MEASURING AND ASSESSMENT OF THE QUALITY OF MOTOR CAR MAINTENANCE AND REPAIR SERVICES WITH USING THE SERVQUAL MODEL WITH REGARD TO CUSTOMER'S PROFILE

POMIAR I OCENA JAKOŚCI USŁUG OBSŁUGI I NAPRAWY SAMOCHODÓW OSOBOWYCH Z WYKORZYSTANIEM MODELU SERVQUAL ZE WZGLĘDU NA PROFIL UŻYTKOWNIKA

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Summary

The work was undertaken to measure and assess the quality of motor car maintenance and repair services with using the SERVQUAL method.

In the investigation, the survey method was used. The inquiry form consisted of two parts. In the first one, identification questions were asked to define the customer's profile, characterizing the car user. The other one included substantive questions of the SERVQUAL inquiry form. Pursuant to the basic lines of the SERVQUAL concept, the discrepancy (gap) between the perceived and expected quality of a motor car maintenance and/or repair service obtained was examined. The diversity in the quality dimensions was analysed in relation to variables in the customer's profile.

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A data analysis based on car users' profiles has provided grounds for a statement that the widest gap was indicated by the respondents who had been car users for over 41 years. This result reflects the requirements regarding the quality dimension labelled as *tangibles*. The only positive value of the quality gap was recorded for the dimension referred to as *responsiveness* and for the same group of car users. This means that the expectations of the most experienced car users were lower than the perceived value of this dimension. The variable that in most cases diversified the assessment results was found to be the time of being a car user.

An analysis of the literature data available has revealed that the SERVQUAL model has not been used to date for measurements of the quality of motor car maintenance and repair services; thus, the attempt to fill this gap may be considered an innovative element of this study.

Keywords: quality, service, repair, motor car

Streszczenie

Celem opracowania był pomiar i ocena jakości usług obsługi i naprawy samochodów osobowych z wykorzystaniem metody SERVQUAL.

Badanie przeprowadzono metodą ankietową. Kwestionariusz ankiety składał się z dwóch części. Pierwszą stanowiły pytania metryczkowe, charakteryzujące użytkowników aut, a drugą stanowiły merytoryczne pytania kwestionariusza SERVQUAL. Zgodnie z założeniami koncepcji SERVQUAL badano różnicę pomiędzy jakością otrzymaną i oczekiwaną w związku z realizacją usługi naprawy samochodów osobowych. Przeprowadzono analizę zróżnicowania wymiarów jakości względem zmiennych opisujących profil użytkownika.

Analiza danych w oparciu o profil użytkownika auta pozwala stwierdzić, że największą wartość luki wskazali ankietowani, którzy są użytkownikami samochodu od ponad 41 lat. Wynik ten odzwierciedla wymagania w odniesieniu do wymiaru elementy materialne. Jedyną, dodatnią wartość luki odnotowano dla wymiaru zdolność reagowania. Oznacza to, że oczekiwania najbardziej doświadczonej grupy użytkowników aut w stosunku do wartości otrzymanej były mniejsze. Zmienną najczęściej różnicującą okazał się czas bycia użytkownikiem samochodu.

Przeprowadzona analiza literatury wykazała, że model SERVQUAL dotychczas nie był wykorzystywany do pomiaru jakości usług obsługi i naprawy samochodów osobowych, zatem ten wypełnienie tej luki stanowi element innowacyjny w opracowaniu.

Słowa kluczowe: jakość, usługa, naprawa, samochód osobowy

1. Introduction

From 1980s on, the notion of quality has vigorously entered the area of services. At that time, new concepts, models, rules, and methods of exploring this issue began to be developed. It has been realized that the measuring, monitoring, and assessing of the service delivery process is a very complicated issue. The service purchaser is often a witness of, and participant in, this process. The process execution involves direct contact between the service provider and the customer; therefore, the behaviour of the former is decisive for the service perception by the latter. In turn, customer's experiences and expectations may be decisive for the perceived effect of the service provided [7].

There is a lack of an unequivocal and universal definition of service quality, adopted as an abstract construct and used in the research practice. This is chiefly because of two reasons: multidimensionality of this category and fact that the service quality is finally assessed by the service purchaser, whose opinion may be based on not only non-objective but also irrational premises [8].

The service quality may be defined from two points of view:

1. Internal, as the fulfilment of specific requirements or standards. This is the quality understood as a comparison with a reasonably objective reference standard, i.e. with a specific effect planned. The quality thus defined is interesting chiefly for those who manage service organizations [20].

2. External, as the usefulness for the service purchaser. The quality thus defined is a subjective assessment of the object (i.e. service provider's product) with reference to customer's benefits, needs, preferences, and values [18]. Here, the service quality assessment is determined by the perception and subjective assessment of the object by the customer. The quality thus defined translates into customer satisfaction and is interesting for the customers themselves.

The early attempts to measure and assess the service quality [3, 6] were made to identify the factors that might be considered as collectively defining the service quality from customers' point of view. Then, a conclusion was drawn from those works that the opinions about the quality generally arise from comparisons between customers' expectations about what should be offered by the service provider and how the services actually provided are perceived [24]. Thus, it has been ascertained that the service quality may be defined as the discrepancy between customers' expectations and their perception of the specific service [3].

The service expected is what the customer expects to obtain and the service perceived is the actual customer's experience. The service quality is considered as subjectively assessed not only because it is "filtered" by customer's perception but also because customers' expectations are very diverse [4]. The quality received by the customer when "consuming" the service is compared with the expected quality, which results in the quality perceived. Therefore, an opinion should be adopted that the latter is a result of a kind of analysis. Thus, the opinion about service quality is finally determined by customer's perception.

In this study, the SERVQUAL model has been used. In spite of some imperfections, this model is a kind of a universal standard of measurement and assessment of service quality. It is universally employed for the assessment of the quality of various services, rendered in the field of e.g. public administration [22], education [23], tourism [1], finances [5], and many other areas [19]. In this study, the measuring and assessment of the quality of motor car maintenance and repair services with using the SERVQUAL method will be addressed.

2. Maintenance and repairs of passenger cars

The motor vehicle powered by an internal combustion (IC) engine has become a basic means of passenger and goods transport. At present, the functioning of a society without it is hardly imaginable. Motor vehicles are manufactured in increasing quantities, with being constantly improved to keep up with customer requirements [11].

The automotive market is one of the most developed sectors of economy. The number of motor vehicles moving on roads is growing from year to year; hence, the quantity of vehicle repairs and parts being replaced is increasing as well. The motor vehicle is a specific constructional entity, which may consist of even ten to twenty thousand component parts, with each of them performing a strictly defined function. Specific sets of the parts constitute individual constructional vehicle members (assemblies, subassemblies, systems, installations, auxiliaries, etc.). The general layout and constructional details of individual vehicle components depend on many factors. The most important of them are the intended use and anticipated operation conditions [12].

The motor vehicle, like any other technical device or machine, is subject to changes in its technical conditions during its service. As a structure consisting of many interrelated mechanisms, it is subjected to the impact of many external factors and, in consequence, it undergoes wear or damage. This results in deterioration in, or even loss of, the technical and operational features given to the vehicle by its engineering design and finally makes the vehicle operation difficult or even impossible [21].

The motor vehicles being in use require professional servicing, which is obtainable from authorized service stations and independent garages. Anything that should be done to ensure correct vehicle operation is done there by properly prepared personnel, having adequate technical equipment (back-up facilities) at their disposal.

The service life of present-day motor vehicle designs falls within a range of 250 000-500 000 km, providing that recommended spare parts and operating materials are used and recommended intervals between maintenance and repair operations are adhered to [10]. There are about fifteen million motor cars moving on Polish roads and they require an extensive and efficiently functioning technical support base, which includes authorized service stations, independent garages, and vehicle inspection stations.

The constantly increasing group of entities dealing in the technical support of vehicle servicing has become a basis for an assessment of the quality of services provided in this field.

3. Exploration methods

There are only a few methods of generalizing and simultaneously standardizing, to some extent, the quality of services that are, in author's opinion, sufficiently pertinent and universal. One of them is the use of the SERVQUAL model. In this model, two elements are observed:

(1) conceptual approach of five gaps in the service quality perception, indicating that the fifth one, critical from the customer's point of view, results from a failure to adapt the actual delivery of a service to customer's needs, and

(2) multi-item measuring scale, covering 22 statements registered on Likert scales and grouped into five quality dimensions labelled as *tangibles, reliability, responsiveness, assurance*, and *empathy*.

A concept of this model was presented by American researchers A. Parasuraman, L. Berry, and V. Zeithaml in 1985 [14] and the measuring scale was proposed by them in 1988 [13]. The SERVQUAL model is an analytical tool, which is to help in identifying gaps between the expected and perceived values of the variables that have an impact on the quality of the services offered and in striving to reduce the gaps and thus to improve the service quality [16]. The main good points of the SERVQUAL model include defining the attributes of service quality, capability of identifying reasons for low service quality, identifying quality gaps in relation to customers' expectations, and determining the benefits to be obtained in result of rectification of the quality gaps [19].

The empirical part of this study was aimed at identifying gaps in the quality of motor car maintenance and repair services, with the customer's profile being taken into account. As the secondary goal, the factors diversifying the assessment of the quality of such services were to be identified, based on a variance analysis.

In the investigation, the survey method was used. The inquiry form consisted of two parts. In the first one, identification questions were asked to prepare formal profiles of the respondents who received services in the trades under analysis. The other one included substantive standard statements presented in the SERVQUAL inquiry form for the respondents to express their opinions (agreement or disagreement) about the statements.

The respondents were sampled in accordance with the survey objective. The survey covered 100 purchasers of motor car maintenance and repair services. The sample size may be deemed big enough in consideration of the fact that a sample consisting of merely n = 200 respondents in total [2, 15] and 40 respondents for each category of the services obtained [13] is suggested by many quality and marketing researchers to be sufficient even if the measuring tools used were far more complex in comparison with those proposed here.

The survey was carried out in the period from 12 to 25 November 2016.

The data collected were statistically processed with the use of MS Excel 2003 and StatSoft Statistica 7.1 computer software.

The procedure of statistical processing, analysis, and presentation of data was as shown in Table 1.

Table 1. Investigation procedure

Item	Type of the analysis	Description, methods	Tools
1	Presentation of the sample taken for the investigation	Sample structure in respect of each variable in the customer's profile	Sample size tables
2	Presentation of investigation results: quality dimensions	Descriptive statistics for each quality dimension (mean values, standard deviation values)	Tables, bar graphs
3	Analysis of quality gaps	Descriptive statistics for five quality dimensions (mean values)	Bar graphs
4	Analysis of quality gaps in terms of the diversifying factors	Graphical analysis of the distributions, Kruskal-Wallis test, Mann-Whitney U test	Histograms, tables with results of the testing of statistical hypotheses

Source: Author's study

To verify the statistical hypotheses concerning the diversity of assessments of individual quality dimensions among specific groups separated according to individual variables in the customer's profile, the non-parametric Kruskal-Wallis test was used. In this test, the zero hypothesis (H_0) and the alternative one (H_1) assume that the samples have been taken from populations having identical and different distributions, respectively. This may be written as follows:

H_0: The distributions of the variable are identical for all the codes of the grouping factor.

H_1: The distributions of the variable differ from each other for at least two codes of the grouping factor.

A consequence of accepting the H_0 hypothesis is a statement that the levels of a factor (group) under test have no significant impact on the results observed. Similarly, the rejection of the H_0 hypothesis has the meaning of a statement that the levels of the factor under test have a significant impact on the results observed. In the latter case, the specific factor is said to diversify the results [17]. The Kruskal-Wallis test is applicable to a case where at least three codes of the grouping variable are present. For the case with only two codes of the grouping variable being present, the Mann-Whitney U test was used. Here, the zero hypothesis assumes that the mean values are equal to each other for both groups, as against the alternative hypothesis, according to which the mean values differ from each other.

4. Characterization of the sample taken for the investigation

The respondents were sampled in accordance with the survey objective, from among customers of authorized service stations and independent garages. In result of the survey, 100 inquiry forms correctly filled were obtained and subjected to a further analysis. The following six variables in the customer's profile were adopted as criteria characterizing individual respondents:

- sex;
- time of being a car user;
- age of the car being currently used;
- average annual mileage (in kilometres) of the car;
- provider of car maintenance and repair services;
- average annual number of visits at a car service workshop.

The sample has been characterized in detail in Fig. 1.

Fig. 1. Distributions of sample characteristics: (a) sex; (b) time of being a car user [years]; (c) age of the car being currently used [years]; (d) average annual mileage of the car being currently used [km]; (e) provider of car maintenance and repair services; (f) average annual number of visits to a car service workshop

Source: Author's study
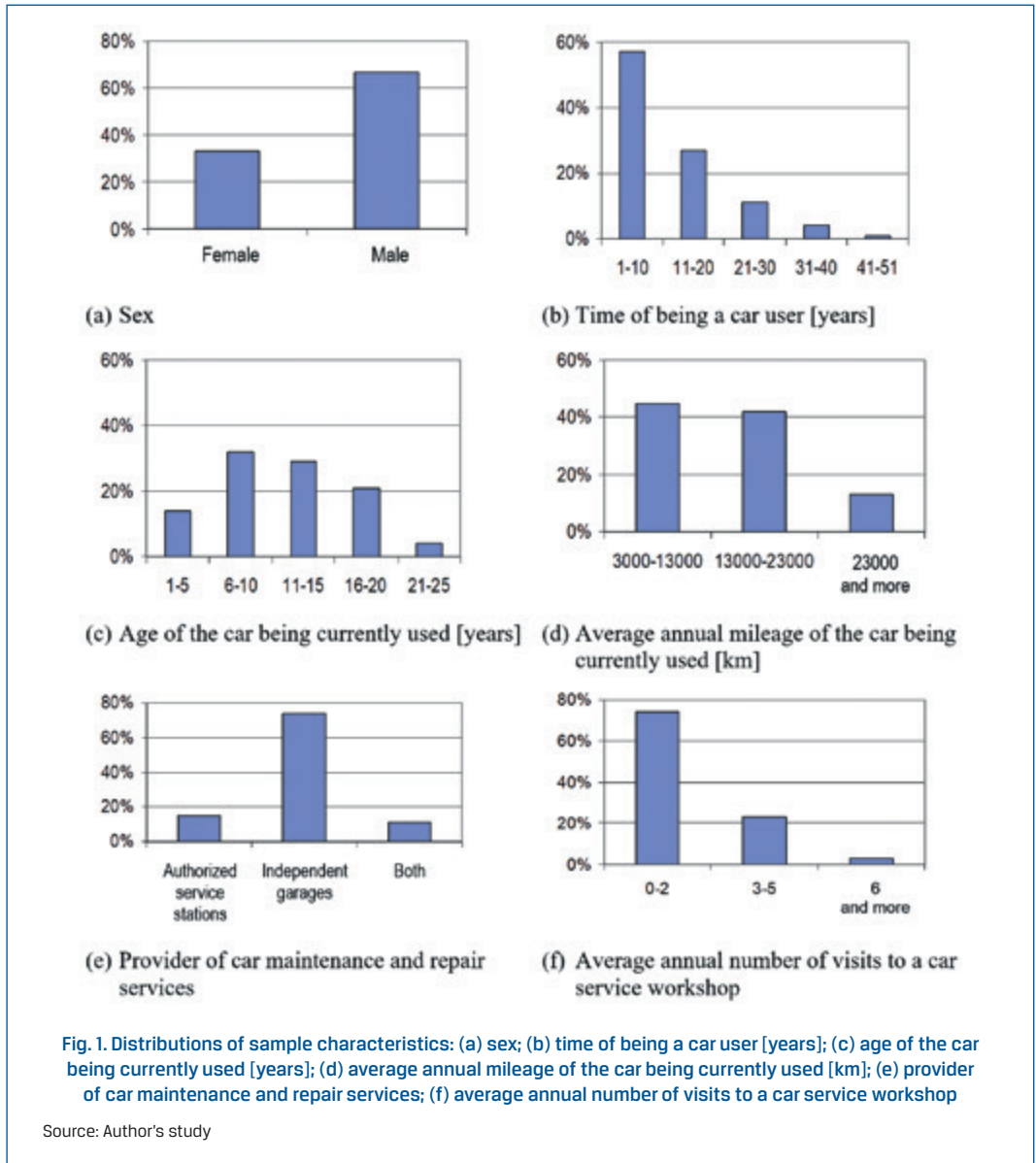
It can be seen in Fig. 1a that females made one third of all the respondents while the other two thirds consisted of males. In consideration of the subject matter, method, and place of the investigation, the relatively high proportion of females in the sample may be deemed a success. The data presented in Fig. 1b show that more than a half (57 %) of the respondents had been using a car for not more than 10 years and another 27 % of them had been car users for more than 10 but not less than 20 years. The lowest proportion of all the respondents consisted of those who had been using a car for periods of the intervals 31-40 and 41-51 years (4 % and 1 %, respectively). In the population under investigation, the average time of being a car user was 13 years. Another criterion under analysis was the age of the car being currently used. The distribution of this variable has been shown in Fig. 1c. Based on these data, a statement may be made that the highest proportion (32 %) of the total consisted of the users of cars aged 6-10 years. The drivers who possessed the oldest cars (aged 21-25 years) made only 4 % of the total. The average age of the cars being in use was 11.5 years. The next variable diversifying the sample was the average annual mileage of the car being currently used, i.e. the number of kilometres travelled on average during a year. According to the data illustrated in Fig. 1d, almost a half (45 %) of the respondents declared to travel a distance of 3 000-13 000 km a year. A distance within a range from 13 000 km to 23 000 km was annually travelled by another 42 % of the respondents and a mileage exceeding 23 000 km a year was declared by 13 % of the respondents. For the entire sample, the annual mileage averaged at 18 100 km. Fig. 1e shows the distribution of answers to the question where the car being currently used by an individual respondent was serviced or repaired. It can be seen from the data presented that almost three quarters (74 %) of the respondents used such services offered by independent garages, 15 % of the total had their cars serviced or repaired by authorized service stations, and the remaining 11 % ticked both options. The last analysed variable in the customer's profile was the average annual number of visits to a car service workshop (Fig. 1f). Most of the respondents (74 %) had their cars serviced or repaired once or twice a year and only 3 % of them declared six or more visits annually paid to a car service workshop. In general, the participants in the survey visited car service workshops twice a year, on average.

5. Discussion of the investigation results

The quality gaps revealed in result of the investigation have been presented in the form of a graph in Fig. 2.
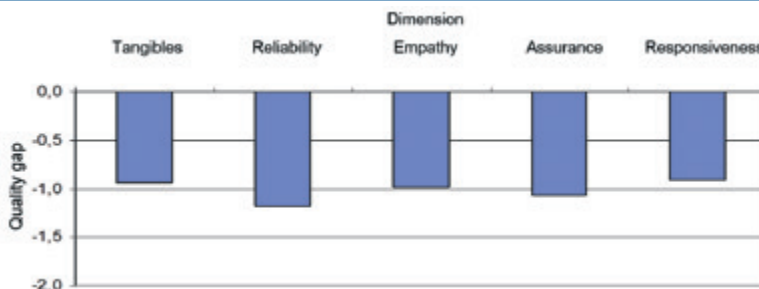

Fig. 2. Values of the quality gaps revealed

Source: Author's study

It can be seen in Fig. 2 that the greatest discrepancy (gap) between expectations and their fulfilment was observed for the quality dimension labelled as reliability. The average value of this gap was –1.18. The investigation carried out revealed that the highest expectations were manifested with respect to the punctuality and correctness (achieved at the first attempt) of the services provided. Within the reliability, both the perception and expectations regarding the way of keeping documents were ranked the lowest. For the assurance, the gap was –1.07. The dimensions for which the gap observed was below 1 (one) were responsiveness, tangibles, and empathy. The smallest discrepancy (the narrowest gap) was recorded for the responsiveness (the gap was –0.91). In this area, the respondents manifested the highest expectations with regard to the speed and efficiency of service and to the notifying of the service completion deadline to the customer (Lotko et al., 2017).

The quality gap values for specific quality dimensions have been brought together in Table 2.

Table 2. Overall summary of the quality gap values for specific quality dimensions

Variable	Quality gap values for specific quality dimensions				
	Tangibles	Reliability	Empathy	Assurance	Responsiveness
Sex					
Female	−0.90	−1.04	−0.92	−0.83	−0.67
Male	−0.96	−1.25	−1.01	−1.19	−1.02
Time of being a car user [years]					
1-10	−0.86	−1.44	−1.20	−1.39	−1.20
11-20	−1.11	−0.86	−0.73	−0.70	−0.45
21-30	−0.80	−0.70	−0.84	−0.68	−0.80
31-40	−0.13	−0.70	−0.15	−0.44	−0.50
41-51	−5.50	−1.80	0.00	0.00	0.25
Age of the car being currently used [years]					
1-5	−0.50	−0.97	−0.70	−0.61	−0.55
6-10	−1.18	−1.18	−0.94	−1.10	−0.84
11-15	−0.94	−1.14	−1.14	−1.18	−1.07
16-20	−0.93	−1.31	−1.00	−1.14	−1.00
21-25	−0.63	−1.50	−0.95	−1.25	−1.00
Average annual mileage of the car being currently used [km]					
3 000-13 000	−0.80	−1.42	−1.08	−1.15	−0.95
13 000-23 000	−0.90	−1.00	−0.90	−0.97	−0.80
23 000 and more	−1.58	−0.95	−0.89	−1.12	−1.12
Provider of car maintenance and repair services					
Authorized service stations	−0.48	−0.99	−0.75	−0.90	−0.45
Independent garages	−1.10	−1.20	−1.01	−1.05	−0.96
Both options	−0.45	−1.29	−1.07	−1.45	−1.16
Average annual number of visits to a car service workshop					
0-2	−1.05	−1.06	−0.98	−1.02	−0.86
3-5	−0.67	−1.45	−1.00	−1.14	−1.05
6 and more	−0.17	−2.07	−0.80	−1.67	−0.83

Source: Author's study

When analysing the data presented in Table 2, we can see that for the *tangibles*, the widest and narrowest quality gap (equal to –5.50 and –0.13, respectively) was indicated by the respondents who had been using a car for more than 41 years and for 31-40 years, respectively. For the *reliability*, the greatest discrepancy between the expected and perceived values was shown by the car users who most frequently (six and more times a year) had their cars serviced or repaired and the narrowest gap was recorded for those who had been using cars for not less than 21 years and not more than 40 years. As regards the *empathy*, the largest gap was indicated by persons with car driver's experience not exceeding 10 years, while the most experienced car users, with 41-51 years of driver's practice, declared the value received as not differing from their expectations. The widest quality gap in the *assurance* was reported by the care users whose vehicles were serviced and repaired by both authorized service stations and independent garages. In this quality dimension, the absence of any discrepancy between the received and expected value was again reported by the most experienced car users, i.e. by those who had been using motor cars for 41-51 years. The data that characterize the *responsiveness* indicate the widest quality gap (–1.20) to have been recorded for the least experienced car users, whose driver's practice did not exceed 10 years. For this quality dimension, a positive discrepancy value (0.25) was declared by the most experienced car users; this has the meaning that the expectations of this age group (41-51 years of being a car user) were lower than the actually perceived value of this dimension.

Table 3 shows statistically significant values of the diversity of assessments of individual quality dimensions in respect of individual variables in the customer's profile.

Table 3. Statistically significant values of the diversity of assessments of individual quality dimensions in respect of individual variables in the customer's profile

Diversifying factor*	Quality dimension				
	Tangibles	Reliability	Empathy	Assurance	Responsiveness
Sex	0.852	0.391	0.550	0.088	0.059
Time of being a car user	0.389	0.073	0.026*	0.004*	0.004*
Age of the car being currently used	0.456	0.928	0.662	0.350	0.377
Average annual mileage of the car	0.302	0.094	0.465	0.729	0.809
Provider of car maintenance and repair services	0.042*	0.785	0.623	0.430	0.124
Average annual number of visits at a car service workshop	0.208	0.071	0.920	0.483	0.799

* At a significance level of $\alpha = 0.05$

Source: Author's study

An analysis of the data presented in Table 3 shows that the factor that in most cases diversified the assessment results was the time of being a car user. The variable that diversified only one criterion was the provider of car maintenance and repair services.

6. Recapitulation

A data analysis based on car users' profiles has provided grounds for a statement that the widest gap (–5.50) was indicated by the respondents who had been car users for over 41 years. This result reflects the requirements regarding the dimension labelled as *tangibles*. The only positive value (0.25) of the quality gap was recorded for the dimension referred to as *responsiveness* and for the same group of car users. This means that the expectations of the most experienced car users were lower than the perceived value of this dimension.

The dimension most highly rated by females was *responsiveness* (–0.67) while males set the greatest value on *tangibles* (–0.96).

The users of both the youngest and oldest cars most highly appreciated the dimension labelled as *tangibles* (–0.50 and –0.63, respectively).

An analysis of the data in respect of the criterion of average annual mileage revealed that the lowest value (–0.80) of the quality gap was indicated for the *tangibles* and *responsiveness.*

As the next, the criterion of provider of car maintenance and repair services was analysed. Here, the narrowest gap (–0.45) was indicated by the customers of authorized service stations for the *responsiveness.*

The worst opinion (–2.07) was expressed by the car users who most frequently visited car service workshops about the *reliability.* In this group of car users, the smallest gap between the expectations and the perceived value was recorded for the *tangibles.*

The variable that in most cases diversified the assessment results was the time of being a car user. The variable that diversified only one criterion was the provider of car maintenance and repair services.

This study has proved the SERVQUAL method to be useful for the measuring and assessment of the quality of motor car maintenance and repair services. Moreover, it has been shown that there are formal vehicle user characteristics that significantly diversify the assessment of service quality level.

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