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EVALUATION OF SERVICE QUALITY MEASUREMENT USING THE MODIFIED SERVQUAL METHOD - CASE STUDY ON THE BASIS OF MOTOROL COMPANY

Abstract. *In the face of constant changes in the service sector, companies must adapt their offer to the needs and requirements of customers in order to gain and maintain their trust. Therefore, special attention should be paid to the quality of the services provided, since it makes it possible to meet customers' expectations. Methods aimed at researching or measuring the quality of services achieved are of great importance. There are many methods, which have been developed both in theoretical and practical applications, and allow for effective measurement of the quality of the non-material area of services. The article presents the application of the SERVQUAL method to assess the quality of services for a company providing automotive services. Familiarization with this method will allow a given company to properly adjust it to the research needs, and thus to properly interpret the collected data and draw conclusions influencing its future decisions. Based on the originality and scientific value of a given article, as demonstrated by the conducted research, the proposed method allows to learn about the actual attitudes and expectations of the client, and therefore it is a universal and very useful tool for measuring the quality of service in business practice. The obtained results prove the cognitive and practical value of the implemented research method.*

Keywords: *service quality, quality management, SERVQUAL method*

1. Introduction

The services market is of great importance for the economic development of the entire world. It is the sector with the highest market share in developed countries. In Poland, it is the main sector of the economy. According to the employment structure (2019), 62% of all employees work in services, and this sector generated 68.7% of the gross value added (2020)Główny Urząd Statystyczny). The dominant service activity in Poland is trade, accounting for 18.6% of the added value of the entire economy (Bedyńska & Cypryańska, 2013). This means that Poland is a developing country. The service sector is very dynamic, it changes with demand and technological progress. The competition on the market is also growing, which has resulted in a change in the mentality of society, which puts the main emphasis not only on the price, but also on the quality offered. Competitive advantage is built on the basis of value for money ratio, since the richer the market

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entities get, the smaller the price role is. Contemporary business management models promote customer orientation (Bielawa, 2011). It has become obvious that if the client is not satisfied with the service offered, he/she will use the services of the competition, and if the client is satisfied, he/she will come back again. Customer preferences and requirements may increase or change over time, so service providers should keep an eye on and analyze their needs to keep their services competitive. Thanks to such research, it is possible to take appropriate preventive actions at the right time and build a competitive advantage.

2. Research methodology

2.1. The essence of testing the quality of services using the SERVQUAL method

Testing the quality of services is more complex than testing the quality of products. This is mainly caused by the intangible nature and subjective dimension of service processes. For quality management to be effective, it is necessary to introduce systematic quality tests (Chakrapani, 1998). These measurements are the basis for the quality assessment of the service offered and constitute a reference point for observing the increase in quality in the company and for continuous improvement. The SERVQUAL method is one of the most popular and most frequently used methods of assessing the quality of services used by service entities operating in various industries. It allows for the assessment of the quality of services and the expression of this assessment in a quantitative manner (Cheba, 2011). The essence of this method is that the quality of the service provided results from the discrepancy between the expectations and observations of the customer. This method can be determined using the formula (Cronin & Taylor, 1994):

$$S = \sum (P - O)$$

S - the degree of meeting the expectations of recipients of services,
O - quality expected by recipients of services,
P - quality perceived by recipients of services.
There are three different variants of the mutual rate between P and O**:**
$P < O$ - consumer expectations have not been met, there is a gap in the quality of the service,
$P = O$ - consumer requirements have been met, the customer is satisfied with the service provided, the quality is acceptable to him/her,
$P > O$ - perfect condition, the customer is fully satisfied, the quality of the service offered is higher than his/her requirements.
The authors of the method (Frąś, 2009; Gilmore & McMullan, 2009; Goranczewski & Puciato, 2011; Hall, 2013; Ingaldi, 2019; Jain, 2020) defined five service quality gaps that cause customer dissatisfaction and result in low quality assessment:

- gap 1 – the difference between customer expectations and the perception of these requirements by the company's management,
- gap 2 – the difference between the company's management's perception of customer expectations and the specification of services,
- gap 3 – the difference between the specification of service quality and the quality of service provision,
- gap 4 – the difference between the quality of service provision and the information the customer has about the service,
- gap 5 – the difference between the level of meeting expectations and the customer's perception of the service.

High quality, satisfying the customer is a situation where there are no gaps (Jezior, 2013). The greater the discrepancies are, the lower the assessment will be. As a result, only the introduction of total quality (TQ) may result in full consumer satisfaction. Therefore, it is necessary to achieve excellence on three levels: designed quality, quality of implementation and, above all,

quality in accordance with customer requirements (Kosiorek, 2013). The gaps are characterized by the discrepancies between different levels. The most important element of the SERVQUAL method is the fifth gap, which is described using 22 criteria derived from five dimensions: material framework of the service (tangibles), reliability, liability of service providers (responsiveness), service assurance and service affordability (empathy) which express basic quality parameters in services. The number of criteria can be modified according to the needs of a given service. All the criteria can be modified, as the market of services is very large and they should always be properly adjusted taking into account the specific features of a given service. According to (Laudański et al., 2012; Rodzeń et al., 2018; Roszak, 2014; Słowiński, 2011; Snarski, 2012). SERVQUAL is a framework that, when necessary, can be adapted or supplemented in order to adjust it to the characteristics or specific research needs of individual organizations.

The study is carried out in two parts (Stoma, 2012), with the use of a fixed scale of differentiation and the examination of the significance of individual criteria, which include: the examination of customer expectations, the assessment of service perception, the assessment of the importance of criteria for the customer.

The result of the study should be, first of all, a ranking set of specific criteria for the service under examination, taking into account all levels of the service that are the basis of the SERVQUAL model, but most of all, the factors that are important for a given service. Due to its universal nature and the possibility of applying criteria specific to each industry the SERVQUAL method is an effective tool for examining the characteristics of services. The division of criteria into five groups (Zarządzanie jakością bez tajemnic 2015) allows for full identification of factors influencing the quality and ordering the quality assessment system. By naming and categorizing the characteristics of individual aspects of services makes them become more

"material". However, it should be noted that the applied quality assessment criteria are too general to be used to measure the quality of various services. Each industry requires the application of detailed, specific criteria, differentiated also according to the type and standard of the offer (Urban, 2018).

2.2. Subject matter and purpose of the research

Leave The aim of the research is the dimensional characteristics and the analysis of the quality assessment of the services provided by the Motorol company which deals with the distribution of car parts in southern Poland, using the modified SERVQUAL method. The study was conducted in the months of X-XI 2020 on the customers of the analyzed company. The basic principle adopted in order to select appropriate research sample was that the respondents could only be entities which placed systematic orders within 10 months, at least several times a month. The research site was the commercial premises of Motorol company's customers. The survey questionnaire was delivered together with the ordered goods. Moreover, an interview with the company's customers was conducted via the Google Docs website.

Due to the complex characteristics of the industry and the variety of services offered by the company, it was decided that the original SERVQUAL method might not be sufficient to measure all aspects affecting the quality of the services provided. It was decided to modify the criteria and dimensions of quality to better suit the specificity of the analyzed industry.

The starting point of the research was an attempt to identify the features that affect the quality of the service. Using the expert method, the knowledge of the authors, literature sources and cooperation with the management of Motorola, x27 features that affect the quality of services offered were distinguished. It was assumed that the number of features does not have to be 22, as it is in

the SERVQUAL method. The list of criteria was consulted with 15 Motorol customers and supplemented with 2 additional criteria. The following x29 criteria were proposed: good location of the storehouse; good availability of parking spaces; modern equipment (fleet, warehouse); neat, professional appearance of employees; neat, legible invoice; relevant promotional materials; affordable price level; wide product offer; appropriate departure times; affordable order fulfillment time; timely execution of orders; delivery compliance; a wide range of promotions offered; exemplary honesty of employees; no software problems; high employee competences; good manners of employees; comprehensive knowledge of employees regarding the ordered goods; friendly attitude towards the customer; individual approach to client; adjusting departures to customer needs; ease of placing orders; the possibility of carrying out special orders; staff patience; convenient payment methods; no busy telephone lines; quick handling of complaints and claims; quick handling of returns; quick response to delivery inconsistencies.

In the next section of the research, a questionnaire using the 5-point Likert scale was constructed, in which the respondents assessed the impact of variables on the quality of services offered. On this scale, it was assumed that the number 1 indicates a very weak impact, while the number 5, a very strong impact of a given factor on the overall quality of services expected by the customers. When completing the questionnaire, the customers also assessed the expectations as to individual quality criteria. During the two-month survey the responses of 105 respondents were collected. The results of these studies were used to build the structure of factors and characteristics of the quality dimensions using exploratory factor analysis with normalized Varimax rotation. The number of dimensions was determined graphically by means of a scree plot on the basis of which the classification of criteria to appropriate dimensions was developed. In order to obtain reliable data for further

analysis, a second questionnaire also based on Likert scale was developed. In this questionnaire, the customers assessed individual quality criteria based on their experience with the Motorol company. In addition to the questions on the quality criteria, the questionnaire also included additional questions to identify the descriptive features of the respondent, including: type of activity, area of activity, gender, length of cooperation with Motorol, ordering method and respondent's age. This questionnaire was presented to potential respondents in order to determine if it was understandable and clear. The pilot test and reliability analysis were carried out on 30 respondents. Then, proper research was conducted on a sample of 105 respondents, and then another questionnaire was developed, on the basis of which the weights of individual dimensions were obtained according to the expectations of Motorol's customers. The responses received from 97 respondents were used to calculate weighted and unweighted quality gaps. A model of the company's services quality was built in order to interpret them. This model was described by a mathematical formula in which the weights and the results of individual dimensions were taken into account. For the construction of the model, assumptions were made, taking into account the results of the factor analysis, which allowed for the elimination of strongly correlating criteria and for classifying and assigning them to a specific quality group. All research activities were carried out using the IBM SPSS program.

3. Research results and discussion

In order to confirm the correctness of using the exploratory factor analysis to perform the analysis of service quality evaluation in a given company, control tests were performed to determine whether it meets the required conditions of applicability according to rigid assumptions contained in the literature. X29 variables were specified and 105 observations

were made. This means that their minimum number was met. On the basis of calculations and descriptive statistics of the analyzed variables, it was found that the requirement regarding the absence of variables with standard deviation equal to 0 was also met.

The results of this part of the analysis allowed to build a correlation matrix in the form of the so-called shadow map (Table 1) and calculate the determinant of the detA matrix, expressed as the ratio of the variables variance to their covariance:

$$detA = 0,000000036$$

Table 1. Correlation matrix in the form of a shadow map (source: own study)

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16	x17	x18	x19	x20	x21	x22	x23	x24	x25	x26	x27	x28	x29
x1	1	0,482	0,074	0,168	-0,1	0,295	0,237	0,226	0,006	0,094	0,13	0,216	0,304	0,092	0,192	0,193	0,044	0,124	0,226	0,124	0,171	0,231	0,256	0,241	0,444	0,056	0,173	0,04	0,071
x2	0,482	1	0,279	0,294	0,12	0,129	0,176	0,198	-0,06	0,104	0,073	-0,02	0,23	0,284	0,185	0,206	0,122	0,146	0,206	0,114	0,094	0,09	0,198	0,169	0,104	0,263	0,275	0,274	0,104
x3	0,074	0,279	1	0,476	0,558	0,143	0,111	0,146	0,196	0,114	0,11	0,046	-0,05	0,311	0,266	0,317	0,251	0,169	-0,01	0,217	0,117	0,094	0,166	0,037	0,044	0,019	0,154	0,152	0,172
x4	0,168	0,294	0,476	1	0,381	0,282	0,223	0,285	0,243	0,22	0,148	0,215	0,234	0,442	0,205	0,421	0,486	0,279	0,244	0,126	0,096	0,209	0,153	0,267	0,096	0,09	0,25	0,138	0,267
x5	-0,1	0,12	0,558	0,381	1	0,29	0,206	0,078	0,403	0,036	0,008	0,068	-0	0,223	0,347	0,245	0,336	0,292	0,165	0,22	0,214	0,117	0,213	0,23	0,134	0,191	0,116	0,141	0,148
x6	0,295	0,129	0,143	0,282	0,29	1	0,319	0,325	0,378	0,202	0,148	0,213	0,392	0,266	0,241	0,321	0,295	0,287	0,334	0,191	0,233	0,193	0,272	0,306	0,306	0,129	0,166	0,203	0,143
x7	0,237	0,176	0,111	0,223	0,206	0,319	1	0,707	0,497	0,622	0,598	0,474	0,228	0,541	0,448	0,442	0,332	0,471	0,499	0,468	0,388	0,507	0,453	0,312	0,28	0,255	0,413	0,308	0,416
x8	0,226	0,198	0,146	0,285	0,078	0,325	0,707	1	0,44	0,638	0,541	0,503	0,274	0,574	0,41	0,452	0,336	0,314	0,374	0,389	0,321	0,508	0,438	0,372	0,254	0,241	0,397	0,257	0,441
x9	0,006	-0,06	0,196	0,243	0,403	0,378	0,497	0,44	1	0,463	0,462	0,4	0,093	0,481	0,555	0,357	0,407	0,289	0,32	0,418	0,388	0,507	0,48	0,279	0,352	0,164	0,385	0,243	0,163
x10	0,094	0,104	0,114	0,22	0,036	0,202	0,622	0,638	0,463	1	0,623	0,618	0,314	0,56	0,272	0,463	0,339	0,241	0,406	0,339	0,311	0,389	0,217	0,352	0,248	0,207	0,458	0,275	0,561
x11	0,13	0,073	0,11	0,148	0,008	0,148	0,598	0,541	0,462	0,623	1	0,688	0,178	0,452	0,443	0,408	0,272	0,265	0,288	0,354	0,391	0,499	0,411	0,138	0,232	0,248	0,626	0,439	0,471
x12	0,216	-0,02	0,046	0,215	0,068	0,213	0,474	0,503	0,4	0,618	0,688	1	0,171	0,385	0,406	0,438	0,364	0,211	0,274	0,275	0,296	0,382	0,353	0,282	0,303	0,274	0,523	0,326	0,446
x13	0,304	0,23	-0,05	0,234	-0	0,392	0,228	0,274	0,093	0,314	0,178	0,171	1	0,23	-0,04	0,138	0,146	0,165	0,252	-0,02	0,031	0,035	0,06	0,289	0,231	0,225	0,317	0,178	0,326
x14	0,092	0,284	0,311	0,442	0,223	0,266	0,541	0,574	0,481	0,56	0,452	0,385	0,23	1	0,436	0,495	0,446	0,291	0,427	0,452	0,377	0,518	0,522	0,469	0,241	0,259	0,328	0,236	0,375
x15	0,192	0,185	0,266	0,205	0,347	0,241	0,448	0,41	0,555	0,272	0,443	0,406	-0,04	0,436	1	0,543	0,412	0,364	0,386	0,458	0,433	0,567	0,514	0,318	0,331	0,165	0,384	0,273	0,157
x16	0,193	0,206	0,317	0,421	0,245	0,321	0,442	0,452	0,357	0,463	0,408	0,438	0,138	0,495	0,543	1	0,599	0,511	0,425	0,335	0,218	0,42	0,221	0,357	0,284	0,241	0,33	0,181	0,366
x17	0,044	0,122	0,251	0,486	0,336	0,295	0,332	0,336	0,407	0,339	0,272	0,364	0,146	0,446	0,412	0,599	1	0,452	0,389	0,167	0,167	0,375	0,242	0,266	0,192	0,22	0,263	0,194	0,14
x18	0,124	0,146	0,169	0,279	0,292	0,287	0,471	0,314	0,289	0,241	0,265	0,211	0,165	0,291	0,364	0,511	0,452	1	0,565	0,387	0,211	0,38	0,287	0,336	0,283	0,105	0,336	0,231	0,261
x19	0,226	0,206	-0,01	0,244	0,165	0,334	0,499	0,374	0,32	0,406	0,288	0,274	0,252	0,427	0,386	0,425	0,389	0,565	1	0,5	0,379	0,359	0,355	0,5	0,274	0,22	0,311	0,193	0,193
x20	0,124	0,114	0,217	0,126	0,22	0,191	0,468	0,389	0,418	0,339	0,354	0,275	-0,02	0,452	0,458	0,335	0,167	0,387	0,5	1	0,553	0,395	0,443	0,417	0,177	0,157	0,322	0,203	0,196
x21	0,171	0,094	0,117	0,096	0,214	0,233	0,388	0,321	0,388	0,311	0,391	0,296	0,031	0,377	0,433	0,218	0,167	0,211	0,379	0,553	1	0,508	0,455	0,394	0,306	0,158	0,219	0,308	0,217
x22	0,231	0,09	0,094	0,209	0,117	0,193	0,507	0,508	0,507	0,389	0,499	0,382	0,035	0,518	0,567	0,42	0,375	0,38	0,359	0,395	0,508	1	0,573	0,312	0,435	0,1	0,336	0,276	0,247
x23	0,256	0,198	0,166	0,153	0,213	0,272	0,453	0,438	0,48	0,217	0,411	0,353	0,06	0,522	0,514	0,221	0,242	0,287	0,355	0,443	0,455	0,573	1	0,528	0,401	0,177	0,313	0,335	0,18
x24	0,241	0,169	0,037	0,267	0,23	0,306	0,312	0,372	0,279	0,352	0,138	0,282	0,289	0,469	0,318	0,357	0,266	0,336	0,5	0,417	0,394	0,312	0,528	1	0,408	0,21	0,268	0,125	0,293
x25	0,444	0,104	0,044	0,096	0,134	0,306	0,28	0,254	0,352	0,248	0,232	0,303	0,231	0,241	0,331	0,284	0,192	0,283	0,274	0,177	0,306	0,435	0,401	0,408	1	0,143	0,287	0,089	0,115
x26	0,056	0,263	0,019	0,09	0,191	0,129	0,255	0,241	0,164	0,207	0,248	0,274	0,225	0,259	0,165	0,241	0,22	0,105	0,22	0,157	0,158	0,1	0,177	0,21	0,143	1	0,382	0,173	0,123
x27	0,173	0,275	0,154	0,25	0,116	0,166	0,413	0,397	0,385	0,458	0,626	0,523	0,317	0,328	0,384	0,33	0,263	0,336	0,311	0,322	0,219	0,336	0,313	0,268	0,287	0,382	1	0,517	0,411
x28	0,04	0,274	0,152	0,138	0,141	0,203	0,308	0,257	0,243	0,275	0,439	0,326	0,178	0,236	0,273	0,181	0,194	0,231	0,193	0,203	0,308	0,276	0,335	0,125	0,089	0,173	0,517	1	0,368
x29	0,071	0,104	0,172	0,267	0,148	0,143	0,416	0,441	0,163	0,561	0,471	0,446	0,326	0,375	0,157	0,366	0,14	0,261	0,193	0,196	0,217	0,247	0,18	0,293	0,115	0,123	0,411	0,368	1

One On the basis of the data included in Table 1, it was noticed that many variables strongly correlate with each other. Additionally, Bartlett's test of sphericity was carried out using the IBM SPSS program and the coefficient (KMO - Kaiser-Mayer-Olkin) for the selection of the sample effectiveness was calculated. In the Bartlett's test of sphericity, a large discrepancy was obtained (chi-square = 1586), which with the given significance level and 406 degrees of freedom means that the theoretical condition of the test was met. Moreover, the value of the KMO coefficient was 0.823, which with theoretical assumption> 0.5, also confirms the correctness of using factor analysis to assess the quality of testing services in the analyzed enterprise.

To perform the factor analysis, the number of factors (dimensions) were determined, which were created through the relational dependencies of individual variables. To determine their number, the results obtained from tests carried out with the use of three different methods were used.

The first one was the Kaiser criterion method, in which each component variable that explains more variance than the base variable (eigenvalues greater than 1) was taken into account. Initial eigenvalues are presented in Table 2.

According to the Kaiser criterion, eight factors were distinguished (the ninth factor has an eigenvalue <1), which together explain 70% of the total variance of all 29 variables. The second criterion for determining the number of factors was the Cattell scree method, in which the eigenvalues sorted in non-decreasing way were interpreted, on the basis of which the so-called scree plot (Fig. 1) was prepared. In this graph, the slope and the scree were defined, and the factors that make up the slope were taken as the number of factors.

Table 2. Initial eigenvalues (source: own study)

Component	Initial eigenvalues		
	in total	% variance	% cumulative
1	9,506	32,781	32,781
2	2,190	7,551	40,332
3	1,957	6,747	47,079
4	1,829	6,307	53,386
5	1,407	4,851	58,237
6	1,169	4,031	62,268
7	1,134	3,910	66,178
8	1,095	3,777	69,954
9	0,977	3,370	73,325
10	0,834	2,875	76,200
11	0,788	2,717	78,917
12	0,664	2,291	81,208
13	0,601	2,072	83,280
14	0,572	1,972	85,252
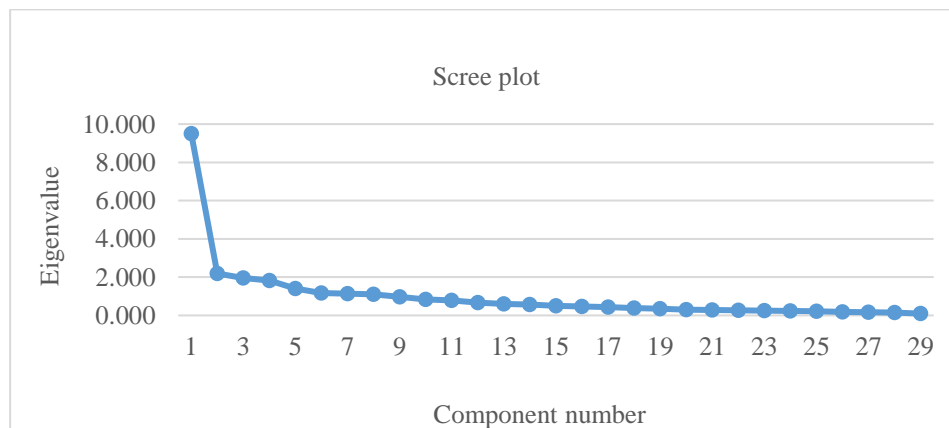
Figure 1. Scree diagram (source: own study)

The third method used to establish the number of factors was the sufficient proportion criterion. In this method, it was necessary to determine what level of the explained variance of variables should be achieved by the factors. In the literature (Urbaniak, 2014; Wasilewski, 2010; Woźniak & Zimon, 2016; Wyrębek, 2013), different levels (70-90%) of the explained values of the variables are assumed. Based on the results included in Table 2, it was found that 8 factors should be taken into account in accordance with this criterion. Together, they explain 70% of the total variance of all variables.

Subsequent research included the analysis of the results using Varimax rotation, the aim of which was to match the structure of the factors to the obtained variables more accurately. It was established that for the variable to be significant, the minimum absolute value of the factor load should be> 0.5. After rotating the factor load matrix, it was determined that the tested variables are significant because their factor values significantly exceed 0.5. The first factor W1 – reliability, which was obtained at the level of - 14.6%, explains the greatest number of variances, the eight factor W8 – location, at the level of 5.8%, explains the least.

On the basis of the analysis, the interpretation and description of each of the 8 analyzed dimensions that affect the quality of services provided by the company dealing with the distribution of car parts was made:

- W1 – reliability – 14.6 % variability. It mainly includes features related to keeping deadlines and the speed of order fulfillment. Appropriate competitive prices and the honesty of employees are also of great importance to customers.
- W2 - ability to adapt to the client - 11% variability. In the analyzed industry, an individual approach and meeting all customer wishes is important, for example, the implementation of special orders that go beyond the standard range of products offered. Customer satisfaction increases significantly when they see that each customer is important to the enterprise and that they can meet all industry needs in one place. The patience of staff is also important as customers can be very demanding.
- W3 - staff reliability - 9.2% variability. This factor is understood as professionalism, high competences and personal culture of employees. Customers often have direct contact with employees,

therefore they can perceive the quality of the enterprise through the quality offered by the staff.
- W4 - flexibility - 8.2% variability. This dimension applies to the channels through which the customer can be served. Nowadays, it is an important aspect, because the company's services are used by customers of all ages who want to settle matters in the most convenient way. Various forms of payment and the company's intuitive software, which is free from errors, as well as the number of ways in which goods can be ordered significantly contribute to the quality perceived by the customer.
- W5 - visual aspects - 8% variability. In this dimension, a positive image of the company is important, which is influenced by such aspects as the appearance of employees, what the invoice looks like or modern equipment.
- W6 - service dynamics - 6.8% variability. The dimension refers to the speed of handling matters not directly related to the execution of the order, such as: the speed of handling returns or the speed of handling complaints and claims. These aspects are also important for the customer, and good management of them increases the company's competitiveness.
- W7 - promotion - 6.3% variability. It covers matters related to advertizing and promotional materials. Attractive promotions, as well as clear and legible promotional materials increase the quality of services.
- W8 - location - 5.8% variability. The dimension refers to the possibility of settling matters directly in the storehouse. It includes features such as the location of the storehouse and the availability of parking spaces.

The model of the characteristics of services provided by the enterprise is described using the formula:

$$Y = (W1, W2, W3, W4, W5, W6, W7, W8)$$

Y – service dimensional characteristics model,

W1,W2,W3,W4,W5,W6,W7,W8 – factors (dimensions).

Table 3. Alpha-Cronbach coefficient for each dimension (source: own study)

Dimensions	Features	Alfa-Cronbacha
Dimension 1 – Reliability	Proper order fulfillment time	0,874
	Timely execution of orders	
	Wide range of products	
	Quick response to delivery inconsistencies	
	Exemplary compliance of the delivery with the order	
	Appropriate price level	
	Honesty of employees	
Dimension 2 – Adaptation to the customer	The possibility of adapting trips to the client	0,774
	Individual approach to client	
	Possibility of carrying out special orders	
	The patience of the staff	
Dimension 3 – Reliability of the staff	Professional employee-customer relationship	0,791
	High personal culture of employees	
	High employee competences	
	Great knowledge of employees about orders	
Dimension 4 – Flexibility	Various forms of payment	0,768
	Ease of placing orders	
	Well-functioning software	
	Adequate departure times	
Dimension 5 – Visual aspects	Modern design of the equipment	0,726
	Simple texture look	
	Neat appearance of the staff	
Dimension 6 – Dynamics of service	Fast handling of complaints and complaints	0,719
	Quick handling of returns	
	No busy telephone lines	
Dimension 7 – Promotion	Relevant promotional materials	0,711
	A wide offer of promotion	
Dimension 8 – Location	High availability of parking spaces	0,747
	Good location of the warehouse	

On this basis, the importance of individual dimensions was assessed by assigning weights to them. Weights were assigned to dimensions on the basis of the survey questionnaire. The respondents were asked to distribute 100 points into eight dimensions, according to the rule the more important the dimension is, the more points it should get. According to the respondents, the most important dimension in the case of the quality of services of a company dealing with the distribution of car parts is reliability, which was assigned a weight of 0.28. The second dimension is the dynamics of service - weight 0.18, the next one is flexibility 0.16. The fourth place was determined by the staff reliability dimension - weight 0.12, the fifth - ability to adapt to the client 0.11.

The least important factors are promotion - weight 0.08, visual aspects - weight 0.04 and location - 0.03. These results made it possible to develop a service quality model for the analyzed company, which is presented graphically in Fig. 2 and in the form of a mathematical formula:

$$Q = 0,28q1 + 0,11q2 + 0,12q3 + 0,16q4 + 0,04q5 + 0,18q6 + 0,08q7 + 0,03q8$$

Q – the quality of the services provided,

q1,q2,…,q8 – partial qualities of individual dimensions.

Subsequently, the results of the analysis were assessed for the quality expected and experienced by the respondents. All the features of the analyzed dimensions reached the average of expectations at a level greater than (4.4). The highest level of expectations concerns the timely execution of orders (4.77) and the exemplary compliance of the delivery with the order (4.71). Rapid response to delivery inconsistencies came third (4.63). The least significant feature in this dimension was the honesty of employees (4.41). High average expectations (above 4.0) were also achieved by the characteristics of the service dynamics dimension: fast handling of complaints and claims (4.38), quick handling of returns (4.15), no busy telephone lines (4.05). In other dimensions, most of the features reached the average level in the range of (3.0 - 4.0). Other attributes that achieved the average (above 4.0) are: high competences of the employees (4.05), ease of placing orders (4.12), well-functioning software (4.11). The lowest average expectations concern the characteristics of the dimensions: visual aspects - neat invoice (2.36), modern equipment (2.83) and location - high availability of parking spaces (2.99).
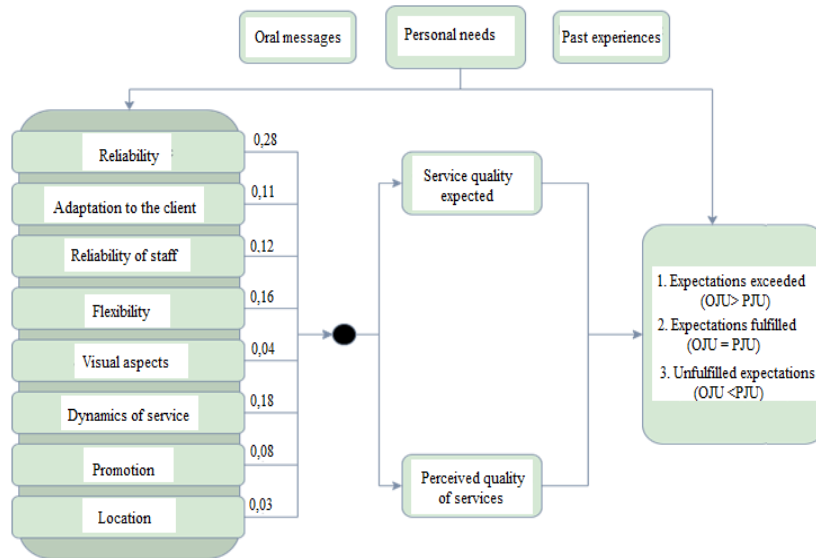

Figure 2. Model of the perception of the quality of services by the company's customers
(source: own study)

The features of the considered dimensions regarding the experienced quality differ significantly from the expected quality. The respondents best assessed quick response to delivery inconsistencies (4.26) and timeliness of orders (4.24). Both of these features are found in the reliability dimension. Other features assessed (above 4.0) are: various

forms of payment (4.10), a wide promotion offer (4.10) and the ease of placing orders (4.01). The least-rated attributes were: the ability to adjust departures to the customer (2.54) and an individual approach to the customer (2.77) from the dimension of adaptation to the customer and quick handling of returns (2.74) from the dimension of service dynamics. Other attributes had mean values in the range of (3.0 - 4.0).

Based on the obtained results of the quality assessment, the gaps of individual attributes were determined. The difference between the value of experienced quality and the value of expected quality for individual dimensions was calculated. Figure 3 (see Appendix) presents a data comparison of the average experienced quality and the expected quality. In a much larger quantity of attributes, the mean expected value is higher than the mean experienced value. This means that there are many gaps in the quality of services provided by the company. The largest one occurs in the case of exemplary compliance of the delivery with the order and quick handling of returns. There are also cases of attributes where the experienced quality exceeds the expected quality. These are, among others: a broad promotion, a neat invoice and various forms of payment.

Partial gaps of individual attributes are the basis for further analysis of dimensional gaps. Total quality gap, which is (-0.26), was calculated as the difference between the mean value of experienced quality (3.58) and the mean expected quality (3.84). Interpretation of the gap using the four gap levels proposed by M. Sidor (Sidor M. W. 2005) says that the gap in the range (0 to -1) indicates a satisfactory level of services. This shows that Motorol company provides a satisfactory level of service. However, the existence of gaps indicate that not all customer requirements have been met, so the areas where corrective actions can be applied must be identified. For this purpose, the gaps were

analyzed and calculated individually for each dimension, the values of which are summarized in Table 4 and schematically shown in Figure 4.

Table 4. Gaps for individual dimensions (source: own study)

Dimension	Gap
Reliability	-0,76
Adaptation to the client	-0,63
Reliability of staff	-0,16
Flexibility	-0,06
Visual aspects	0,91
Dynamics of service	-1,02
Promotion	0,35
Location	0,36

According to this part of the analysis, the company should focus on eliminating the largest gaps, which comes to improvement activities in the areas of: service dynamics, reliability and adaptation to customer needs.

In order to locate the features affecting the gaps in individual dimensions, an analysis of service quality assessments was made in relation to expectations in each dimension. Due to the extensive results in this part of the analysis, it was decided to present the results of only one gap in the reliability dimension. In the case of this dimension, it can be seen that all features create a quality gap (Table 5). In this dimension, the respondents have the greatest requirements, so despite high evaluation of most features, a large quality gap emerged at the level of: compliance of the delivery with the order (-1.65) and the appropriate price level (-0.82). In turn, the smallest gap (-0.37) is generated by a quick response to delivery inconsistencies. Due to high requirements, despite the fact that this feature was rated the highest among all the analyzed ones, customer expectations were not met. The remaining features create gaps in the range of (-0.5 to -0.8). These results are the basis for introducing corrective actions at particular levels of features.
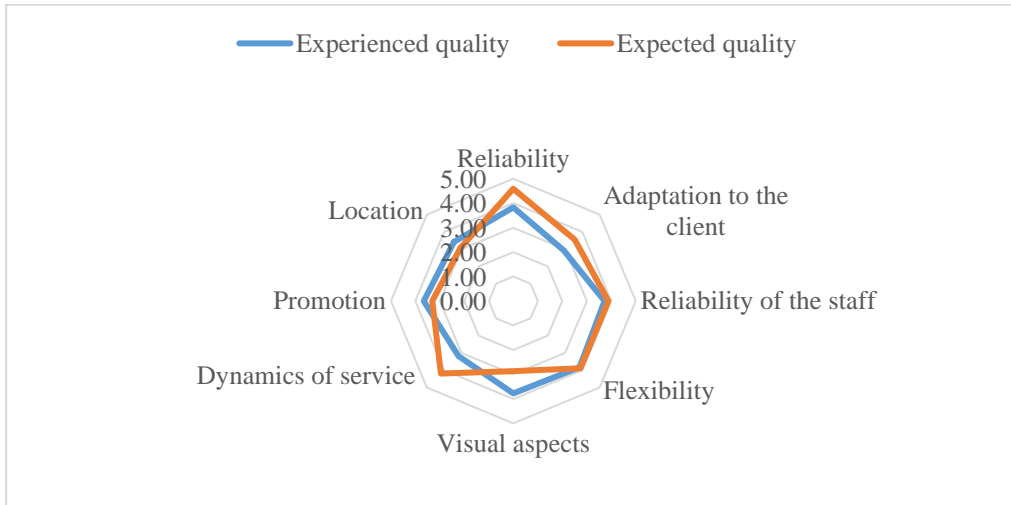
Figure 4. Quality of service according to dimensions (source: own)

Table 5. Gaps in the reliability dimension (source: own study)

Dimension	Features	The value of the gap
Dimension 1 – Reliability	Proper order fulfillment time	-0,69
	Timely execution of orders	-0,53
	A wide range of products	-0,64
	Quick reaction to delivery inconsistencies	-0,37
	Exemplary compliance of the delivery with the order	-1,65
	Right price level	-0,82
	Honesty of employees	-0,62
	C1	C2
Importance Weights	(0.7,0.9,1.0)	(0.5,0.7,0.9)

To calculate the weighted quality gaps of individual dimensions, a survey questionnaire was used in which the respondents were asked to distribute 100 points at their own discretion between all dimensions. Weighted gaps were calculated from the formula:

$$SQx = Qx * Wx$$

SQx – dimension x weighted mean gap,

Qx – dimension x gap,

Wx – dimension x weight,

The weighted gaps of individual dimensions are summarized in Table 6. Due to the large unweighted gap and the greatest weight, the reliability dimension creates the largest weighted gap of (-0.21). Another dimension, despite its less importance, is the dynamics of service (-0.18). This is due to the largest unweighted gap. The third dimension that stands out is adapting to the customer, which creates the (-0.07) weighted gap. In the remaining dimensions, the weighted gap is (-0.03 to -0.01). The overall Servqual weighted score is the mean of the gaps of all dimensions. In the examined enterprise it amounted to (-0.42).

Table 6. Weighted gaps for individual dimensions (source: own study)

Dimension	Gap	Weight	Weighted gap
Reliability	-0,76	0,28	-0,21
Adaptation to the client	-0,63	0,11	-0,07
Reliability of staff	-0,16	0,12	-0,02
Flexibility	-0,06	0,16	-0,01
Visual aspects	0,91	0,04	0,04
Dynamics of service	-1,02	0,18	-0,18
Promotion	0,35	0,08	0,03
Location	0,36	0,03	0,01

In order to compare the results of the research on unweighted and weighted gaps in individual dimensions, a graph was constructed as shown in Figure 5. The weighted gap is more meaningful than the unweighted gap because it takes into account the hierarchy of importance of individual dimensions for the customer. When analyzing the data in Figure 5, it can be seen that dimensions that exceeded customer expectations due to low weight were marginalized, reaching results close to 0.
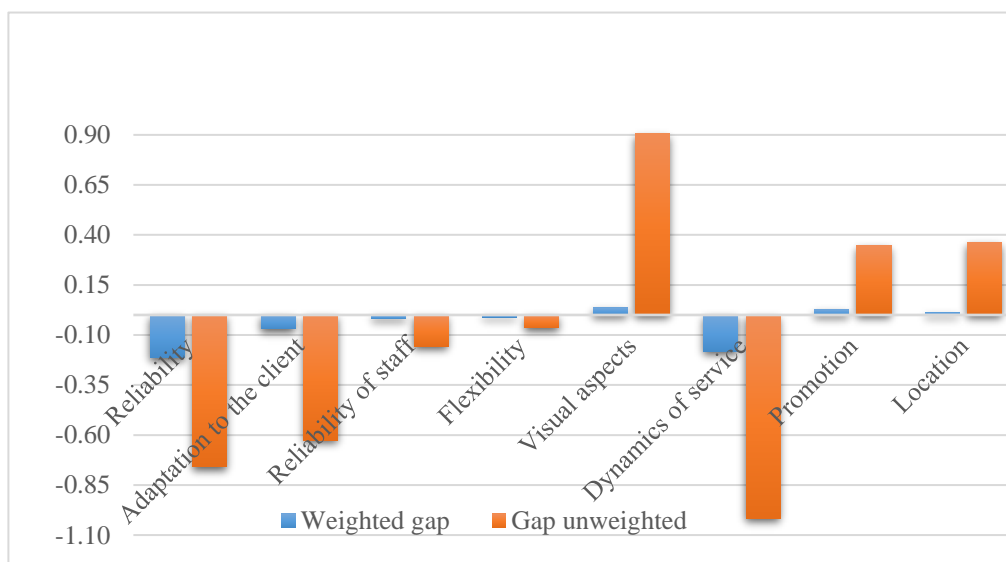

Figure 5. Compare weighted and unweighted gaps for individual dimensions (source: own study)

In turn, Figure 6 shows the matrix: dimension evaluation - dimension weight. This matrix allows to perform a SWOT analysis and divide dimensions into individual categories. On the X axis, the assessment of dimensions is presented - the threshold point above which the quality level in the dimension is satisfactory was considered (-0.70). The weights of dimensions are shown on the Y axis - the threshold point was considered (0.125 - this is a situation in which all dimensions have the same weight). The matrix analysis classifies all dimensions into four groups: threats, opportunities, weaknesses, and strengths. The dimensions of reliability and service dynamics were

classified as threats because they are important to the customer and were rated poorly. Most dimensions were classified in the opportunities group. These are: customer adaptation, staff reliability, promotion, location and visual aspects. The flexibility dimension was classified as a strength.
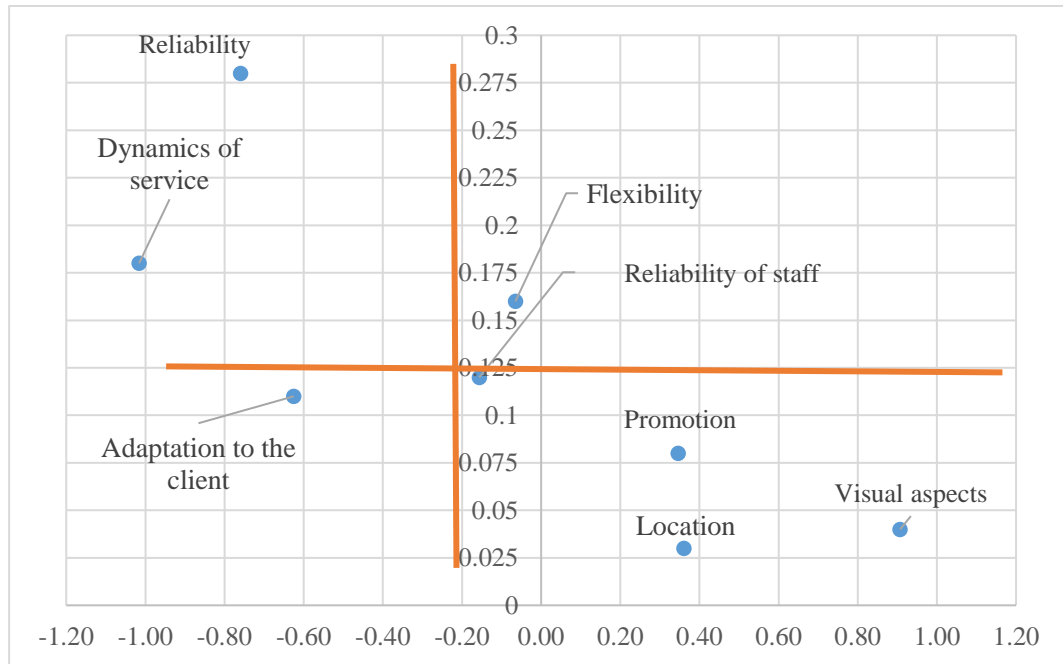

Figure 6. Grading matrix - dimension weight (source: own study)

3. Summary and conclusions

Clearly Taking into account the obtained results of quality measurement from the perspective of general dimensions, the improvement actions should be focused on "service dynamics", "reliability" and "adaptation to the customer". This order of problem areas was established based on the results of the weighted SERVQUAL index. Partial results of the calculations concerning the gap between the perception and the expectation of the service provided within individual dimensions can be grouped according to the criterion of the degree of meeting the customer expectations. Partial statements used in the SERVQUAL method, describing a given dimension, can be verified. For this purpose, extrapolative factor analysis is used, which allows to determine the impact of a given statement on the degree of explanation of the difference size for the entire dimension. The Cronbach's α index is most often used to determine the reliability of the modified test. It seems that this type of research carried out on a larger research sample, as well as standardized in terms of the selection of customers from a specific organization, will allow for a more accurate measurement of the quality of services and may affect the modification of the initial set of statements. The use of the original SERVQUAL method to evaluate service quality may lead to incomplete or incorrect results. The basic version of the method should be used as a basis for modification for a given industry due to the variety of services. This method should be modified, taking into account the specifications of a given industry.

In many industries, the five-dimensional model is insufficient to fully reflect quality in services. A very important aspect is to define the appropriate criteria that will be assessed. A useful tool for determining the dimensions of quality is the factor analysis, which, based on the answers collected using the questionnaire, can reliably reproduce the dimensions of a given industry.

Moreover, the following conclusions were drawn when performing the research:

- weights of individual dimensions should be determined using a questionnaire, because depending on the industry, these weights may differ drastically, which may translate into incorrect results. Determination of appropriate weights is an essential part of assessing the quality of service, as gaps created in each dimension have different meanings for customers. Quality assessment based on the weighted SERVQUAL method allows for more accurate interpretation and identification of areas that should be improved first;
- the improvement of service quality should be based on both experienced and expected quality as the criteria are not equally important to customers and depend on many different factors;
- for the SERVQUAL method to bring the expected results, an analysis of the market and the company's environment should be performed, and the research itself should be carried out systematically, because both the expectations and experiences of customers are dynamic elements that change with time. These tests should be carried out according to the Deming cycle, which allows for continuous improvement of processes in an enterprise. It should be remembered that the method itself does not improve processes, but is only a tool that helps in identifying areas where appropriate improvement and corrective actions should be introduced;

- the use of factor analysis to specify the quality dimensions of a car parts distribution company allowed for the formulation of a general formula for quality in the industry, as well as for the construction of an appropriate model, which is also based on the weights of individual dimensions. As a result, it was possible to identify areas and gaps that most affect the quality in the industry,
- on the basis of the weighted gaps, a matrix was built: dimension assessment - dimension weight, which allows to categorize dimensions according to the SWOT method and indicates an opportunity for further development of the enterprises
- Growth-oriented enterprises should remember that the path leading to higher standards of customer service is never ending. In accordance with the principle of continuous improvement, after meeting the current needs of buyers, further analyzes aimed at identifying previously unknown customer requirements should be undertaken.

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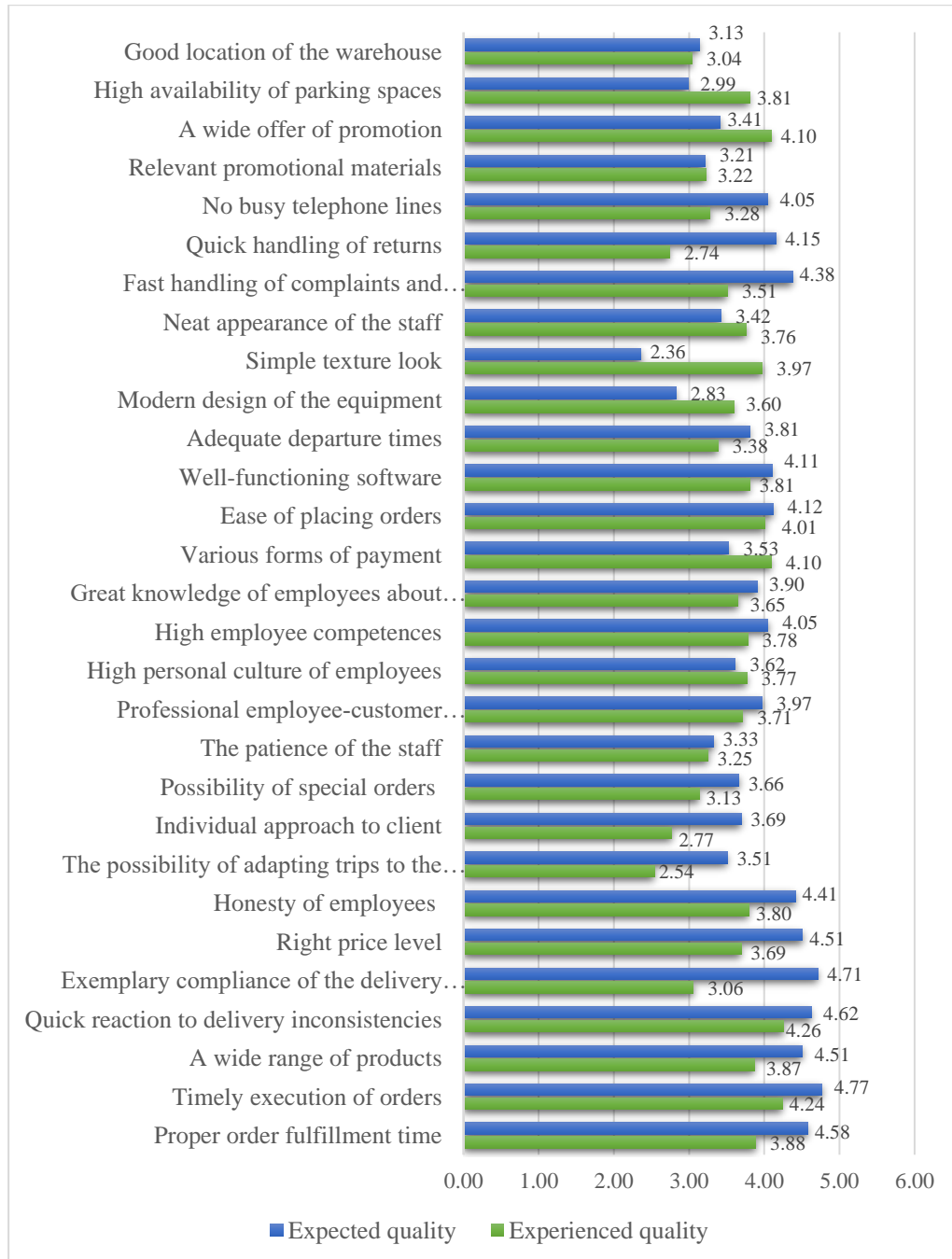Cracow,
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Appendix

Figure 3. Average values of the expected and experienced quality of individual characteristics in the analyzed company (source: own study)