Quality of Service Management in Automotive Service Stations

D. Velimirovic

Professor of Professional Studies
ATSSB – Department for Traffic,
Mechanical and
Environmental Engineering
Belgrade, Serbia

C. Duboka

Professor
University of Belgrade
Faculty of Mechanical Engineering

M. Velimirovic

Mr. mech. ing
Network Development Manager
FCA Srbija d.o.o., Serbia

Quality is the basis of the existence of any modern organization. Delivery of quality products/services satisfying or exceeding consumer expectations is imperative for the success of any organization. Therefore, quality must be managed.

The purpose of this work is to establish a model for quality management of vehicle after-sale maintenance activities. To achieve this goal it was first necessary to identify quality indicators.

An instrument for quality measurement of after-sale vehicle maintenance activities was afterward established, based on identified quality indicators and theoretical and practical knowledge in the field of quality management, to be followed by a model for quality management.

An example of quality management of vehicle maintenance with the implementation of the established model was also presented. The developed methodology may be generalized and applied to other service industries.

Keywords:
motor vehicle maintenance, quality indicators, quality measurement instrument, quality of service management

1. INTRODUCTION

There are numerous classifications of services. In a basic manner, services are any benefit that one party provides to another and that is essentially intangible and that does not result in ownership [1]. Regardless of this definition, some services are focused on ownership and where the nature of service activities comprises visible - tangible elements. Those services often include a high level of adjustments and a high level of capital investments [2]. Among other services in this group belong aftersales services of the automotive industry.

After-sales services in the automotive industry have numerous specifics. They serve to enable the reliable use of a fixed asset, a car, over its lifecycle. In the case when those services are delivered by authorized services, they enable the contact of the vehicle owner with the company that produced the car. This offers several advantages [3, 4].

Due to the great specifics of service activities, there are several approaches and models related to the recommendation for measuring the quality of service, satisfaction, and customer loyalty. The basic approaches most mentioned in the literature are SERVQUAL [5] and SERVPERF [6]. These two approaches recognize the same service quality factors but differ in the quality measurement approach. However, in the past, approaches have emerged that have emphasized the importance of adapting the instrument for measuring the Quality of Service activities to a specific service segment [7, 8].

In one research that preceded this paper, this approach was adopted and nine factors of service quality in-car services were identified: Reliability, Special features, Responsiveness and empathy, Transparency, Visual impression, Comfort, Confidence and assurance, Communication, Additional service dimension [9].

With these factors, we wanted to determine whether the characteristics of the respondents influence the defined criteria. It is hypothesized that based on the selected factors of service quality in automotive service stations, it is possible to form a model for Quality of Service measuring. Taking into account these results based on the formed model for measuring the quality of services in automotive service stations, it was shown how this model can be used for quality management.

2. MOTOR VEHICLE MAINTENANCE AS THE MAJOR AFTER-SALES ACTIVITY

To operationalize the subject research it is necessary to define what aftersales services in the automotive industry are. Aftersales services are all those services that are taken on the vehicle after it has been delivered to the customer, and are necessary to assure quality and reliability of vehicle throughout the lifecycle, which is important for customer satisfaction [10]. Aftersales services comprise the maintenance of motor vehicles, warranty, paint shop, tire sales, „hotel" for tires, spare parts sales, etc. [11]. A statement that could be heard in services is that first car sells sales staff and all others aftersales. Quality of service management also comprises the possibility of failure occurrence [12, 13].

Namely, in the last decade, there was a trend of vehicle price reduction on the motor vehicle market, to keep up with the competition. Cost reduction from the aspect of internal processes is a long-term process, requiring special attention [14]. Cost reduction by itself must be analyzed on all levels, thus it is also necessary

in specific cases to introduce extraordinary measures to reduce costs in certain fields to reasonable levels.

It is also possible to find statements in literature [14] indicating that all vehicles are approximate "the same" nowadays, taking into consideration vehicle appearance, quality and price, regardless of their manufacturers. The main difference worth taking into consideration is how after-sales services are performed. These authors have therefore pointed out that companies can be much more successful if they deliver better service and higher quality.

Figure 1 illustrates the aftersales process in seven steps, describing the care offered to customers in a manner as defined by modern world vehicle manufacturers. One can see that both user demand and service delivery satisfying his needs are positioned at the very center of these activities.

The after-sales vehicle maintenance process may be analyzed by taking into consideration the customer's perspective and his satisfaction with the delivered services. The extended after-sales process that begins with an appointment has been divided into seven steps as represented in the literature and practice dealing with this field under the name of "Seven Steps of After-Sales", as shown in Figure 1 [15].

Additional contacting, as indicated in Figure 1, refers to calling customers within 3 – 5 days from servicing, on which occasion customer satisfaction with the performed service and the entire process is measured by a standardized questionnaire, defined by the manufacturer himself.

This procedure systematization if often referred to as customer care, indicates a focus on the customer and achievement of his satisfaction in the course of this process. The ultimate goal of this approach is to have repeated purchases and an increase of material gain both for the authorized service station as well as for the vehicle manufacturer.

Figure 1. Seven steps of the after-sales process

These presentations and analyses have been used as guidelines in the course of the operationalization of the subject research. Some brands point out particularly the significance of customer, besides the previously expressed customer care, materialized through the seven steps of the after-sales process. One of the famous world manufacturers Toyota represents a good example of the brands, which points out this significance through the „Circles of activities in Toyota dealership", where customers are placed in the very center [16], Figure 2.
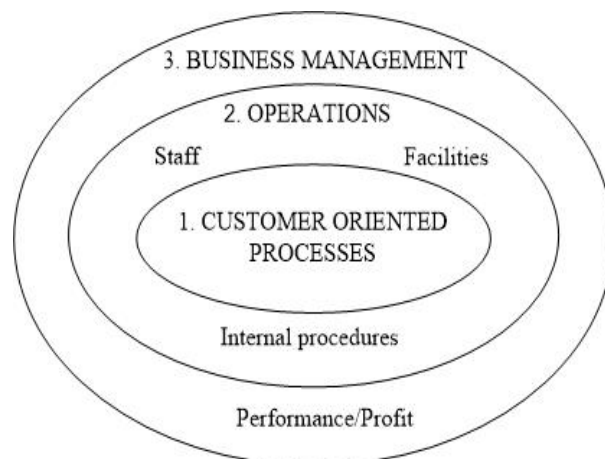

Figure 2. Circles of activities in Toyota dealerships

3. RESEARCH METHOD

The selection of the research method was determined by the nature of the subject of research. Special scientific methods have also been used in the subject research, besides general scientific methods.

As it is mentioned in the introduction, services that are the subject of this research are aftersales services in the automotive maintenance stations. In the research that preceded this paper Quality of Service factors were gotten by factor analysis based on previously defined quality indicators [9]. In this research, regression methods were used to find the relation between identified factors from one side, and social and andragogical characteristics of the customers from another side. It was necessary to implement statistical procedures of different levels in the statistical processing of the obtained data, within this general method, to confirm the proposed research hypotheses. In this research, the use of general scientific methods has also found its place.

However, this does not mean that the use of other research methods had been entirely ignored; on the contrary, to be able to answer all questions designed in the subject research, it was also necessary to apply theoretical and historical methods, making thus the present research more comprehensive and reliable.

Specific scientific methods such as analysis – synthesis and concretization – generalization were used in the second phase of this research with the aim of generalization of research results and definition of a way that formed Quality of service measurement model could be used for their quality management.

4. RESEARCH RESULTS

4.1 Research the impact of social and andragogic personality characteristics on the established instrument for quality determination

The aim of the research presented in this segment is to determine whether there is a correlation among certain predictor variables, in this case, social and andragogic

characteristics of customers using services provided by automotive service stations (gender, age, and education level), on one side and the quality factor of performed services in automotive service stations from a customer perspective as a criterion variable on the other side. In other words, is the systematization of quality dimensions (factors) of a specific service the same for all customers in the case of after-sales activities in automotive service stations.

The structure of customers by gender, age, and education level, who filled out a questionnaire about after-sales services is presented in Figure 3, Figure 4, and Figure 5.
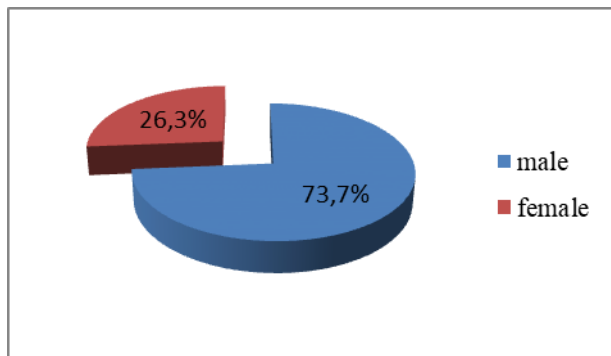

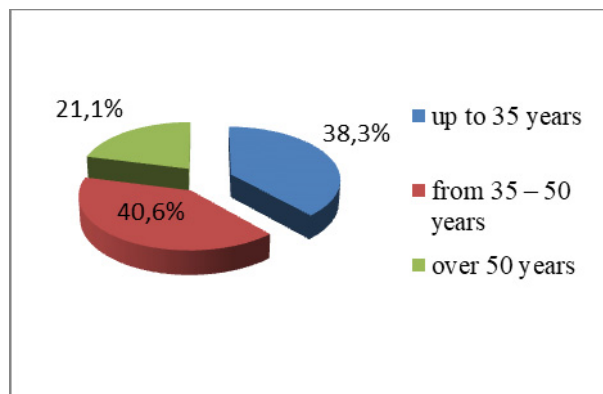Figure 3. Sample structure by gender
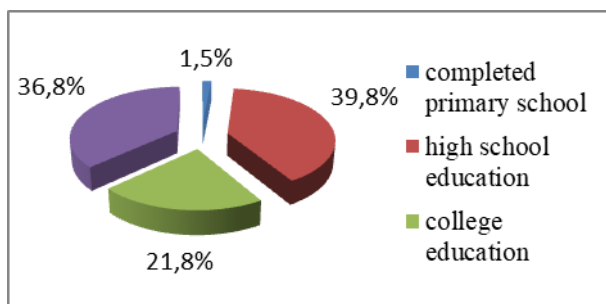

Figure 4. Sample structure by age

Figure 5. Sample structure by education level

Regression analysis (linear regression model) has been implemented to determine the above-mentioned correlation. The values of standardized regression coefficients (β) and multiple correlation coefficients (R) have been used as key indicators for this purpose. Care has been taken thereby for the size of the sample of those who were questioned to exceed by far (at least 20 to 30 times) the number of predictor variables to get as unbiased multiple correlation coefficient values as possible [17].

This procedure enabled the identification of social and andragogic customer characteristics which have the greatest impact on the evaluation of performed services quality factors as well as the direction of such impact. The procedure has been implemented for each factor separately, which enabled the obtainment of a more comprehensive idea about the determination of performed Quality of Service factors by social-andragogic customer characteristics. However, an approach has been selected for the requirements of the subject research, to collectively present the representative results of regression analysis in this segment, based on which it was possible to make the required analysis. They are given in Table 1.

It is possible to determine, based on the data presented in Table 1 and their detailed analysis, that the predictor variable system generally (analyzed social and andragogic characteristics) are not significant for pre–dictating criterion variables (singled out quality factors). Such conclusion can primarily be drawn based on obtained values of multiple correlation coefficients R and their squares, the values of which led us to the fact that partial contributions of predictors are not statistically significant, i.e. that the assumed social and andragogic characteristics do not contribute to the prediction of values of criterion variables, i.e. analyzed factors. It is shown, based on the values of the F-test (table 1) for each of the verified correlations, that the coefficient of multiple determinants is not statistically significant (p>0,05). The assumed predictor variables, looked at separately, for each analyzed factor, contribute differently to the explanation of criterion variables, and considering the values of standardized regression coefficients (β), presented in Table 1, they do not have a predictive value.

Even in the case when the value obtained for the last ninth singled out factor, additional service dimension, shows that predictor variables contribute to a certain degree to the prediction of criterion variable values and that the partial predictor variable *age* contributes to the prediction of criterion variable values (p=0,022), such contribution was not statistically significant, since the obtained F-test value was below the level of statistical significance.

Considering the results of regression analysis, it is possible to conclude that there is not a significant connection among social and andragogic characteristics of automotive service station customers and the factors of the suggested instrument for the determination of Quality of Service in automotive service stations from the customer perspective.

This means, that it is not possible to predict customer requirements concerning the capability of automotive service stations to deliver the required services satisfactorily, based on gender, age, and level of education. Customer requirements concerning the expected Quality of Service in automotive service stations are uniform and this is due to customers being well-informed, having increasing levels of technical knowledge, and the transparency of the whole process. Considering this fact, service providers in automotive service stations have equal responsibility to provide the requested high quality to all customers, without a difference.

Table 1: Regression analysis results

	Quality Factors	Predictor variables		
		Gender	Age	Education Level
Criterion variable	Reliability	Multiple correlation coefficient: R = 0,144		
		Squared multiple correlation coefficient: R_{Square} = 0,021		
		F-test: F = 0,815		
		p = 0,488		
		β = -0,037 p = 0,686	β = 0,126 p = 0,188	β = -0,046 p = 0,629
	Special features	Multiple correlation coefficient: R = 0,131		
		Squared multiple correlation coefficient: R_{Square} = 0,017		
		F-test: F = 0,675		
		p = 0,569		
		β = 0,025 p = 0,788	β = 0,118 p = 0,217	β = -0,038 p = 0,691
	Responsiveness and empathy	Multiple correlation coefficient: R= 0,142		
		Squared multiple correlation coefficient: R_{Square}= 0,020		
		F-test: F= 0,794		
		p = 0,500		
		β = -0,085 p = 0,361	β = 0,062 p = 0,512	β = -0,074 p = 0,434
	Transparency	Multiple correlation coefficient: R= 0,153		
		Squared multiple correlation coefficient: R_{Square}= 0,023		
		F-test: F= 0,927		
		p = 0,430		
		β = 0,085 p = 0,361	β = 0,100 p = 0,291	β = -0,072 p = 0,445
	Visual impression	Multiple correlation coefficient: R= 0,148		
		Squared multiple correlation coefficient: R_{Square}= 0,022		
		F-test: F= 0,871		
		p = 0,458		
		β = - 0,113 p = 0,222	β = 0,078 p = 0,410	β = -0,056 p = 0,540
	Comfort	Multiple correlation coefficient: R= 0,083		
		Squared multiple correlation coefficient: R_{Square}= 0,007		
		F-test: F= 0,269		
		p = 0,848		
		β = -0,068 p = 0,464	β = 0,014 p = 0,884	β = -0,038 p = 0,689
	Confidence and assurance	Multiple correlation coefficient: R= 0,175		
		Squared multiple correlation coefficient.: R_{Square}= 0,031		
		F-test: F= 1,228		
		p = 0,303		
		β = 0,142 p = 0,127	β = -0,045 p = 0,635	β = -0,100 p = 0,289
	Communication	Multiple correlation coefficient: R= 0,126		
		Squared multiple correlation coefficient.: R_{Square}= 0,016		
		F-test: F= 0,625		
		p = 0,600		
		β = 0,089 p = 0,341	β = 0,041 p = 0,669	β = -0,078 p = 0,408
	Additional Service Dimensions	Multiple correlation coefficient: R= 0,244		
		Squared multiple correlation coefficient: R_{Square}= 0,060		
		F-test: F= 2,452		
		p = 0,067		
		β = -0,038 p = 0,672	β = 0,216 p = 0,022	β = -0,060 p = 0,517

4.2 Presentation of Instrument for Quality of Service Measurement

Based on previous research where quality indicators and quality factors were defined, and the results of regression analysis presented in this paper, a model for quality of service determination were formed in Table 2.

To present how quality can be managed based on a defined model, it is necessary to first measure the quality of after-sales services based on the established instrument. Questionnaire results of 146 customers of services provided by authorized service stations were used in the subject research, who expressed the degree of their satisfaction concerning specific quality aspects

and offered services on a scale from 1 (I do not agree) to 5 (I fully agree), Likert scale [18].

A mean value was calculated for each one of the defined quality indicators, based on the obtained values from the questionnaire and these values were included in Table 2. A mean value was also calculated for each defined factor.

An established model is used to make decisions about quality management, based on such results. It is customary to convene a meeting of the management to make an action plan to complete this task efficiently. The management has generally to be dedicated to quality to be able to successfully materialize quality management.

This model is thus, based on nine latent variables – factors, whereby each one of them is measured by a large number of indicators for which respondents expressed their views on a numerical scale from 1 to 5 [9]. Each factor was considered separately and advantage was given to those constituent elements of factors (performed services quality indicators) with the highest commonality values, saturation, and coefficient of correlation with factors. This kind of methodological procedure was also used earlier. It is also included in the SERVQUAL quality measurement model in the service sector [19]. Of course, the number of factors used to express Quality of Service is not the same, because it is predetermined by the kind of service activity.

Table 2. Quality factor quantification for services provided by automotive service stations

QUALITY FACTORS	Performed Quality of Service indicators	Mean/St. dev		Mean
1	2	3		4
1. Reliability	1. Responsible person answers telephone calls promptly	4,00	1,3	**4,306**
	2. Service departments respect the set time frames for the works to be performed on the vehicle	4,21	1,05	
	3. It does not take long at vehicle take over for preparation of documents for performed service	4,25	0,99	
	4. Staff conduct at the service station gives confidence to the customer	4,36	0,9	
	5. Service departments endeavor to complete works within the foreseen (agreed) time frame.	4,34	0,87	
	6. Works on the vehicle have been completed in good quality and there is no need for additional correction.	4,13	1,06	
	7. Staff at the service station is qualified and experienced to be capable of answering all questions posed by customers	4,31	0,89	
	8. Atmosphere at a service station is pleasant	4,61	0,65	
	9. Service station has an available parking lot for customers	4,55	0,92	
2. Special features	1. Service station offers a replacement vehicle	3,01	1,46	**3,461**
	2. Vehicle can also be delivered to customer after working hours	3,79	1,23	
	3. Service departments contact customer to find out whether he is satisfied with the given service	3,32	1,59	
	4. Service departments contact customer to remind him of the appointed service	3,4	1,5	
	5. Staff at service station endeavors to better get to know the customer	3,79	1,17	
3. Responsiveness and empathy	1. Staff at service station shows interest and readiness to solve customer problems	4,45	0,86	**4,396**
	2. Service station recipient listens carefully to customer observations related to his vehicle	4,6	0,74	
	3. Service station recipient explains to the customer why repair work is necessary	4,53	0,73	
	4. The responsible people at the service station take into consideration customer interest when proposing solutions for problems	4,36	0,89	
	5. Customer always gets good advice about using his vehicle	4,16	1,06	
	6. Unnecessary works on vehicles are avoided at a service station	4,27	0,95	
4. Transparency	1. Customer gets a clear and transparent invoice	4,72	0,61	**4,546**
	2. Staff at the service station contacts the customer to ask for approval if additional works are required	4,53	0,84	
	3. A competent person as service station clarifies the invoice to a customer	4,39	0,92	
5. Visual impression	1. Staff at a service station is properly dressed and tidy	4,82	0,42	**4,825**
	2. Premises at a service station are clean and tidy	4,83	0,41	
6. Comfort	1. There is a pleasant place within the service station where customers can wait for the service to be performed	4,71	0,64	**4,488**
	2. There are clear direction marks for customers at a service station	4,54	0,77	
	3. Staff at service station pays equal attention to each customer	4,25	0,99	

QUALITY FACTORS	Performed Quality of Service indicators	Mean/St. dev		Mean
1	2	3		4
	4. Staff at service station respects defined working hours	4,45	0,96	
7. Confidence and assurance	1. Customer gets written assurance that quality control has been performed for the completed works	4,1	1,27	**4,346**
	2. Vehicle is handed over to the customer in clean condition, following performed works	4,36	1,06	
	3. Service station recipient describes to the customer the works to be performed on the vehicle	4,58	0,62	
8. Communication	1. Service station recipient delivers the vehicle to the customer, once works have been completed	4,78	0,53	**4,355**
	2. Customer is informed about the price for the agreed works	4,32	1,0	
	3. Customer gets timely information about when works on the vehicle will be finished	4,19	1,07	
	4. Service station has attractive advertising material	4,13	1,23	
9. Additional service dimension	1. Staff at reception endeavors to satisfy customers when making appointments for works on the vehicle	4,62	0,6	**4,608**
	2. The quality of service provided by service station has an impact on customer choice when deciding which car make to buy	4,6	0,82	
	3. Staff at a service station is kind to customers	4,6	0,7	
The weighted average value of performed Quality of Service indicators		**PSV** = 4,312		

5. DISCUSSION OF THE RESULTS

The hypothesis stated at the beginning of this paper was stated that it is possible, based on defined quality indicators and factors in automotive service stations, to make a model for service quality measurement. Hence this model has been made, In Table 2, the question arose how this model can be used for quality management.

The results of regression analyses showed that regardless of the analyzed social and andragogic characterrristics of the respondents there are no differences regards to service quality factors. That means that models formed for service quality measurement are valuable for all groups of customers. In forward, the text is described model how this measurement model could be used for the management of service quality in automotive service stations.

The first signal about the need for action to be taken in the field of quality advancement is emitted in practice by the person in charge of monitoring customer satisfaction within a dealership or by the person in charge of quality. This person suggests most frequently also measures to be taken, but what will be adopted and implemented in practice is decided by the after-sales manager.

Should this procedure be respected, some actions for quality improvement, as a base for quality management, could be proposed in specific cases. Data about quality evaluations given in Table 2 present a basis for such proposals.

The starting point of this analysis is the first factor, because this factor, as the data in factor analysis showed, participates with 35,741% in the explanation of the total variant [9]. The next factor, the so-called "Special characteristics" participates almost six times less in the explanation of the total variant (6,490%). It is thus quite justified to give priority to the "reliability" factor and its accompanying indicators when making a selection of parameters requiring improvement.

Weight of every elected factor in factor analysis was used when the determined average value of performed Quality of Service indicators, Table 2.

The mean mark of the „Reliability" factor following the data from the table was 4,306. This factor includes nine indicators according to how the quality measurement model was conceived. This means that some individual marks were below and some were above this value. An analysis of the requirement for improvements should always start from the lowest mean values of specific indicators within this factor. Standard deviation values given in Table 2 are also taken into consideration, besides mean values, in the selection of aspects requiring improvement.

The analysis will be made in the specific case of possible ways for improvement of after-sales Quality of Service covered by the following indicators:

1. The responsible person answers telephone calls promptly;

2. Quality works have been performed on the vehicle and there is no need for additional corrections and

3. Service departments respect the appointments for the works to be done on the vehicle.

Considering that the obtained values are not significantly below the mean value (the mean value for the first indicator is 4, for the second 4,13 and 4,21 for the third, table 2) it is possible to plan improvement activities following the "step by step" principle, i.e. using the PDSA cycle [20].

If we consider the indicator related to the prompt answering of telephone calls made by customers, the first improvement step would be to plan what should be done to achieve this. This sense must analyze the existing process and present an ideal one. It is necessary in the specific case to define a rule for the time frame in which telephone calls should be answered, how and when missed calls should be activated, how and when electronic mails should be answered, how inquiries should be answered etc. This indicator shows the importance of proper communication in the service segment also [21]. Then a deadline should be set for these measures to be implemented, followed by internal

control. If results show that a performance improvement has been achieved, then the improvement procedures should be standardized.

To be able to define activities related to the second singled out factor "quality of performed works the first time" it would first be necessary to make an analysis of the existing process, determine what customer complaints are, and find causes of omissions in vehicle maintenance. Considering that this is a complex process and that many factors influence it, the proposal would be to introduce the so-called Control list of the performed works on the vehicle within the maintenance procedure to be able to systematize the required data. This would mean that there is a person in charge of control at the automotive service station, whose main role would be to monitor the quality of performed works so that records of performed bad quality works could be compiled based on written evidence of effected control. Considering that there is a large number of possible reasons leading to this, it is very important to systematize and analyze such data. It would be very important in this procedure to understand the causes of the performed bad quality works on vehicles.

To be able to plan improvement measures based on such data, it would be necessary to introduce periodical meetings of the responsible people at automotive service stations to analyze the causes of malfunction and introduce measures for their reduction. It would be necessary for the next step to define time frames for the materialization of these measures and the time for making an internal control. If the measured values turn out to be greater than the previously obtained ones, it would be necessary to standardize the proposed improvement procedure.

To be able to define improvement activities related to the third singled out indicator "service departments respect appointments for works to be performed on vehicle", it is necessary to first make an adequate analysis and determine the causes which have led to the existing situation. It would be necessary in this aim to keep strict records on each work order about the time of vehicle receipt, promised vehicle delivery time, and actual vehicle delivery time. By monitoring the so filled in work orders, data would be collected whether vehicles were delivered on promised times and it would be possible to measure the number of vehicles delivered beyond the foreseen time frame. Cases of delayed works could be analyzed at periodical meetings with a determination of the reasons leading to this. Prevention activities would be planned based on such data. Time frames for improvement implementation would also be defined in this case as well as the time for making the next internal control. If the results of internal control show better values, then it would be necessary to standardize the whole improvement procedure.

6. CONCLUSIONS

The subject of this research dealt with after-sales services in the automotive industry and finding solutions for managing their quality. The first step in this aim was to define quality indicators of these services, as parameters by which customers evaluate best their quality.

The basis point for this research was earlier identified service indicators and factors. Nine key quality factors were singled out based on defined indicators and questioned customers with the use of factor analysis.

This paper is presented a model for quality of service measurement formed based on those results. To test are those factors relevant for all group of customers regression analysis are done.

It is possible to conclude, based on the given presentations, analyses, and results, that it is possible to confirm the hypothesis presented at the beginning of the work itself and that means that it is possible to form a model for service quality measurement based on previously defined quality factors and results of regression analysis.

The instrument for quality measurement and the knowledge in the field of quality management form the basis for the materialization of quality management by the established model. The presented instrument for quality measurement covering the singled out factors and identified indicators within the latter makes it possible to analyze and quantify separately the performance of each service, then get a mean mark for each singled out factor as well as a total mark for the delivered Quality of Service.

It can be a significant help and useful tool for managers in solving problems existing between service providers and customers. The work shows how this model is implemented, based on results obtained from questionnaires. The model for Quality of Service management is based on singled out quality factors and knowledge in the subject field and with due respect to the customer perspective.

This model has an applicative value in automotive service stations. Its elements point out to service aspects that have the greatest significance for customers when evaluating Quality of Service, which later has an impact, following established models, both on customer satisfaction and loyalty, which all manufacturers strive to achieve nowadays.

REFERENCES

[1] Veljković, S.: *Service Marketing*, Faculty of Economics, University in Belgrade, 2009. (in Serbian)

[2] Schmenner, R.W.: Service Business and Productivity, Decision Sciences, Vol. 35, No. 3, pp. 333-347, 2004.

[3] Adusei, C. and Tweneboah-Koduah, I.: After-Sales Service and Customer Satisfaction in the Automobile Industry in an Emerging Economy, Open Access Library Journal, Vol. 6, No. 1, pp. 1-21, 2019.

[4] Fazlzadeh, A., Fatemeh Bagherzadeh, F. and Pegah, M.P.: How after-sales service quality dimensions affect customer satisfaction, African Journal of Business Management, Vol. 5, No. 17, pp. 7658-7664, 2011.

[5] Parasuraman, A, Berry L.L, Zeithaml, V.A.: Servqual: A multiple-item scale for measuring consumer perceptions of Service Quality, Journal of Retailing, Vol. 64, No.1, 1988, pp. 12-40.

[6] Cronin, J. J., Taylor, S. A.: SERVPERF versus SERVQUAL: Reconciling Performance-based and Perceptions– Minus–Expectations Measurement of Quality of Service, Journal of Marketing, Vol. 58, No.1, pp. 125-131, 1994.

[7] Sachdev, S.B. and Verma, H.V.: Relative importance of service quality dimensions: A multisectoral study, Journal of Services Research, Vol. 4, No. 1, pp. 93-116, 2004.

[8] Seth, N., Deshmukh, S.G and Vrat P.: Service quality models: a review, International Journal of Quality&Reliability Management, Vol. 22 No. 9, pp. 913-949, 2005.

[9] Velimirovic, D., Duboka C., Damnjanovic P.: Automotive Maintenance Quality of Service Influencing Factors, Tehnicki Vjesnik-Technical Gazette, Vol. 23, No.5, pp.1431-1438, 2016.

[10] Saccani, N., Songini, L, Gaiardelli, P.: The role and performance measurement of after-sales in the durable consumer goods industries: an empirical study, International Journal of Productivity and Performance Management, Vol. 55, No. 3/4, pp. 259-283, 2006.

[11] Duboka, Č.: *Maintenance of Motor Vehicles*, Yugoslav Society of Automotive Engineers, Belgrade, 1999. (in Serbian)

[12] Stamenković, D., Popović, V.: Warranty optimization based on the prediction of costs to the manufacturer using neural network model and Monte Carlo simulation, International Journal of Systems Science, Vol.46, No. 3, pp. 535-545, 2015.

[13] Popović, V., Vasić, B.: Review of hazard analysis methods and their basic characteristics, FME Transactions, Vol. 36, No. 4, pp. 181-187, 2008.

[14] Asadollahi, A., Jahanshahi, A., Nawaser, K.: A Comparative Study to Determine Customer's Satisfaction from after Sales Services in the Automotive Industries, Asian Journal of Business Management Studies, Vol. 2, No.3, pp. 124-134, 2011.

[15] Velimirović, D.: *Model for Quality of Service Management*, PhD thesis, Mechanical Faculty University in Belgrade, 2106. (in Serbian)

[16] Radojević, Z., Stefanović, I., Velimirović, D.: Process approach as a basis for BSC implementation and improvement of organizational performance, Management: Journal for Theory and Practice Management, Vol. 14, No. 52, pp. 41-48, 2009.

[17] Tabachnick B. G & Fidell L. S: *Using multivariate statistics*, 5th edition, Boston: Person Education, 2007.

[18] Joshi A., Kale S., Chandel S. and Pal D.K.: Likert Scale: Explored and Explained, British Journal of Applied Science & Technology, Vol. 7, No.4, pp. 396-403, 2015.

[19] Hill N, Alexander J: *Handbook of customer satisfaction and loyalty measurement*, Gower Publishing Limited, Hampshire, 2006.

[20] Taylor, M.J., McNicholas, C., Nicolay, C., Darzi, A., Bell, D., and Reed, J.E.: Systematic review of the application of the plan–do–study–act method to improve quality in healthcare, BMJ Quality & Safety, Vol.23, No.4, pp. 290–298, 2014.

[21] Schneider, H., Coskun, B.: Significance and Specifics of Communication in the Service Sector., in: Keuper F., Hogenschurz B. (Ed.): *Sales & Service*, Gabler, pp. 3-21, 2008.

УПРАВЉАЊЕ УПОТРЕБНИМ КВАЛИТЕТОМ ОДРЖАВАЊА МОТОРНИХ ВОЗИЛА У АУТОСЕРВИСИМА

Д. Велимировић, Ч. Дубока, М. Велимировић

Испорука квалитетних производа/услуга који задовољавају или превазилазе очекивања потрошача је основа за успех сваке организације данашњице. Због тога се квалитетом мора управљати.

Сврха овог рада је успостављање модела за управ–љање квалитетом одржавања возила. Да би се пос–тигао овај циљ, потребно је да се прво идентификују индикатори квалитета ових услуга.

На основу идентификованих индикатора квалитета и теоријских и практичних знања из области упра–вљања квалитетом, формиран је инструмент за мерење квалитета процеса одржавања моторних возила у аутосервисима. На основу њега је форми–ран модел за управљање квалитетом.

Представљен је и пример управљања квалитетом одржавања моторних возила на основу формираног модела. Развијена методологија се може уопштити и применити и на друге услужне делатности.