity generation remains largely coal-based. In 2025 too, the fossil share of electricity generation was also one of the highest at EU level with the share of solid fossil fuels in the energy balance far exceeding the EU average. (Eurostat, 2025). In this context, the skepticism of Polish consumers seem to be very rational. If electricity is largely generated from "dirty" energy sources, the environmental benefits of electric cars seem less clear. This can be seen in the fact that (as many Polish people believe) electric vehicles only contribute to climate protection very slightly. On the other hand in Hungary, where the government has significantly reduced the role of coal in recent years, while nuclear and solar energy are increasingly important in electricity generation. By 2024 the share of carbon-free electricity generation will be around two-thirds (Eurostat, 2025) This is in line

with the fact that environmental considerations are somewhat stronger in Hungary, while in Poland many consumers question the climate benefits of EVs. In countries where electricity generation is “visibly” still carbon-based, electric cars are more difficult to sell as a clean environmental friendly solution. Where the decarbonization of the energy mix can be seen and very tangible, the environmental narrative of electric cars is more credible.

In the Visegrad countries, the political-economic framing of electromobility follows a similar logic. Due to the post-socialist industrial structure, the strong automotive industry embeddedness and the pressure to catch up electromobility are basically presented as an industrial-technological modernization, rather than as a loss and negative trend of the traditional automotive model. The high level narrative that investments related to electric vehicles (battery factories, supplier capacities and potential R&D centers) serve to strengthen national competitiveness, industrial catch-up and stabilize the export-oriented economy is also emerging. Governments, global OEMs and domestic automotive clusters mostly form a political-economic coalition that connects electromobility not with the mass elimination of jobs, but with new types of jobs and higher technological level.

It's important to note that the emphases of the electromobility narrative slightly differs at the V4 level. While in Hungary the discourse of the “battery superpower” and the electric based car industry is particularly strong, meanwhile in the Czech Republic, Slovakia and Poland due to the dominant role of the automotive industry, uncertainty about structural change is also more present in public discourse. So the fear from decline of the traditional engine and component production is more frequently articulated. In Poland, the issue of the energy mix (carbon dependence) and energy prices is intertwined with the interpretation of electromobility, so the discussion around electric cars here often takes place in the language of energy security, rather than simply environmental protection or industrial development. Despite all this, what is common in the V4 countries is that the social acceptance of electric vehicles is not primarily based on so called “green values”, but on the political-economic message. This change is necessary for adapting to electromobility as the base of the future competitiveness and catching up. Despite high income barriers and limited purchasing power, electric cars are increasingly framed in the region as symbols of a modern, technologically advanced achievements.

Another important explanatory factor is the incentives, regulation and information visibility. All four countries have an EV support and tax incentives system, but their availability, “generosity” and awareness vary country to country. The Hungarian Government was among the first countries round the world who introduced the green license plate for environmental friendly cars. The governmental policies highlight the green license plate benefits (tax breaks, certain free parking options, local toll benefits), subsidies for private and corporate purchases, furthermore targeted programs to expand the charging network in Hungary. These “visible” incentives can also strengthen the positive image (including environmental friendly side) of electric cars. In Poland and Slovakia, relatively large purchase subsidies also available for customers but according to researches, a significant part of the population has not heard of them at all. Corporate and fleet-level incentives are more prominent in the Czech Republic, while subsidies are less transparent or less visible in the residential segment. It can be concluded, where incentives are simple, stable and well communicated (like in Hungary) consumers more easily integrate environmental and long-term cost benefits into their decisions. Where incentives are complicated or poorly communicated (like in Poland, Slovakia), electric cars remain less environmental friendly solutions in the public opinion.

Overall, the results suggest that the similarities between the V4 countries are stronger than the differences. The region's common structural characteristics like the income level, the countries dependence on the automotive industry, the energy mix and the charging infrastructure currently dominate the purchase of electric cars much more than the deep cultural "national characteristics". Where differences can be seen like the Hungarian environmentally friendly narrative, Czech students' green orientation toward sustainability, Slovak focus on car status symbol and the Polish climate skepticism, these differences can be easily traced

back to country specific energy policy, industry, social structure and communication factors, rather than to "mystical" cultural differences.

7. Conclusion and recommendation

Based on the research results, it can be concluded that in the Visegrad countries the electric cars buying process is primarily influenced by the purchase price, the inadequacies of the charging infrastructure and the insufficient range. Environmental awareness is present in the decision-making process, but it plays only secondary role. Based on these findings, a number of recommendations can be made to promote the spread of electromobility in the Visegrad countries.

In order to speed up the pace of electric vehicles sales, it's important to start or continue the widespread government subsidy programs and strengthen tax incentives. These economic incentives have the highest priority as the purchase price remains one of the most significant barriers in consumer decisions process. It's important to note that through mass production, electric cars are becoming even cheaper and cheaper. In the same time, price parity between electric and conventional cars has already been achieved in certain vehicle categories. The price of the used electric cars also falls steadily year by year, but the fears of the fast battery degradation is still hindering faster EVs acceptance (International Energy Agency, 2023). With the above written measures, these could improve the economic dimension of PU and increase PBC of the customers.

The development of the charging infrastructure network also stands out from the governmental reach. The development of rural areas, where the sparse charging network continues to be a significant obstacle to charging e-cars. A whole transparent and reliable fast charging network development could further increase and boost the EV buyer's confidence, especially among those people who are still unfamiliar with the electric based mobility. Furthermore this could reduce the perceived risks-fears associated with range and charging, thereby improving PEOU and PBC.

Different pilot projects regarding EVs should be intensively introduced by the local authorities. For example, local governments should start to use electric vehicles in public services, which could have a demonstration value in communities. These kind of projects can promote the technological transformation in the public and future customer's attitudes towards EVs.

Social awareness campaigns should be started immediately to ease the lack of environmental awareness and financial literacy, which could also contribute to strengthen the social acceptance of electric vehicles.

Car manufacturers also have a key role to introduce more and more affordable models in order to reduce high consumer price sensitivity. As it turned out, purchase price is not the only one, but the strongest factor influencing the purchase decision. It's also essential for stakeholders to clearly inform all of the customers regarding the total cost of ownership - abbreviated TCO -, highlighting the long-term financial benefits of using electric cars. Before deciding to purchase an electric vehicle, it's advisable to examine the above mentioned TCO, meaning that the higher initial costs of electric vehicles are often recouped through lower operating costs even within a few years.

Environmental awareness is not an important factor in the decision-making process, but does play a role, so setting a social example can also help increase willingness to buy an EV. In addition to this, it's also important to consciously strengthening the pro-environmental subjective norms with education, media discourse, corporate and municipal role models, which shift environmental PU and attitudes towards EVs in a favorable direction.

Regional cooperation between the Visegrad countries is also important in order to promote the transition to electromobility in the region. The faster and more efficient spread of electromobility throughout the

region can be achieved with the harmonization of regulatory frameworks, the involvement of common EU funds and the development of cross-border charging infrastructure.

Limitations and future research directions

Part of the SLR, I have focused on selected studies, publications and surveys to determine the key influencing factors in the electric car purchase process in all Visegrad countries. Some of the surveys were not representative and used different questions and methodology. As the spread of the electromobility accelerates, to get more precise and most up to date results, new primary empirical future investigations must be performed in each Visegrad country to validate and quantify these identified influencing factors and follow up the potential changes. This future research's findings enable us to compare these V4 findings with different studies executed within the framework of the European Union's general influencing factors as well. In addition to the future primary empirical investigations, these new findings could be compared with the influencing factors identified in the world biggest car market, in China.

Conflict of Interest Statement

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.

References

- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Bartosik, A., Manev, N., Pyk, A., & Pendaroska, M. (2025). Electric vehicle adoption in Poland: Insights from academia and technically educated youth. *Sustainability*, 17(11), 5–14.
- Bednarz, J., Konewka, T., & Czuba, T. (2023). Perceived value and preferences of purchasing EVs. *Journal of International Studies*, 16, 175–192.
- Chan, C., & Wong, Y. (2004). Electric vehicles charge forward. *IEEE Power and Energy Magazine*, 2(6), 24–33.
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed., pp. 98–110). SAGE.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13, 319–340.
- Eurostat. (2025). *Greenhouse gas emission statistics*. Retrieved February 3, 2025, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Quarterly_greenhouse_gas_emissions_in_the_EU#Emissions_by_economic_activity
- European Commission. (2019). *The European Green Deal: Striving to be the first climate-neutral continent*. Retrieved February 3, 2025, from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
- Gądek-Hawlena, T., & Bęben, A. (2023). Demand determinants for electric vehicles in Poland. *Military Logistics Systems*, 58, 161–180.
- Haghani, M., Sprei, F., Kazemzadeh, K., Shahhoseini, Z., & Aghaei, J. (2023). Trends in electric vehicles research. *Transportation Research Part D: Transport and Environment*, 123, 103881.
- International Energy Agency. (2023). *Global EV outlook 2023*. Retrieved February 3, 2025, from <https://www.iea.org/reports/global-ev-outlook-2023>
- Ipsos. (2021). *Változatlanul pozitív az elektromos autók megítélése*. Retrieved February 3, 2025, from <https://www.ipsos.com/hu-hu/valtozatlanul-pozitiv-az-elektromos-autok-megitelese>
- Jaderná, E., Volfová, H., Zapletal, F., & Velínov, E. (2025). Decision making and consumer behaviour towards electromobility in the Czech Republic. *Revista de Gestão - RGS A*, 19(4), 18–21.
- Khalilov, I., & Tábořecká, J. (2024). Exploring consumer behaviour in Slovakia's electric vehicle market. *Scientia Iuventa*, 105–109.
- Németh, T., & Kovács, L. (2022). Consumer perception of electric cars in Hungary: Theoretical considerations and empirical results. *International Journal of Engineering and Management Sciences*, 7(2), 7–17.
- Page M. J., Moher D., Bossuyt P.M., Boutron I., Hoffmann T.C., Mulrow C.D, Shamseer L., Tetzlaff J.M., Akl E.A., Brennan S.E, Chou R., Glanville J., Grimshaw J.M., Hróbjartsson A., Lalu M.M., Li T., Loder E.W., Mayo-Wilson E., McDonald S., McGuinness L.A., Stewart L.A., Thomas J., Tricco A.C., Welch V.A., Whiting P. & McKenzie J.E. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71.
- Rho Motions Benchmark Company, (2025). *Over 17 million EVs sold in 2024—Record year*. Retrieved February 3, 2025, from <https://rhomotion.com/news/over-17-million-evs-sold-in-2024-record-year/>

Rovňák, M., Kalistová, A., Štofejová, L., Benko, M., & Salabura, D. (2022). Management of sustainable mobility and the perception of the concept of electric vehicle deployment. *Polish Journal of Management Studies*, 25(2), 275–277.

Secinaro, S., Calandra, D., Lanzalonga, F., & Ferraris, A. (2022). Electric vehicles' consumer behaviours: Mapping the field and providing a research agenda. *Journal of Business Research*, 399–416.

Vereckei-Poór, B., & Törőcsik, M. (2022). Az elektromos autózás fogyasztói megítélése, dilemmái. *Hungarian Journal of Marketing and Management*, 57–66.

Vins, M., & Kosova, S. (2020). Here comes the electric car: Delving into young Czech consumers motivations in buying an electric car. *Perner's Contacts*, 15(2), 6–8.

Zábojník, S., Steinhauser, D., & Král, P. (2022). E-mobility in Slovakia by 2030—End of oil dependency? *IET Smart Cities*, 132–140.

Zámečník, P., Šuchab, M., Řezáč, P., & Bohmová, K. (2021). Attitude towards electric vehicles in the Czech Republic. *Applied Human Factors and Ergonomics International*, 3–4.



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