

DETERMINANTS OF THE CHOICE OF THE PETROL STATION BY HOUSEHOLDS IN THE SOUTH-EAST POLAND

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Purpose: The main objective of this article is to present the results of research aimed at identifying the determinants of gas station selection by households residing in southeastern Poland. The research problem will focus on answering questions regarding the primary and secondary factors determining the choice of gas stations by individual customers in the studied region. Specific questions will address differences in supplier selection based on location, age structure, income sources, household size, and daily geographic scope of activity. Therefore, the subject of this research is the primary and secondary factors determining the choice of gas stations by individual customers. The research subject is households. The research area is the retail market for transport fuels located in the Podkarpackie Voivodeship.

Design/methodology/approach: The structure of the article consists of the following sections: establishing the current state of knowledge on the subject matter, describing the research method, presenting the measurement results and their interpretation, and presenting the final conclusions. The research method employed is a critical review of the literature on the subject and quantitative methods.

Originality/value: This publication has a practical dimension. The adopted main topic and research objective respond to identified needs expressed by individual clients in relation to the current state of knowledge, achievements, and experience of the researcher. The actions undertaken are aimed at advancing scientific knowledge in the discipline of management and quality science in the area of commercial systems, their organization, and management.

It should be emphasized that the research results presented in this article constitute the second stage of scientific research, the subject of which is: Attributes and determinants of the commercial offerings of fuel station chains targeted at households in southeastern Poland. The aim of the research is to identify the scope and form of cooperation between a retail supplier of liquid fuels and individual customers residing in Poland, in the Podkarpackie Voivodeship. The research is being carried out in three stages: determining the attributes of the commercial offerings of fuel station chains targeted at households in the studied region, identifying the determinants of the choice of transport fuel supplier by households residing in the Podkarpackie Voivodeship, and determining the extent to which the commercial offerings of fuel station chains targeted at individual customers in the studied region reflect actual market needs.

Keywords: supplier, liquid fuels, individual customers.

Category of the paper: Research paper.

1. Introduction

A household is an economic category that includes one person or group that lives together, is related or unrelated, supports itself and makes financial decisions to meet the common and individual needs of household members (Statistics, 2024c). The basic functions of farms commonly include: economic functions, including consumption and production, and social functions related to reproduction and upbringing. However, the division of households included in the literature on the subject most often takes into account social criteria (i.e. number of members, their age structure, biological type, level of education, etc.), economic criteria (i.e. size and structure of income and expenses, professional structure, etc.) and geographical criteria (i.e. place of residence, classes of town, etc.) (Statistics, 2024c). A household budget is a statement of both monetary and non-monetary income and expenses. Expenditures include expenses incurred for the purchase of consumer goods and services and other expenses. Consumer goods are non-durable goods (including transport fuels), semi-durable goods and durable goods (Statistics, 2024c).

In recent years, Poland has seen an increase in the share of the costs of purchasing transport fuels in the structure of household expenses. This was related to their persistently high price level. In 2021, in Poland in the south-eastern region, i.e. Podkarpackie Voivodeship, the average number of people in a household was 2.98 (nationally 2.55). There is a low standard of living of the inhabitants in this region. GDP per person amounted to 69.4% of the national economy. The Podkarpackie Voivodeship was characterized by one of the lowest average gross salaries per person in the country (87.3% compared to the average in Poland). Disposable income per person in a household reached 82.6% of the national level. The average monthly expenses per person amounted to 76.4%. In the structure of household expenditure, 9.4% was transport (9.4% nationally), while expenses incurred for the use of an apartment or house and the purchase of energy carriers were 17.4% (18.9%) (Statistics, 2022). In 2023, the number of passenger cars in the studied voivodeship reached 1.3 million, which constituted 655 cars per 1,000 inhabitants (723 in the country) (Statistics, 2024a). In the analyzed period, in the Podkarpackie Voivodeship, the largest share in the structure of fuel consumption in road transport had motor gasoline - 46.8% (53.6% in the country) and diesel oil - 36.8% (32.4%). The share of LPG was 16.0% (13.4%). However, electric passenger vehicles and hybrid cars accounted for 0.12% (0.20%) and 0.18% (0.24%), respectively (Statistics, 2024b).

In the Podkarpackie Voivodeship, there was strong competition on the retail market of transport fuels, both from domestic and foreign companies. Over the past period, the petrol station market has changed towards a shopping and service center. At the stations, depending on their purpose, one could not only refuel the vehicle, but also do basic shopping, rest during the trip, provide financial services, eat a meal or perform simple maintenance and repair activities (Polish, 2024). Petrol stations operated as dependent chains or independently,

and as independent operators or stations at stores (Polish, 2024). The Central Statistical Office reports that in 2021, the total number of petrol stations in the Podkarpackie Voivodeship was 448 (5.5% share in the country) (Statistics, 2022). According to the Polish Organization of Petroleum Industry and Trade, in 2023 domestic concerns had a 24.4% market share, foreign ones 25.6%, independent chains 18.5%, other independent operators 29.0%, and stores 2.5%. In their entity structure, the highest share was held by PKN Orlen SA 24.4%, BP Polska Sp. z o.o. 7.3%, Shell Polska Sp. z o.o. 5.8, Anwim SA (Moya) 5.7%, Circle K Polska Sp. z o.o. 5.2%, and Mol Polska Sp. z o.o. 5.0% (Polish, 2024).

A review of the literature on the subject reveals that there are few studies on the petrol station sector in Poland. It should be emphasized that there are no detailed studies that take into account the economic and social specificity of a specific region. Available scientific works present nationwide factors determining the choice of petrol stations (Zawadzki, 2015; Zielińska, 2018; Lewicki et al., 2020; Domasiewicz et al., 2023) or a study of mobility recorded at petrol stations (Norman D., 2006). They present forms of management of petrol stations (Zawadzki et al., 2017) and issues of spatial arrangement and location conditions (Roj-Rojewski et al., 2018; Aslani et al., 2011; Tuzmen et al., 2011; Zhu et al., 2024). Moreover, the literature on the subject indicates trends and expectations in the distribution of fuels and the direction of transformation in road transport in the use of alternative power sources (Kamiński et al., 2021; Bayram et al., 2022; Domasiewicz et al., 2023). Many available scientific works emphasize the adverse impact of the operation of petrol stations on the area in which they are located, human health and their long-term consequences (e.g. Terrés et al., 2010; Maksoud et al., 2019; Adedeji et al., 2022). It should be emphasized that research on the determinants of the choice of petrol stations in the Podkarpackie Voivodeship was conducted by the author of this publication and the final results are presented in the article: Determinants of the choice of petrol stations by micro and small road transport enterprises in the Podkarpackie Voivodeship (Jedynak, 2023c). Their aim was to identify the primary and secondary factors determining the choice of fuel stations by micro and small road transport enterprises headquartered in the province. Podkarpackie.

In response to the above issues, it was assumed that the main purpose of the article will be to present the results of research aimed at identifying the determinants of the choice of petrol stations by households living in south-eastern Poland in the Podkarpackie Voivodeship. The structure of the implementation of the research topic and objective will include: 1) determining the current state of knowledge in the field of the issues discussed; 2) description of the research method; 3) measurement and interpretation of the obtained results; 5) final conclusions. The research method used is a critical review of the subject literature and quantitative methods. The literature review was conducted based on electronic databases, i.e. Scholar.Google.com, Scopus.com, Academica.edu.pl and in a traditional form - library resources.

The research results presented in the article constitute the second stage of scientific research: *Attributes and determinants of the commercial offerings of petrol station network aimed at households in south-eastern Poland*. The aim of the research is to identify the scope and form of cooperation between a retail supplier of liquid fuels and individual customers residing in south-eastern Poland in the Podkarpackie Voivodeship. It will be implemented by: 1) determining the attributes of the commercial offer of the petrol station network addressed to households in the Podkarpackie Voivodeship; 2) indication of the determinants of the choice of a transport fuel supplier by households residing in the Podkarpackie Voivodeship; 3) determining the extent to which the commercial offer of the petrol station network addressed to individual customers in the Podkarpackie Voivodeship reflects the actual needs of the market.

2. Theoretical basis

Petrol stations play an important role in the automotive industry. Zielińska E. describes a petrol station as a technical base for the automotive industry (Zielińska, 2018). Norman D. notes that many activities performed at petrol stations also take place in street traffic, and thus petrol stations reflect changes and needs recorded in the automotive industry (Norman, 2006). Petrol stations primarily enable the distribution of various types of fuel, without which neither the owner of new or used vehicles could operate their own cars, in accordance with their individual transport needs (Zielińska, 2018). They may be publicly available or with limited access (Roj-Rojewski et al., 2018). In his scientific work on mobility at petrol stations, Norman emphasizes that they are a place of transition between the "static" and "mobile" states (Norman, 2006).

Kamiński A., Jakubiec J., Pusz A. note that currently petrol station facilities are architectural objects with complex construction, development and equipment (Kamiński et al., 2021). According to the Regulation of the Minister of Economy of November 21, 2005, a liquid fuel station is a building which may include: a building, underground storage tanks for liquid fuels, underground or aboveground liquid gas tanks, liquid fuel and liquid gas dispensers, technological installations, including devices for storing and loading liquid fuels and liquid gas, water, sewage and energy installations, driveways and roofs, and other devices service and support spaces (Regulation, 2005). The structure of the petrol station space will include sales and service facilities as well as technical facilities. Within the sales and service part of a petrol station, three basic zones should be indicated, i.e. refueling, vehicle service and passenger service (Zielińska, 2018).

Numerous criteria apply to the characteristics of petrol stations. When adopting the criterion of the permanent location of infrastructure facilities, portable (container) and permanent (stationary) stations should be indicated (Energy, 2024; Roj-Rojewski et al., 2018). Due to the

breadth and depth of the commercial offer, we distinguish residential, basic and highway stations (Roj-Rojewski et al., 2018; Zielińska, 2018). Similarly, Lewicki M., Zawadzki T. distinguishes petrol stations located in cities, on highways and expressways, transit stations, next to supermarkets and others (including automatic ones) (Lewicki et al., 2020). The division of petrol stations in the literature also takes into account the business organization model, on this basis we distinguish dependent and independent chains, independent operators and store stations (Polish, 2024). Adopting this criterion, Zawadzki T., Suszyńska K. indicates five possible forms of running a petrol station, i.e. running an independent petrol station operating under its own brand, running an association petrol station operating under a common brand, running a franchise petrol station, leasing the petrol station facility to a fuel concern and running a petrol station as an agent (Zawadzki et al., 2017). In the available studies, the Polish Organization of Petroleum Industry and Trade takes into account the origin of capital and subjective criteria in the division of fuel steel (Polish, 2024). The Central Statistical Office also uses geographical criteria in its studies (Statistics, 2024a).

The core activity of every petrol station is the sale of transport fuels (Roj-Rojewski et al., 2018). However, currently these entities do not focus their activity only in this area. The Polish Organization of Petroleum Industry and Trade notes that the petrol station market is changing towards the model of a shopping and service center. This meant that at stations you could not only refuel your vehicle, but also do basic shopping, rest during the journey, provide financial services, eat a meal or perform simple maintenance and repair activities (Polish, 2024). According to the Polish Organization of Petroleum Industry and Trade, important factors behind the observed changes are large road investments, changes in the location of stations, and takeovers by both domestic companies and independent chains. In addition, a ban on Sunday trading was introduced (Polish, 2024). Similarly, Zawadzki T., Suszyńska K. notes that the commercial offer of petrol stations addressed to customers is expanding to include more and more services that were previously reserved for other commercial entities, such as sending and receiving courier parcels, selling motor insurance or car rental (Zawadzki et al., 2017). Norman D. emphasizes that at petrol stations we are dealing with a very diverse group of people based on the criteria of age, gender, profession, education, financial status, etc. (Norman, 2006).

It is commonly emphasized in the literature on the subject that the scope of services offered depends mainly on its location and, therefore, the purpose of the petrol station (Zielińska, 2018; Aslani et al., 2011; Tuzmen et al., 2011). Additionally, it depends on the package of products and services available to a given operator and is significantly influenced by local competition (Jedynak, 2022). Domasiewicz M., Anuszkiewicz A. notes that the advantage of stations compared to other commercial facilities is their 24-hour availability, good location and thus access or access on days when other commercial units are closed due to applicable regulations (Domasiewicz et al., 2023). Zawadzki T., based on research, points to three key factors that Polish drivers pay particular attention to when choosing a station: convenient location, fuel price and the station's membership in a given network - understood in the context of the quality

of the fuel sold (Zawadzki, 2015). However, Roj-Rojewski S., Kotarska E. notes that the operation of petrol stations is influenced by many factors, the most important of which are the offered fuel prices and the appropriate location (Roj-Rojewski et al., 2018).

Domasiewicz M., Anuszkiewicz A. note that currently buying fuel is accompanied by purchasing food and drinks, using toilets, operating vehicles or simply resting. Based on the research conducted, they conclude that station customers are guided not only by the fuel purchase offer, but also by the gastronomic offer. Domasiewicz M., Anuszkiewicz A. in their scientific work indicate that every refueling customer uses additional options. Moreover, petrol stations must expand their customer base not only among drivers, but also among fellow passengers who satisfy their consumer needs at petrol stations. Domasiewicz M., Anuszkiewicz A. note that with constant attempts to increase the attractiveness of the station's offer, the sales of the fuel itself are decreasing (Domasiewicz et al., 2023). Zawadzki T., Suszyńska K. state that it is the relatively low margin per liter of fuel sold that is the source of dynamic changes in the offer of petrol stations, both in terms of the range of goods and services offered. In terms of personnel management, the emphasis is placed on enforcing the obligation to actively sell (so-called "cross-selling) in relation to each customer, and store promotions at petrol stations are shaped in the same way as in the case of other types of commercial units (Zawadzki et al., 2017).

Lewicki M., Zawadzki T. indicate that the most common reason for choosing a given petrol station by individual customers is a convenient location, station brand, price of fuel and other products, the possibility of using a loyalty program, convenient infrastructure and signage (Lewicki et al., 2020). Moreover, based on own research, it indicates that the main reason for stopping at a petrol station located on highways and expressways in the country is the need to refuel (91% of respondents), the need to use the toilet (35%) and buy other products (32%) (research conducted among 603 respondents) (Lewicki et al., 2020). Other Payback Opinion Poll studies show that for 41.2% of Poles, price is a decisive element when choosing a petrol station, and 36% of respondents indicate the location. In addition, available loyalty programs are an important selection factor (Payback Opinion Poll, 2023). The survey was conducted in July 2023 among 684 respondents. Based on the research conducted, Jedynak Z. concluded that the price of fuel is an essential factor in the selection of petrol stations by micro and small enterprises. The importance of non-price factors changes with the geographical scope of the business and the size of the fleet of vehicles at disposal. However, the main determinants were indicated by (Jedynak, 2023c):

- linking purchases, a significant number of customers refuel their vehicles at petrol stations included in the retail chain,
- permanent form of cooperation, enterprises prefer cooperation with petrol stations based on permanent contracts, however, the importance of a permanent form of cooperation varies depending on the size of the enterprise, the number of vehicles owned or geographical scope,

- the main factor in choosing petrol stations by the surveyed enterprises is price,
- non-price conditions were a secondary factor in the selection of petrol stations by the surveyed enterprises, the most important factors in their structure were: transaction execution conditions (including the form of cash and non-cash payment and a collective invoice for a given period), petrol station services (including a parking lot/TIR parking lot and a car wash) and the number of petrol stations and their location,
- traditional form of cooperation, the surveyed enterprises did not show much interest in the possibility of using e-book and the availability of a mobile application,
- in the case of primary and secondary factors in the selection of petrol stations by the surveyed enterprises, the criterion of enterprise size, fleet operated or geographical range of services provided does not indicate significant differences.

3. Methodology

The stages of implementing the research procedure include: 1) indicating the research topic, its purpose, scope and method; 2) determining and defining evaluation criteria; 3) selection of a sample for research; 4) measurement; 5) interpretation of the obtained results; 6) final conclusions; 7) dissemination of research results.

The research topic adopted is: *Determinants of gas station selection by households in south-eastern Poland*. The main goal will be to identify the primary and secondary factors that determine gas station selection by households residing in the south-eastern part of Poland.

The essence of the research problem will be to answer questions regarding the primary and secondary factors determining the choice of petrol stations for individual customers in the studied region. Detailed questions will refer to the indication of differences when choosing a supplier, taking into account the criteria of respondents' place of residence, age structure, main sources of income, number of people in the household or geographical scope of daily activity. Therefore, the research focuses on the primary and secondary factors that determine individual customers' choice of fuel station. The research is conducted on households. The research area is the retail market for transportation fuels located in south-eastern Poland in the Podkarpackie Voivodeship.

In terms of the state of knowledge, taking into account the researcher's achievements and experience, the following research hypothesis was formulated, i.e. the price of fuel is an essential factor in the selection of petrol stations by households in the Podkarpackie Voivodeship in Poland. The importance of non-price factors changes with the geographical scope of daily activities of people in the household.

The research method used is quantitative research. The research technique is a survey. Research tool Interview form. Data measurement will be carried out by surveys. Geographical scope of research: Podkarpackie Voivodeship. It was assumed that the measurement would be carried out in March-April 2025. MS Excel analytical tool. The confidentiality of data and the reliability of its collection will be maintained in the research.

For the needs of the conducted research, the following research areas were indicated, i.e. initial criterion - characteristics of respondents (*Entry criterion*); applicable form of cooperation (Form of cooperation); primary and secondary selection factors (*Determinants*). The adopted areas were defined using 22 questions. The survey form is presented in Table 1-3.

Table 1.
Interview form – Entry criterion

TESTED PARAMETER		DESCRIPTION		
I.1	Place of residence of the respondent:	A	city/village name:	
		B	name commune:	
		C	name of poviats:	
I.2	Gender of the respondent:	A	<input type="checkbox"/> woman	
		B	<input type="checkbox"/> man	
I.3	Age of the respondent:	A	<input type="checkbox"/> 18-25	
		B	<input type="checkbox"/> 26-35	
		C	<input type="checkbox"/> 36-45	
		D	<input type="checkbox"/> 46-55	
		E	<input type="checkbox"/> 56 and above	
I.4	Education of the respondent:	A	<input type="checkbox"/> higher/higher incomplete	
		B	<input type="checkbox"/> medium	
		C	<input type="checkbox"/> other	
I.5	The main source of income in the household:	A	<input type="checkbox"/> pension and annuity	
		B	<input type="checkbox"/> agricultural activities	
		C	<input type="checkbox"/> hired work (employed person)	
		D	<input type="checkbox"/> self-employed (entrepreneur)	
		E	<input type="checkbox"/> other (living on unearned sources)	
I.6	Number of people in the household:	A	<input type="checkbox"/> 1	
		B	<input type="checkbox"/> 2	
		C	<input type="checkbox"/> 3	
		D	<input type="checkbox"/> 4	
		E	<input type="checkbox"/> 5 and above	
I.7	Geographic scope of people's daily activities in households: <i>* you can mark multiple answers.</i>	A	<input type="checkbox"/> local (poviats, commune)	
		B	<input type="checkbox"/> regional (Podkarpackie Voivodeship)	
		C	<input type="checkbox"/> interregional (Podkarpackie Voivodeship area and neighboring voivodeships)	
		D	<input type="checkbox"/> domestic	
		E	<input type="checkbox"/> continental	
I.8	Type and number of vehicles at your disposal in the household: <i>* you can mark multiple answers.</i>	A	<input type="checkbox"/> passenger car	pcs.
		B	<input type="checkbox"/> delivery vehicle up to 3.5 tons (DMC)	pcs.
		C	<input type="checkbox"/> motorbike, quad, scooter, etc.	pcs.
		D	<input type="checkbox"/> electric bike, electric scooter, etc.	pcs.
		E	<input type="checkbox"/> other self-propelled vehicles	pcs.

Cont. table 1.

I.9	Type of fuel used: <i>* you can mark multiple answers.</i>	A	<input type="checkbox"/> ON
		B	<input type="checkbox"/> ON Premium
		C	<input type="checkbox"/> PB 95
		D	<input type="checkbox"/> PB 98 (Premium)
		E	<input type="checkbox"/> LPG
		F	<input type="checkbox"/> Electricity
I.10	Average monthly number of kilometers traveled in the household	A	<input type="checkbox"/> up to 1000 km
		B	<input type="checkbox"/> 1001-2500 km
		C	<input type="checkbox"/> 2501-4000 km
		D	<input type="checkbox"/> over 4000 km
I.11	Average monthly expenses incurred for the purchase of fuel in the household:	A	<input type="checkbox"/> up to 300 pln
		B	<input type="checkbox"/> 301-600 pln
		C	<input type="checkbox"/> 601-900 pln
		D	<input type="checkbox"/> over 900 pln

Source: own study.

Table 2.*Interview form – Form of cooperation*

TESTED PARAMETER		DESCRIPTION	
II.1	Do you use petrol station services?	A	<input type="checkbox"/> yes
		B	<input type="checkbox"/> no
II.2	Please circle the correct answer:	A	<input type="checkbox"/> I refuel my vehicles only at one selected brand of petrol station
		B	<input type="checkbox"/> I refuel my vehicles only at selected brands of petrol stations
		C	<input type="checkbox"/> when choosing a petrol station, the type of brand does not matter
II.3	What type of petrol station do you use? <i>* you can mark multiple answers.</i>	A	<input type="checkbox"/> station networks (e.g. Orlen, Moya, BP, Shell, CircleK, Mol, etc.)
		B	<input type="checkbox"/> independent stations (private owner)
II.4	Do you use loyalty programs offered by the petrol station?	A	<input type="checkbox"/> yes
		B	<input type="checkbox"/> no

Source: own study.

Table 3.*Interview form – Determinants*

TESTED PARAMETER		DESCRIPTION	
III.1	The importance of fuel prices when choosing a petrol station:	A	<input type="checkbox"/> is of fundamental importance (the most important)
		B	<input type="checkbox"/> on par with non-price conditions
		C	<input type="checkbox"/> secondary importance, below non-price conditions
III.2	Do you use discount coupons for fuel purchases offered by the petrol station?	A	<input type="checkbox"/> yes, if available
		B	<input type="checkbox"/> occasionally
		C	<input type="checkbox"/> no
III.3	Do you use discount coupons for the purchase of non-fuel products and services offered by the petrol station?	A	<input type="checkbox"/> yes, if available
		B	<input type="checkbox"/> occasionally
		C	<input type="checkbox"/> no

Cont. table 3.

III.4	Basic non-price factors when choosing a petrol station: <i>* you should indicate a maximum of 5 (on a scale of 1-5, where 1 is the most important factor, 5 is the lowest rated factor)</i>	A	<input type="checkbox"/> loyalty program
		B	<input type="checkbox"/> respecting the Large Family Charter
		C	<input type="checkbox"/> mobile application
		D	<input type="checkbox"/> electronic internet platform (e-book)
		E	<input type="checkbox"/> services offered at the petrol station (e.g. parking, car wash, repairs, catering, etc.)
		F	<input type="checkbox"/> location of petrol stations
		G	<input type="checkbox"/> opening hours
		H	<input type="checkbox"/> number of petrol stations and their geographical range
		I	<input type="checkbox"/> position and importance of petrol stations on the market
		J	<input type="checkbox"/> opinion about the petrol station from buyers
		K	<input type="checkbox"/> availability of gift cards
		L	<input type="checkbox"/> other, i.e.
		III.5	As part of access to the mobile application , the following is of key importance when choosing a supplier: <i>* you should indicate a maximum of 5 (on a scale of 1-5, where 1 is the most important factor, 5 is the lowest rated factor)</i>
B	<input type="checkbox"/> access to an electronic loyalty card		
C	<input type="checkbox"/> access to fuel and non-fuel transactions		
D	<input type="checkbox"/> access to sales documents		
E	<input type="checkbox"/> offered discount coupons for the purchase of fuel and other products/services		
F	<input type="checkbox"/> quick payment at the distributor		
G	<input type="checkbox"/> map location of petrol stations		
H	<input type="checkbox"/> online store		
I	<input type="checkbox"/> electronic loyalty catalogues		
J	<input type="checkbox"/> road and parking fees		
K	<input type="checkbox"/> access to navigation and maps		
L	<input type="checkbox"/> other, i.e.		
III.6	As part of access to e-bok (electronic internet platform), the selection of a supplier is of fundamental importance: <i>* you should indicate a maximum of 5 (on a scale of 1-5, where 1 is the most important factor, 5 is the lowest rated factor)</i>		
		B	<input type="checkbox"/> access to an electronic loyalty card
		C	<input type="checkbox"/> access to fuel and non-fuel transactions
		D	<input type="checkbox"/> access to sales documents
		E	<input type="checkbox"/> offered discount coupons for the purchase of fuel and other products/services
		F	<input type="checkbox"/> quick payment at the distributor
		G	<input type="checkbox"/> map location of petrol stations
		H	<input type="checkbox"/> online store
		I	<input type="checkbox"/> electronic loyalty catalogues
		J	<input type="checkbox"/> road and parking fees
		K	<input type="checkbox"/> access to navigation and maps
		L	<input type="checkbox"/> other, i.e.
		II.7	As part of the services provided at stations, the selection of a supplier is of fundamental importance: <i>* you should indicate a maximum of 5 (on a scale of 1-5, where 1 is the most important factor, 5 is the lowest rated factor)</i>
B	<input type="checkbox"/> parking		
C	<input type="checkbox"/> catering services		
D	<input type="checkbox"/> toilet/sanitation		
E	<input type="checkbox"/> hotel services		
F	<input type="checkbox"/> repair/technical inspection		
G	<input type="checkbox"/> car wash		
H	<input type="checkbox"/> parcel pickup/sending		
I	<input type="checkbox"/> direct service at the distributor		
J	<input type="checkbox"/> mobile cashiers		
K	<input type="checkbox"/> self-service checkouts in the petrol station building		
L	<input type="checkbox"/> double-sided refueling at the distributor		
M	<input type="checkbox"/> electric vehicle charging stations		
N	<input type="checkbox"/> other, i.e.		

Source: own study.

4. Empirical Results and Discussion

The research was conducted in March and April 2025. The number of respondents was 584. The sample was selected randomly. The research was direct. Due to failure to meet the geographical criterion, 29 research forms were rejected. Additionally, 20 formal errors were recorded. A total of 535 correctly completed research forms were subject to further evaluation and interpretation of the obtained results.

In accordance with the adopted geographical scope of the research, the respondents' place of residence was the Podkarpackie Voivodeship. The study was conducted in 24 poviats. Their total number in the studied voivodeship is 25 (of which 21 land counties and 4 city counties). A significant part of the respondents' structure were people living in the Rzeszów district and the city of Rzeszów. Their total share was 39.6%. It should be emphasized that the number of inhabitants of these two counties constitutes 17.8% of the Podkarpackie Voivodeship. An important group of respondents also included people representing the Dębica, Ropczyce-Sędziszów, Łańcut and Leżajsk counties. In total, their share in the research structure amounted to 19.9%, and in the number of inhabitants of the studied region - 17.1%. The geographical structure of respondents is presented in Figure 1.

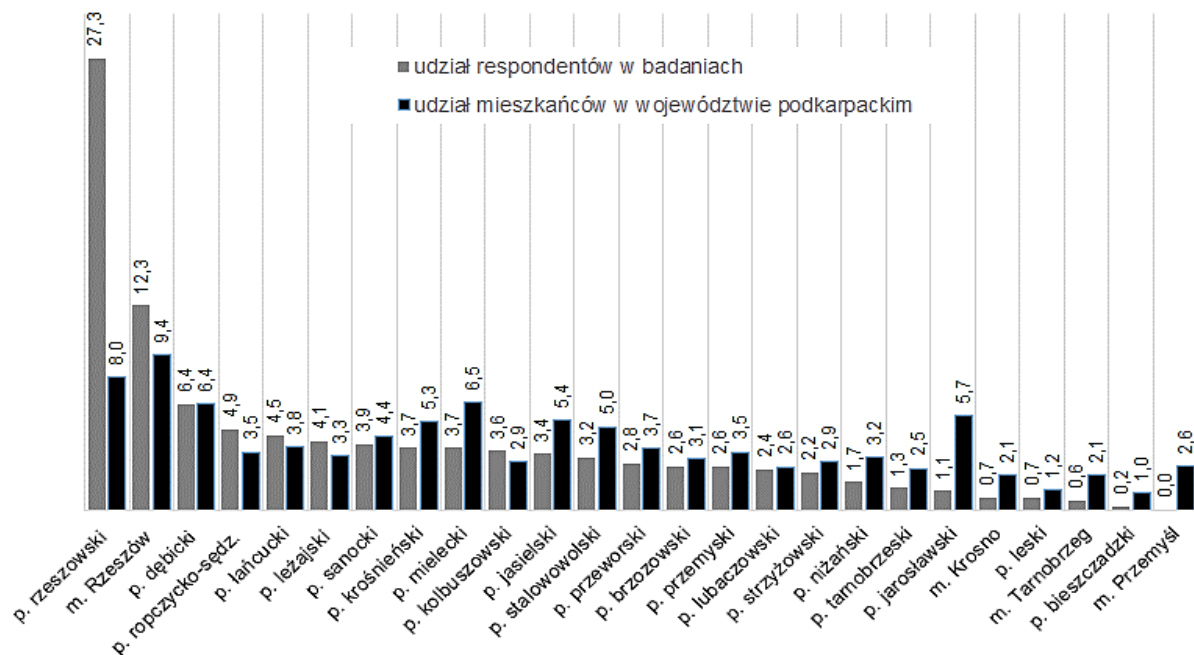


Figure 1. Geographical structure of respondents (by poviats).

Source: own study.

65.2% of the surveyed people were men. In the age structure, 73.3% are people aged 18-25 and 36-55. Taking into account education - 50.7% were people with higher education, and 43.0% with secondary education. Their main source of income was hired work - 62.0% of respondents. Self-employed people also constituted an important group (22.3%). Assuming the

criterion of the number of people in a household, the largest group were 3- and 4-person households (their total share was 58.0%). A high share was also recorded by more than 4 people (20.1%).

The geographical scope of everyday activity of people in the surveyed households was mainly local and regional (87.9% in total). 83.3% of respondents traveled a distance of up to 2500 km on average per month.

In the vehicle type structure, 72.8% were passenger cars. The average number of passenger cars per household was 2.1 vehicles. Assuming the criterion of the type of fuel used, Standard fuels had the largest share (69.4% in total, where PB 95 - 41.9%, diesel - 28.2%). However, expenses incurred for the purchase of transport fuels were mainly in the range of PLN 301-900/month (64.5% of respondents). The measurement results in the Initial Criterion area are presented in Table 4.

Table 4.
Measurement results in the area of Entry criterion

TESTED PARAMETER		MEASUREMENT										
		Total answer		I.7 [%]					I.10 [%]			
		pcs.	%	A	B	C	D	E	A	B	C	D
I.2	A	186	34,8	34,8	34,8	35,3	31,5	29,1	12,0	28,6	42,0	29,0
	B	348	65,2	65,2	65,2	64,7	68,5	70,9	88,0	71,4	58,0	71,0
I.3	A	131	24,5	24,5	24,5	23,5	27,0	25,9	16,7	0,0	25,7	21,6
	B	67	12,5	12,5	12,5	11,4	15,4	24,1	16,7	0,0	10,6	15,1
	C	114	21,3	21,3	21,3	22,7	19,5	14,8	16,7	14,3	16,8	26,1
	D	147	27,5	27,5	27,6	26,6	26,1	29,6	33,3	57,1	26,5	28,0
	E	75	14,0	14,0	14,0	15,8	12,0	5,6	16,7	28,6	20,4	9,2
I.4	A	229	43,0	43,0	43,0	38,9	48,8	58,2	48,0	57,1	38,5	41,2
	B	270	50,7	50,7	50,6	53,4	47,9	40,0	52,0	42,9	52,7	54,6
	C	34	6,4	6,4	6,4	7,8	3,3	1,8	0,0	0,0	8,8	4,2
I.5	A	46	8,5	8,5	8,5	11,0	5,7	3,6	4,0	14,3	15,4	2,3
	B	15	2,8	2,8	2,8	3,1	2,5	1,8	0,0	0,0	3,1	3,2
	C	334	62,0	62,0	61,9	62,9	63,5	58,9	64,0	57,1	55,3	72,1
	D	120	22,3	22,3	22,3	18,7	23,0	33,9	28,0	28,6	20,6	19,2
	E	24	4,5	4,5	4,5	4,3	5,3	1,8	4,0	0,0	5,7	3,2
I.6	A	41	7,6	7,6	7,6	8,8	6,1	9,1	8,0	0,0	11,1	4,5
	B	77	14,3	14,3	14,3	16,5	10,6	12,7	12,0	14,3	20,8	10,9
	C	151	28,1	28,1	28,1	25,8	28,2	27,3	20,0	28,6	30,1	25,3
	D	161	29,9	29,9	29,9	28,1	33,9	30,9	32,0	14,3	21,7	40,3
	E	108	20,1	20,1	20,1	20,9	21,2	20,0	28,0	42,9	16,4	19,0
I.7	A	388	54,1	54,1	54,0	69,4	30,9	22,6	21,7	12,5	67,7	48,5
	B	242	33,8	33,8	33,8	22,9	58,5	24,2	20,0	12,5	26,2	37,6
	C	55	7,7	7,7	7,7	5,0	7,2	44,4	13,3	18,8	3,9	9,2
	D	25	3,5	3,5	3,5	2,3	2,9	6,5	41,7	12,5	1,4	3,4
	E	7	1,0	1,0	1,0	0,4	0,5	2,4	3,3	43,8	0,7	1,4
I.8	A	1098	72,8	72,8	72,9	72,7	71,8	73,2	64,9	76,2	82,0	71,3
	B	68	4,5	4,5	4,5	5,2	4,0	5,4	6,2	0,0	3,7	4,7
	C	162	10,7	10,7	10,7	11,0	12,0	10,7	9,3	9,5	6,3	10,8
	D	73	4,8	4,8	4,8	3,6	5,6	4,8	9,3	0,0	2,8	4,6
	E	107	7,1	7,1	7,1	7,4	6,6	6,0	10,3	14,3	5,2	8,6
I.9	A	260	28,2	28,2	28,2	27,0	29,9	26,2	21,2	20,0	24,0	30,5
	B	41	4,4	4,4	4,4	3,9	6,0	9,3	7,7	0,0	4,7	4,1
	C	381	41,3	41,3	41,3	42,6	37,8	36,4	40,4	50,0	47,1	38,1
	D	78	8,5	8,5	8,5	8,8	9,7	11,2	13,5	10,0	7,9	9,6
	E	140	15,2	15,2	15,2	14,9	13,9	15,9	13,5	20,0	14,3	14,9
	F	23	2,5	2,5	2,5	2,7	2,6	0,9	3,8	0,0	2,0	2,9

Cont. table 4.

I.10	A	226	42,4	42,4	42,4	49,0	30,3	20,0	16,0	28,6	100,0	0,0
	B	218	40,9	40,9	40,9	37,0	46,1	49,1	40,0	57,1	0,0	100,0
	C	60	11,3	11,3	11,3	8,3	18,3	18,2	24,0	14,3	0,0	0,0
	D	29	5,4	5,4	5,4	5,7	5,4	12,7	20,0	0,0	0,0	0,0
I.11	A	88	16,5	16,5	16,5	19,7	8,3	7,3	8,0	14,3	36,9	1,4
	B	201	37,8	37,8	37,8	40,5	37,3	30,9	24,0	14,3	51,6	38,5
	C	142	26,7	26,7	26,7	22,3	30,3	34,5	36,0	57,1	9,3	44,5
	D	101	19,0	19,0	19,0	17,4	24,1	27,3	32,0	14,3	2,2	15,6

Source: own study.

96.3% of surveyed people use petrol station services. Almost half of the respondents (i.e. 48.4) refuel their vehicles only at selected brands of petrol stations. 27.0% buy fuels only at one selected brand of petrol station. For the remaining respondents, the type of brand is not important when choosing a petrol station. The preferred type of station by respondents is stations that are part of the sales network (79.0%). 63.2% of surveyed people used loyalty programs.

Regardless of their daily activity or the number of kilometers traveled, almost all respondents use the services of petrol stations. A significant number of them use the services of retail chains and loyalty programs. Almost half of people refuel their vehicles only at selected brands of petrol stations. It should be emphasized that the results obtained, which take into account daily activity and the number of kilometers traveled, are consistent with the overall assessment. There were no significant deviations in the structure of the responses. The measurement results in the Form of cooperation area are presented in Table 5.

Table 5.

Measurement results in the area of Form of cooperation

TESTED PARAMETER		MEASUREMENT										
		Total answer		I.7 [%]					I.10 [%]			
		pcs.	%	A	B	C	D	E	A	B	C	D
II.1	A	492	96,3	95,2	96,2	95,9	100,0	100,0	95,0	97,6	98,2	100,0
	B	19	3,7	4,8	3,8	4,1	0,0	0,0	5,0	2,4	1,8	0,0
II.2	A	143	27,0	28,5	27,1	27,3	32,0	57,1	26,9	27,3	23,3	34,5
	B	256	48,4	45,3	50,4	49,1	32,0	42,9	44,8	52,8	51,7	37,9
	C	130	24,6	26,2	22,5	23,6	36,0	0,0	28,3	19,9	25,0	27,6
II.3	A	482	79,0	79,0	78,5	83,1	65,6	100,0	80,8	81,7	68,0	69,7
	B	128	21,0	21,0	21,5	16,9	34,4	0,0	19,2	18,3	32,0	30,3
II.4	A	60,1	71,5	70,9	68,0	85,7	54,4	72,0	63,3	69,0	60,1	71,5
	B	39,9	28,5	29,1	32,0	14,3	45,6	28,0	36,7	31,0	39,9	28,5

Source: own study.

Almost half of respondents said that price is of primary importance when choosing a petrol station. For 39.8% of people, it was treated equally with the rest of the commercial offer. When purchasing fuel, 52.3% of respondents always use available discount coupons, and 27.0% occasionally use them. When purchasing non-fuel products and services offered by the station, only 23.2% take advantage of the discount offer. However, most respondents do not use discount coupons or use them only occasionally.

The basic non-price factors when choosing a petrol station were mainly indicated by its location - 19.5%, services offered at petrol stations - 12.5% and opening hours - 12.2%. Additionally, buyers' opinions about petrol stations were important - 11.1% and the available loyalty program - 9.6%. The lowest rating was given to the electronic online platform - 2.0% and the availability of gift cards - 3.2%.

As part of access to the mobile application, discount coupons for the purchase of fuel and other products or services were important when choosing a supplier - 14.9% and access to an electronic loyalty card - 13.6%. In addition, electronic access to transactions was also important - 10.6%, quick payment at the pump - 9.5% and a map of the location of petrol stations - 8.9%. 15.8% of respondents do not use the mobile application. And the lowest ratings were given to access to navigation and maps - 4.0%, online store - 4.2% and road and parking fees - 4.5%.

69.7% of respondents do not use the online platform. Users rated access to sales documents the highest - 4.4% and access to transactions - 4.0%. Electronic loyalty catalogs have the lowest - 2.1%. Moreover, similarly to the mobile application, access to navigation and maps - 2.1% and road and parking fees - 2.3%.

Among the services provided at petrol stations, toilet/sanitary conditions were of primary importance - 15.8%, accessible shops - 13.8% and parking 12.9%. Additionally, the decision was influenced by double-sided refueling at the pump - 11.8% or an available car wash - 10.2%. The lowest rated were hotel services 1.8% and electric vehicle charging stations 1.9%.

Taking into account daily activity and the number of kilometers traveled, almost all respondents indicated that price is of primary importance when choosing a petrol station. The answer recorded a high result, along with other purchase conditions. Regardless of the form of activity or the number of kilometers traveled, almost half of respondents use discount coupons for fuel purchases. However, in the case of non-fuel coupons, the vast majority are not interested or only use them occasionally. The basic non-price factors in choosing a petrol station, regardless of daily activity or the number of kilometers traveled, correspond to the overall results. There were no significant deviations in the structure of the responses. The situation is similar when assessing the functionality of a mobile application, e-book or access to services provided at petrol stations. The measurement results in the Determinants area are presented in Table 6.

Table 6.
Measurement results in the area of Determinants

TESTED PARAMETER	MEASUREMENT											
	Total answer		I.7 [%]					I.10 [%]				
	pcs.	%	A	B	C	D	E	A	B	C	D	
III.1	A	262	49,0	50,1	48,1	30,9	52,0	57,1	47,3	50,0	53,3	41,4
	B	213	39,8	38,3	39,5	43,6	24,0	28,6	42,5	39,9	30,0	41,4
	C	60	11,2	11,6	12,3	25,5	24,0	14,3	10,2	10,1	16,7	17,2

Cont. table 6.

III.2	A	279	52,3	49,1	58,5	49,1	48,0	71,4	46,5	59,0	51,7	51,7
	B	144	27,0	26,9	26,6	27,3	20,0	14,3	27,0	26,7	31,7	20,7
	C	110	20,6	24,0	14,9	23,6	32,0	14,3	26,5	14,3	16,7	27,6
III.3	A	122	23,2	21,8	25,5	29,6	33,3	33,3	20,7	23,8	23,7	37,9
	B	200	38,0	37,9	41,4	35,2	45,8	33,3	32,9	42,5	42,4	34,5
	C	204	38,8	40,3	33,1	35,2	20,8	33,3	46,4	33,6	33,9	27,6
III.4	A	242	9,6	9,4	9,9	8,9	7,7	18,8	9,7	9,8	7,7	10,7
	B	134	5,3	5,6	5,1	4,4	4,9	9,4	5,9	5,2	3,3	6,0
	C	212	8,4	8,2	8,6	8,9	8,4	9,4	7,7	9,1	9,0	6,7
	D	50	2,0	1,9	1,6	2,2	4,2	0,0	1,8	1,8	2,7	2,7
	E	317	12,5	12,3	13,8	12,6	10,5	6,3	11,3	13,1	15,0	12,1
	F	492	19,5	19,5	19,3	19,3	15,4	21,9	20,0	18,6	22,0	17,4
	G	308	12,2	12,9	12,0	11,5	11,2	9,4	13,3	11,7	11,0	10,7
	H	193	7,6	7,2	7,3	9,3	8,4	3,1	7,6	7,2	9,7	7,4
	I	208	8,2	7,9	8,4	8,5	9,8	3,1	8,2	8,9	4,7	10,7
	J	281	11,1	11,6	10,5	11,9	11,9	18,8	10,9	11,7	10,3	10,1
	K	80	3,2	3,1	2,9	1,9	6,3	0,0	3,0	2,8	3,7	5,4
	L	9	0,4	0,3	0,5	0,7	1,4	0,0	0,5	0,1	1,0	0,0
III.5	A	239	15,8	17,8	12,5	16,8	9,7	17,6	23,5	11,1	12,7	11,8
	B	206	13,6	12,5	14,6	13,5	11,7	17,6	13,0	14,0	13,3	15,3
	C	160,0	10,6	9,7	10,8	11,0	13,6	11,8	9,4	11,5	11,6	8,2
	D	130	8,6	8,6	8,6	6,5	5,8	5,9	8,5	9,1	8,3	5,9
	E	226	14,9	14,6	16,0	16,8	13,6	23,5	13,9	15,6	14,9	16,5
	F	144	9,5	9,2	10,5	10,3	10,7	11,8	7,0	11,1	10,5	10,6
	G	134	8,9	8,9	9,7	8,4	8,7	0,0	8,3	9,0	10,5	8,2
	H	63	4,2	4,5	3,9	3,9	4,9	5,9	3,8	4,1	5,0	5,9
	I	82	5,4	5,5	5,1	4,5	7,8	5,9	5,3	5,5	4,4	8,2
	J	68	4,5	4,4	5,3	5,2	5,8	0,0	3,2	5,0	6,1	4,7
	K	60	4,0	4,3	3,0	3,2	7,8	0,0	4,1	4,1	2,8	4,7
	L	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
III.6	A	490	69,7	69,2	64,8	70,4	52,4	45,5	78,1	61,3	63,1	100,0
	B	25	3,6	3,5	4,1	5,6	4,8	18,2	2,6	5,0	2,4	0,0
	C	28	4,0	4,3	4,7	2,8	4,8	0,0	3,0	5,7	2,4	0,0
	D	31	4,4	4,5	4,1	5,6	7,1	18,2	3,3	6,0	3,6	0,0
	E	24	3,4	3,3	3,8	4,2	4,8	18,2	3,3	4,4	1,2	0,0
	F	22	3,1	3,3	4,1	2,8	7,1	0,0	2,2	3,1	7,1	0,0
	G	26	3,7	3,9	3,6	2,8	4,8	0,0	3,0	4,1	6,0	0,0
	H	11	1,6	1,6	2,1	1,4	2,4	0,0	0,7	1,9	3,6	0,0
	I	15	2,1	2,0	2,4	0,0	4,8	0,0	1,1	3,1	2,4	0,0
	J	16	2,3	2,2	3,3	1,4	4,8	0,0	1,5	2,8	3,6	0,0
	K	15	2,1	2,2	3,0	2,8	2,4	0,0	1,1	2,5	4,8	0,0
	L	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
III.7	A	351	13,8	14,5	13,3	13,7	12,5	18,5	14,8	12,9	14,3	12,7
	B	327	12,9	12,6	12,1	12,9	9,9	18,5	13,9	12,3	11,9	12,0
	C	240	9,4	9,5	10,4	9,7	7,9	7,4	8,6	9,8	10,8	10,2
	D	402	15,8	15,6	16,8	18,0	13,8	25,9	15,1	16,2	17,8	13,9
	E	46	1,8	1,8	1,5	1,8	3,3	0,0	1,7	2,0	1,4	2,4
	F	92	3,6	4,1	3,5	3,6	4,6	0,0	3,2	3,8	3,1	5,4
	G	259	10,2	9,8	10,9	11,2	11,2	3,7	9,7	10,5	11,5	9,0
	H	103	4,1	4,1	4,1	2,5	5,9	3,7	4,1	4,1	3,5	4,2
	I	161	6,3	6,4	6,9	5,8	5,9	7,4	6,3	6,5	6,3	6,0
	J	103	4,1	3,7	4,0	3,6	3,9	0,0	4,8	3,8	2,8	3,6
	K	106	4,2	4,0	3,7	4,0	5,3	3,7	3,7	4,3	4,2	6,0
	L	300	11,8	11,9	11,3	9,7	10,5	11,1	12,3	11,9	10,1	10,8
	M	48	1,9	1,8	1,4	2,9	3,9	0,0	1,7	2,0	1,4	3,6
	N	4	0,2	0,2	0,2	0,7	1,3	0,0	0,2	0,0	0,7	0,0

Source: own study.

5. Conclusions

The implementation of the topic and purpose of the research allowed to identify the following determinants of the choice of petrol stations by individual customers whose place of residence is the Podkarpackie Voivodeship in Poland, i.e.:

- Regular suppliers, the majority of respondents use the services of selected brands of petrol stations or are attached to one selected brand. Based on the answers provided, it was concluded that the type of brand is important when choosing a petrol station.
- Linking the purchase, a significant number of respondents refuel their vehicles at petrol stations included in the retail chain and use available loyalty programs.
- The main factor in choosing petrol stations by households is price. In the answers provided, price was mainly of primary importance or was treated equally with non-price factors. It should be emphasized that a significant number of respondents use available discount coupons for fuel purchases. However, in the case of non-fuel products and services, they show only occasional or no interest.
- A secondary factor in the selection of petrol stations by households were non-price conditions. The most important factors in their structure were: the location of the petrol station, the services offered there and its opening hours. Opinions about petrol stations and the available loyalty program were also important.
- The preferred form of cooperation is mobile. Only 15.8% of respondents do not use the mobile application. As part of access to the mobile application, discount coupons and access to a loyalty card were important when choosing a supplier. Additionally, access to transactions via the application, quick payment at the pump and a map of petrol station locations.
- Lack of interest in the available online platform. 69.7% of respondents do not use e-book.
- Required basic standard in the scope of services provided to support purchases. As part of the services provided at petrol stations, toilet/sanitary conditions, accessible shops and parking spaces were of primary importance to the surveyed respondents. Additionally, the decision was influenced by double-sided refueling at the pump or an available car wash.
- In the case of primary and secondary factors in the selection of petrol stations by the surveyed households, the additional criteria of daily activity or the number of kilometers traveled per month do not indicate significant differences.

To sum up, the adopted topic and purpose of the article is a response to the identified needs reported by the retail market of petrol stations in relation to the current state of knowledge, achievements and experience of the researcher. The implementation of the topic and purpose of the research allowed us to identify the determinants of the choice of petrol stations by

households living in the Podkarpackie Voivodeship in Poland. In the article, the actions taken to achieve progress in scientific knowledge have led to the expansion of knowledge in the discipline of management and quality science in the area of commercial systems, their organization and management. The adopted research hypothesis was partially rejected. Price turned out to be a crucial factor when choosing a petrol station by households living in the Podkarpackie Voivodeship. However, factors related to daily activity or the average number of kilometers traveled per month did not significantly differentiate the results.

No significant limitations were noted during the research procedure. The number of surveyed respondents was 584. Their selection was random. Due to failure to meet the geographical criterion, 29 research forms were rejected. Additionally, 20 formal errors were recorded. The greatest difficulty when filling out the forms was related to answering questions III.4-III.7. In these questions, it was necessary not only to select the factors determining them but also to provide their scale of importance. A significant number of respondents limited themselves to only indicating them. Consequently, this form of response was taken into account when presenting and interpreting the research results. It should also be noted that a significant part of the respondents, above their average in the studied voivodeship, came from the Rzeszów powiat and the city of Rzeszów.

The study revealed the need for further research into the fuel sector in the Podkarpackie Voivodeship in Poland. Additionally, by introducing the time criterion, taking into account the social and economic structure of households and the purpose and type of a given petrol station. It should be noted that the literature on this subject is very limited. This becomes very clear when we take into account the geographical criterion. The author is aware that the presented study does not exhaust the topic.

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