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Market Performance and Customer Satisfaction Relation in Automotive Sales, Maintenance, and other Services

Milan VELIMIROVIC*, Dragana VELIMIROVIC, Aleksandar MICOVIC, Vladimir POPOVIC

Abstract: The distribution networks of car dealers are in transformation with challenge to evolute and increase portfolio of services and secure sustainability or languish. This paper presents the performance of four automotive dealers regarding their business, financial and customer operations. Principally, the models are developed that measure how Customer Feedback results influence the business and financial Key Performance Indicators, aiming at better understanding, improving, and future-proofing of a dealership. Their activities are analysed with the aim of fostering good practices and finding the best places for improvement from the cost-benefit point of view. Future trends and technological developments in the automotive industry are investigated, and recommendations are made for sustaining and improving dealership operations.

Keywords: automotive; customer satisfaction; financial performance; KPI; maintenance

1 INTRODUCTION

The aim of this research of automotive dealers/retailers (hereinafter: dealers) is to investigate and create a link that connects Customer Feedback (CF) [1, 2] trends with business and financial Key Performance Indicators (KPI). The goal of dealers is to establish a measurement of customer feedback, learn from it, and support the organic and continuous growth of a business-active entity. The delivery of products and services that satisfy or exceed consumer expectations is imperative for the success of any organization [3-5]. The production of congruity actions through the organization, contingency planning, and structured implementation is necessary. Consequently, the final financial result relates to activities needed to foster good practices and to find the best places for improvement from the cost-benefit point of view. Taking that into consideration, car producers are severely changing the distribution model to make it leaner. The consequence of this intention can result in negligence of distribution network needs which can produce derogatory trends towards the end customers. Such an environment can result in fewer business opportunities for dealer partners and poorer service which might cause a lower level of CF results. The results obtained in this paper will be generalized and presented in aggregate form, defining causalities of actions taken in a certain period and enabling a deeper understanding and the most appropriate organization response to customers. Future trends will be noted including recommendations to bridge the gaps that will be discovered involving the methodology proposed. Places for improvement and "new services" will be identified, in order to mitigate predicted future market and industry trends.

1.1 The Problem

Nowadays, in conditions of global competition, every manufacturer tries to maintain a good relationship with the end customer as much as it is possible throughout the product lifespan. Customer feedback results are processed and used to discover and influence the network dealer behaviour in relation to the end customer from a special perspective, as well as to leverage dealer promotion and support loyalty and retention. In the past, selling cars was a single activity which was sufficient to maintain profitability for investors. To increase the business effectiveness of their entities and optimise operational costs, dealers are induced to invent and create new services as profit generators. These development activities can be steered and overviewed from two perspectives: quantity and quality. The first group of measures in sales intends to strictly increase sales volumes. Quantity measures in after-sales management can stimulate setting targets of service visits number to maximum or overall spare parts sales per visit. Secondly, the focus on quality measures can result in pushing sales to achieve the highest margin per unit possible, using cross sales or upselling and making better utilization of the entire workshop during after sales. Those perspectives are usually in contradiction and generate intra-organizational simmering and quite often develop internal employee dissatisfaction. Basic dealer activities are usually divided into sales and services. The former is more goal-oriented and the latter is more process-oriented. Since it is often not self-sustainable, car sales activity has ventured into all additional products which can be purchased and delivered with a car. After-sales activities traditionally generate two separate flows: one in sales of spare parts, lubricants, and additional equipment and the other in labour sales. Nowadays, there are no strict burdens in that sense, but the necessity of additional sales remains. Since the overall car usage paradigm is changing, new additional goods and services are becoming available, and customers will expect them for their benefit. This is schematically presented in Fig. 1.

1.1 Literature Review

At present, the automotive industry is facing huge challenges, as never seen before in its more than 100-year long history. In addition to (or as a part of) ever-present cost reduction, environmental and safety concerns, challenges are related to substantial changes in vehicles utilization, from shared mobility [6], electric drive [7], autonomous drive, connected services (vehicle to vehicle, vehicle to infrastructure) to legislative [8] phasing out of ICE technology by 2035. At the same time, there is a noticeable trend of vehicles becoming more expensive since they are more costly to produce and distribute. These points, as well

as obsolete production concepts, can annoy and confuse end customers. Product distribution reconciliation is necessary and will influence after-sales ability to support overall dealer entity activity and profitability. Dealers' organizations are induced to work on tuning their own traits to abide by other market competitors successfully. Furthermore, to achieve ever-increasing targets, they need to anticipate service design for the current and future needs of customers.

Figure 1 Dealer's portfolio services - existing and new range of services of the authorized dealer

New profit centres [9], aimed at achieving customer satisfaction [10, 11], will provide a business with an edge over competitors not only in its own industry but also secure a takeover from newly entered market niches. The possible range of services that authorized dealers offer in addition to sales and aftersales operations today are at risk of declining, hence they must be inventive and innovative.

2 RESEARCH AND METHODOLOGY

This research systematically analyses operations of dealers, by applying suitable actions, comprising descriptive and comparative analysis methods. Besides day-to-day dealer data collection in defined time period, questionnaire for sales and after sales was inducted in order to understand voice of customer. All of those sources were used to develop conclusions and design measures for improvement. Descriptive methods were used in observation and description of the phenomena, processes, and activities in implementing the CF results steering, as well as registration of all relevant business data from different departments (Sales, After Sales, Finance). All of them are necessary for an objective determination of entity management and the subject of research. All data are gathered in order to be compared among dealers. At the same time, they can be compared on the departmental, channel, or overall entity level. This comparison is important in order to define benchmarks based on average performance. Those benchmarks are used to set up thresholds. Every performer above this level is supported to perform better. Comparisons are used to deep dive into the dealer operations and increase their performance. During the process of operation of the network important for this research, KPI measurement was put in place. At the beginning, a low number of parameters was exchanged and gathered in regular periods. The scope of KPIs was increasing over time and at the end complex set of business data, profit and loss statements and balance sheets on the quartile level were authorized for exchange. This data exchange was strongly supported by the development of dealer information systems and the central data platform. It was necessary to implement consequent CF measures and a proven track which entails deep diving into automotive dealer relation to customers. Consequently, final financial results relate to activities fostering good practices and finding the best places for improvement. Those elements were used as a base for the development of action plans. Activity prioritization was determined from the cost-benefit point of view. As abovementioned, the goal of the research presented in this paper is to measure and present the impact of CF results on business and financial KPIs. The CF methodology was produced using Net Promoter Score (NPS) scaling. Analyses are grouped into three subdivisions, the first one is predominantly connected to new car sales (NCS), the second to after sales (AS), and the last scope is in financial results on the overall organization level, as presented in Tab. 1.

Table 1 Related KPI in research

Department	Business KPI	CF KPI	Financial KPI
NCS	NCS KPI %	NPS %	NCS DP %
AS	Parts Sales	NPS %	Parts DP %
AS	Labour Sales	NPS %	Workshop DP %
Overall	K factor	NPS %	NPBT %

Additionally, this approach establishes links and relationships between NPS and Departmental Profit (DP) and Net Profit Before Tax (NPBT). CF polls are generated using phone/email feedback following defined questionnaires produced for sales and after sales. The same questionnaires are used for all dealers. One of the most common trigger points is activated after clients' approvals in a period no longer than two months after the event, since this period is considered representative from the customer's memory point of view. At the same time, it is important to track quality and secure a regular and representative statistical sample. These results were obtained in a

non-inflection manner so as to understand the best places to gain a deeper understanding of sales operations. Quantitative data were sampled and used to apply statistical methods for the calculation of NPS using known formulae [2] and/or pure averages for other indicators. The results of all questions must be monitored with the main recommendation question as an indicator. An answer to a question does not give insights on how to set action plans and improve. This research conducted 500 sales and 1500 after-sales interviews on a yearly basis. This scope includes up to 15% of clients. The ubiquitous dealer parameters are widely used to monitor processes and financial performances in a dealer organization [12]. NCS KPIs usually tracked involve sold units, turnover (TO), and margins. In after sales track indicators [13, 14] are separated into sales channels: spare parts, additional equipment sales, lubricant TO in various versions (Net Sales, Gross Sales), and margins. Important KPIs used for measuring and evaluating business are known in each dealer operation tracking, as shown in Tab. 2.

Table 2 Key Point Indicators (KPI) used in the research

KPI	Department	Divided by entity	Time period
Closure ratio	Sales	Salesman	Monthly/yearly
Sold Units	Sales	Salesman	Monthly/yearly
Av.prod.margin	Sales	Salesman	Monthly/yearly
NPS	Sales	Salesman	Monthly/yearly
Service visits	After Sales	Workshop	Monthly/yearly
Spare parts TO	After Sales	Serv. visit	Monthly/yearly
Labour sold TO	After Sales	Serv. visit	Monthly/yearly
Techn.efficiency	After Sales	Workshop	Monthly & yearly
Lab. Utilization	After Sales	Workshop	Monthly & yearly
Over.productivity	After Sales	Workshop	Monthly & yearly
NPS	After Sales	Workshop	Monthly & yearly

3 RESULTS

3.1 Sales

Over a period of more than a decade, Sales NPS results were collected from four independent dealers. Linear regression is employed to emphasise the improvement in cumulative yearly satisfaction results. The R^2 value (coefficient of determination), is a measure of the proportion of the variance in the dependent variable that is explained by the independent variables in the regression model. Relatively low R^2 in some cases indicates that the independent variables in the model do not explain a large proportion of the variation in the dependent variable. Dealing with such reported data, R^2 statistics are generally lower. In this case, the intention is to emphasize hardly predictive trends.

The trends shown in Fig. 2 are a result of the implemented long-term continuous improvement process supported with commercial support in areas selected as places for improvement. COVID-19 influence on customer satisfaction as an isolated phenomenon might be an explanation for common sales and after-sales NPS result drop in 2019 - 2020 due to extended delivery lead times and the overall global economic situation. Dedicated actions were the main initiator for the increase in profitability in the car sales department. Main part of actions was improving of product and customer behaviour knowledge. Insisting on standardized sales processes paced with customer feedback indication are leading to better financial performance, Fig. 3.

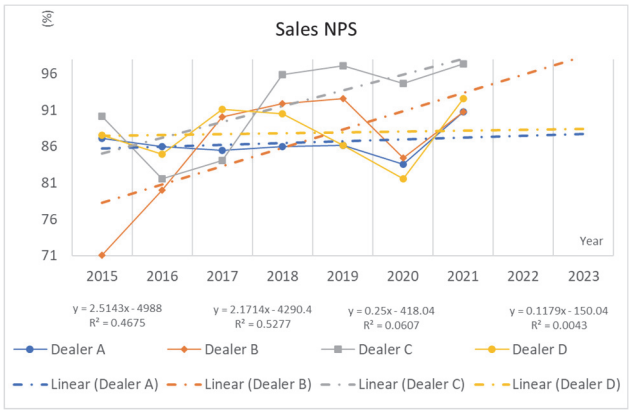

Figure 2 Result of dealers' Sales NPS results for the period 2015 - 2021

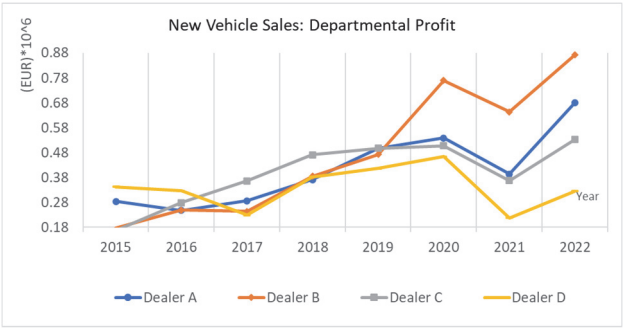

Figure 3 Dealers' New Car Sales Departmental Profit (EUR) 2015 - 2021

3.2 After Sales

In a dealer's operation, the Parts Sales is a very important segment from an overall sustainability and viability point of view. It can lead to and indicate eventual car re-purchase. The generated spare part departmental profit, when all variable costs are deducted (salaries of people employed in the spare part department, shipment, custom costs), is calculated from the difference between the purchased and invoiced articles. Fig. 4 shows increased trends for all dealers in the scope. The best utilization of commercial actions prepared for customers, supported with processes that maintain customer relations and improve satisfaction, led to an increase in parts sales volume. The specific market feature is related to relatively low level of labour values in comparison to developed markets (EU) where the higher level of labour price can potentially provide better conditions for labour margin. Workshop departments (Fig. 5) are contributing from general repair and body and paint repairs (B&P). Positive trends in NPS After Sales KPI are a result of Spare Parts and Workshop departments, side by side with profits on the workshop departmental level. This result is generated when all costs (service advisers, technicians salaries, tool investment etc.) are deducted from the invoiced labour to the customers.

Fig. 6 shows quite substantial differences between the dealers in terms of profit levels during the period monitored (2015 - 2021).

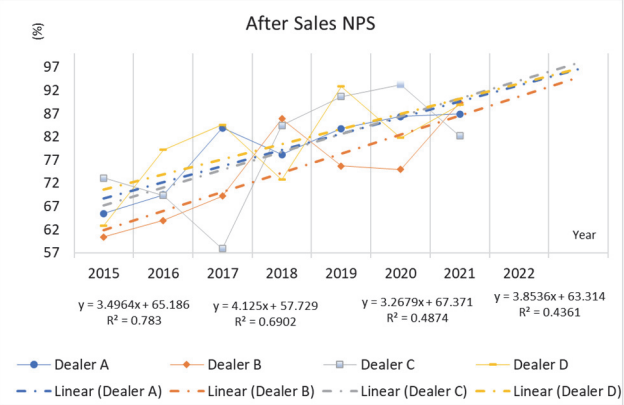

Figure 4 Result of dealers' After Sales NPS for the period 2015 - 2021

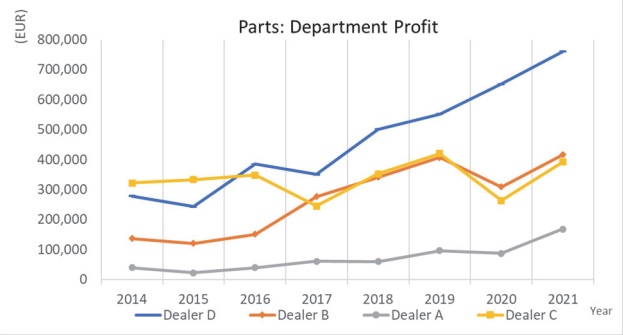

Figure 5 Dealers' Parts SalesDepartmental profit (EUR) 2015-2021

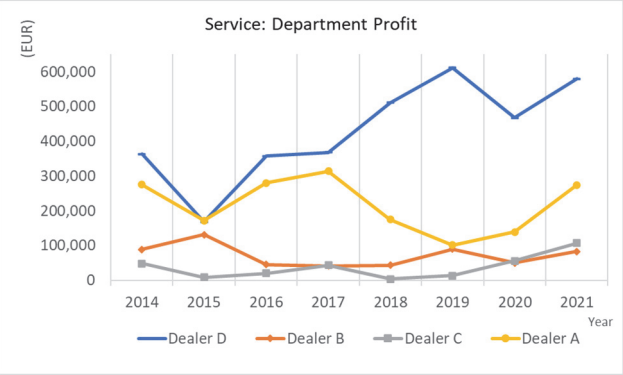

Figure 6 Dealers' Service Departmentalprofit (EUR) 2015 - 2021

As mentioned, After Sales and, in particular, maintenance technology is highly process-oriented. It requires systematic, comprehensive, and complex planning and continuous development. Spare parts supply flow is ideally stable with small, limited fluctuation. To overcome missed deliveries, a dealer needs to plan and prepare spare parts reserves to avoid lost sales. Workshop available time represents a unique derivate in maintenance, hence it is crucial in maximizing capacity utilization of every workshop. The main workshop KPIs are: Technical Efficiency (%), Labour Utilization (%), and Overall Productivity (%) [12-14]. Although the first KPI divided by the second generates the third one, it is important to monitor and continually improve all of them. There are myriads of actions in achieving and sustaining high KPI levels in after-sales activities. Workshop KPIs (TE, LU, and OP) are inclining to industrial standards set by production technology. They are in constant fluctuation since variables (maintenance technology, teams, spare parts lead time) are changing fast. For dealers as complex people-tool systems, long-term measures inherently provide results. Tab. 3 shows the main long-term continuous activities.

Table 3 Long-term activities in maintenance

Long-term maintenance activity
Organization Readiness continuous effort
Training activity Products
Training activity Behaviour
Training activity Maintenance
Customer Appointment Workshop system
Maintenance & tool calibration
Maintenance tool usage training
Highly efficient maintenance tool implementation
Waiting to service days track & decrease
Extended warranty products promotion
Extended maintenance packages dev & promotion
Additional work offer & approval for customer
Lost Spare parts sale monitoring

Main maintenance technology operations are grouped into predictive and corrective. It is a common practice to monitor and manage B&P workshops separately and the mentioned measures are not tailored for them. Predictive (regular) maintenance is considered a ground for the highest workshop KPI achievements, Tab. 2, supported by skilled technicians and high-performance tooling. By observing the marginality of maintenance operations, it is possible to determine special places as margin increase generators. This is a dominant cause in OEM and independent interest in Fast Fit concept implementation predominantly focused on preventive, easy, repetitive maintenance operations, which do not require highly trained technicians. At the same moment, there is a set of short-term activities presented in Tab. 4. These activities require standardization and continuity. A reliable customer appointment system is a prerequisite for achieving high workshop effectiveness. The procedure implementation requires customer behaviour changes, more opportunities for a better presentation of products and services and a better understanding of real customer needs. A good maintenance process shall never challenge CF and involvement in activities with reputational risks. Preferred "Cherry Picking" maintenance either by customers or operations criteria is unethical. It is opposite to car manufacturers intentions and, in the end, will prevent customer satisfaction.

Table 4 Short-term activities in maintenance

Short-term maintenance activity	Type	Channel
Maintenance	Reminder	Digital/SMS/Call/Letter
MOT reminder	Reminder	Digital/SMS/Call/Letter
Registration reminder	Reminder	Digital/SMS/Call/Letter
Service campaign	Invitation	Digital/SMS/Call/Letter
Recall campaign	Invitation	Digital/SMS/Call/Letter
Retention campaign	Invitation	Digital/SMS/Call/Letter
Spare parts campaign	Invitation	Digital/SMS/Call/Letter
Seasonal check campaign	Invitation	Digital/SMS/Call/Letter
No-show service reminder	Reminder	Digital/SMS/Call

3.3 Overall Entity Performance

Among many known indicators such as Net Profit Before Tax (NPBT), where a positive trend was noticed, the importance of *K* Factor is emphasised. *K* Factor is the ratio of the value of after-sales variable gross profit to the

sum of overheads and all departments' fixed expenses:

$$K\ \text{Factor} = \frac{ASP}{OH + \sum FE} \cdot x \cdot 100\% \quad (1)$$

where, ASP = After Sales variable gross Profit (Spare parts + Workshop), $OH + \sum FE$ = Overheads + All departments fixed expenses.

Typically, NCS are quite dynamic and floating in volume and margin, hence, to sustain the entity viability, other profit centres should (ideally) cover overheads and holding costs as much as possible. Fig. 7 shows *K* Factor for the four dealers during the period 2014 - 2021. A relatively long period of high and stable *K* factor indicator value, observed as an indication of dealer sales result independence is a sign of business stability. It demonstrates their resilience from sales pulsations. The same parameter is at risk of changing in the future because electro evolution of vehicle conception will decrease the number of maintenance operations, which might lead to after-sales contribution lag. This is main of the many reasons that new services [15, 16] must be offered.

The departmental profit share is a salient indicator for understanding the contribution of different dealer departments and activities in the overall result. The departmental net turnover ratio is the weight of departmental TO in total TO. In this case, a comparison of two different dealerships, Dealer B and Dealer D is made in order to confront two approaches in dealer management. Fig. 8 shows the different TO departmental weights, while Fig. 9 shows the departmental profit ratio for the same time period (2014 - 2021). There are some year-on-year variations for both dealers but in general, Dealer B is predominantly NCS dependent, and Dealer D has a more balanced spread of business activities. In general, it is more common to discover dominant sales TO weight. NCS weight in that can be up to 70 - 80% of the total. In case of demand decrease, like it was in the period during Global Economic Crysis (GEC) from 2008 - 2012 (before the period considered) or during the COVID-19 market slowdown, it can simply outwear business activities and lead to dealer bankruptcy. As a reveal, the dealer with lower car sales dependence, in this case, Dealer D with a better spread of departmental and TO weights can find it easier to challenge the market crisis. The share of departmental profit is more balanced, and all departments are connected and necessary since there cannot be after sales without car sales and without good service sales channels.

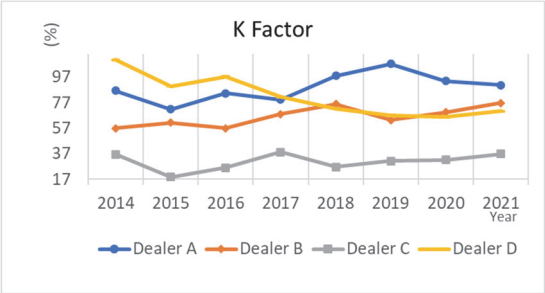

Figure 7 *K* factor (%) 2014 - 2021

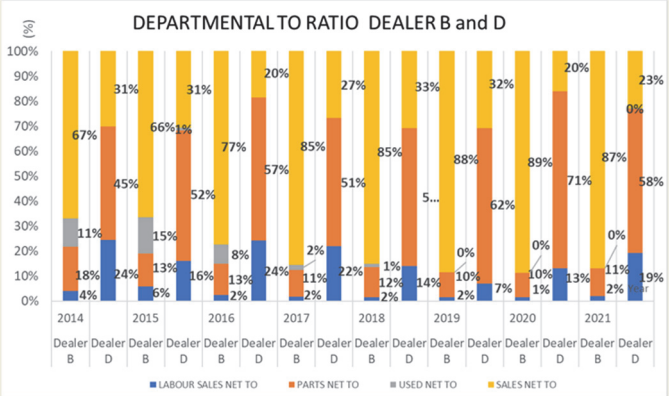

Figure 8 Departmental Turnover ratio dealer B and D (%) in period 2014-2021

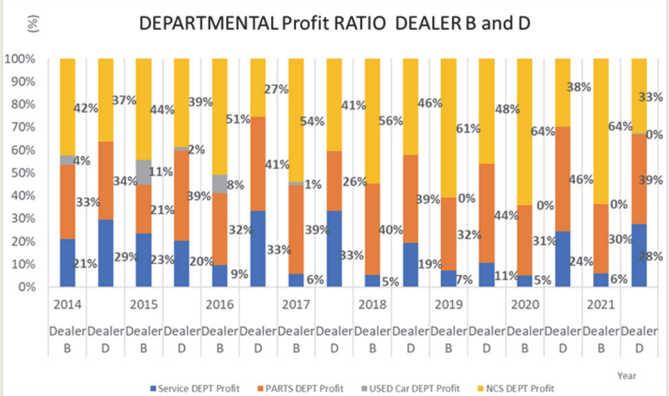

Figure 9 Departmental profit ratio dealer B and D comparison (%) 2014 - 2021

An obvious example is the anticipation of a supposition that demand for Electric Vehicles (EV) powertrain servicing and maintenance will be lower in comparison to an ICE-propelled vehicle for dealer workshop level. This might

provoke a decrease in after-sales contribution to overall entity gains. Based on the mentioned assumption, an internal model is developed to determine such influences. To make an arbitrary comparison among a group of dealers, it can be assumed that a decrease in both, the after-sales TO and departmental profit (DP), will occur. For instance, a decrease of 25% in turnover and 25% in the profitability of after-sales department can be assumed. As a result (Tab. 5), overall entity performance, the dealer operational profitability, will decrease between 12% to 60%.

Table 5 Key Point Indicators variation

KPI decrease / %					
Dealer	Spare Parts TO	Workshop TO	Spare Parts DP	Spare Parts DP	Operational profitability
A	25	25	25	25	–39
B	25	25	25	25	–12
C	25	25	25	25	–36
D	25	25	25	25	–60

In the example given, for the purpose of simulation, car sales TO and DP levels were "frozen", the feasibility of which can be certainly debatable. There is a possibility that the circumstances can develop as it was declared in Tab. 3. In this way, it can easily pull dealer entities below the profitability zone. Similar simulations and estimations can be made for other variations in industries and markets. Again, this can lead to the conclusion that dealers should be ready to offer new services. To foresee the best actions for the future, a detailed analysis of the Departmental Turnover (DT) and Departmental Profit (DP) Ratio is necessary. In the following text, detailed data will be presented for all four dealers considered so far, for the period 2015 - 2021. Dealer A data, shown in Fig. 10 and 11 indicates that 75% of total TO is dedicated to NCS side of the business, with relatively small fluctuation in the 7-year period considered. During the same period, on average, about 30% of the profit is generated from NCS. Meanwhile, about 60% of the profit is based on After Sales activities, with very little contribution from the sale of Used Cars. Such TO and DP correlations were stable for this entity over the last decade. In the same period, the *K* factor for Dealer A is high, stable and shows an increasing trend for the period considered (Fig. 7). Sales NPS trend is stable (Fig. 2), with After Sales increasing throughout the period monitored (Fig. 3). This is a result of the Dealer's dedication to their customers, and this can be confirmed with regular action planning to improve the relationship with customers. A recommendation can be made for this Dealer to further develop lateral profitable channels and to further exploit already successful CF trends.

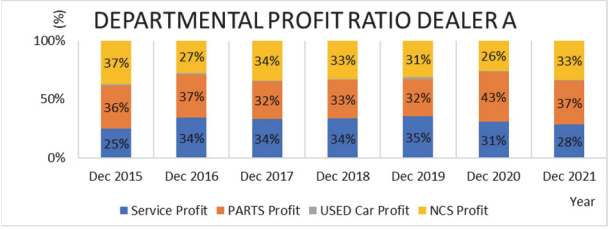

Figure 10 Dealer A: DP ratio (%) 2015 - 2021

Dealer B (Fig. 12 and 13) is focused on NCS and UCS (Used Car Sales), with the contribution of NCS increasing and reaching nearly 90 % of total TO at the end of the period considered. In 2021, more than 60% of the profit is sourced from this line of business. *K* factor (Fig. 7) is showing an increase from 50% to 75%. Sales and After Sales NPS trend increase is a result of the organization dedication to customers. The Dealer is Sales dependent, and its fluctuation can derogate the whole entity.

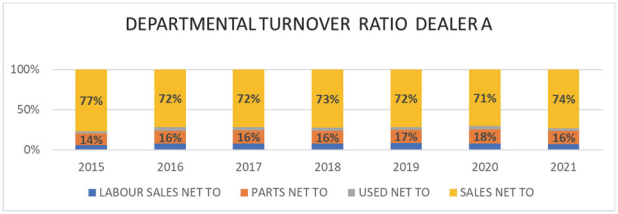

Figure 11 Dealer A: TO weight ratio (%) 2015 - 2021

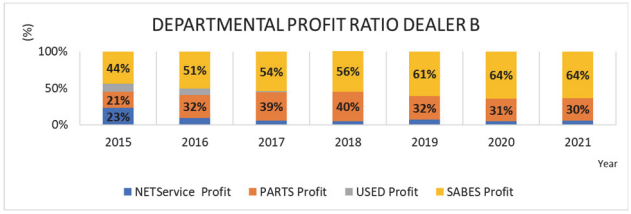

Figure 12 Dealer B: DP ratio (%) in the period 2015 - 2021

In case of the only After Sales decrease, the overall result will not be much influenced or the entity damaged. Nevertheless, it is reasonable to recommend further development of new operating and profit channels, to secure sustainability.

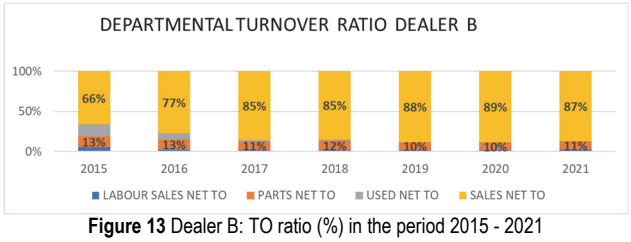

Figure 13 Dealer B: TO ratio (%) in the period 2015 - 2021

Dealer C is similar to Dealer B regarding sales influence significance on the whole entity. Concerning case resemblance further analyses of Dealer C is not effective and will not be presented. Dealer D, shown in Fig. 14 and Fig. 15 has levelled department turnover, as shown in Fig. 14 and Fig. 15. NCS TO is less than a third of the total TO for the entire period. Therefore, there is pronounced NCS independence, with the majority of TO being generated through parts sales. However, looking at the profits graph, the contribution of NCS is higher than TO contribution. Still, in 2021 more than 70% of profit is generated from after sales. The unusually high *K* factor (Fig. 7) has a negative trend, starting from 110% and saturating at the level of 70%.

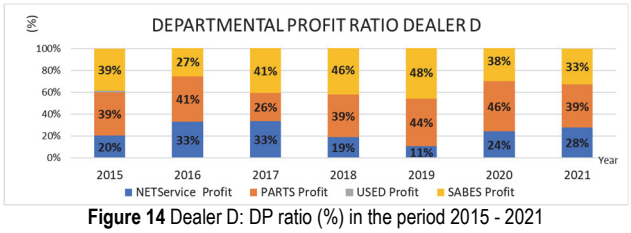

Figure 14 Dealer D: DP ratio (%) in the period 2015 - 2021

After Sales NPS trend (Fig. 3) increase is a result of the organization's dedication to customer satisfaction and

their recommendations. A deep dive overview into the sales whereabouts of Dealer D can detect relatively small changes from the volume point of view. Despite the utilization of an opportunity in sales, there was no important increase in this activity gain in relation to the overall entity.

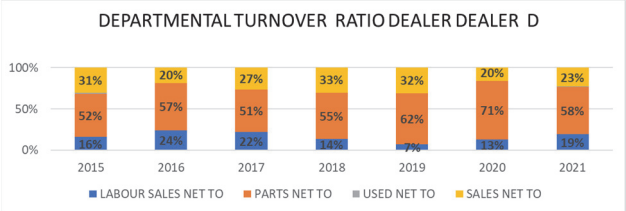

Figure 15 Dealer D: TO ratio (%) in the period 2015 - 2021

In case of only After Sales drop, the overall profitability might be significantly reduced, but there is a rather small possibility that overall business activity can be at risk except for the overall profit decrease. It can be recommended to further develop new customer-oriented channels to decrease the risk of profit decrease and to secure sustainability.

4 DISCUSSION AND CONCLUSIONS

There is a "confirmed" relationship between customer satisfaction and the profitability of a dealer, which can be extended, up to a certain level, to customer loyalty. At the same time, each and every dealer's operation and individual department needs to be profitable and contribute to overall business success and sustainability. However, experience is also telling us that many "good dealers" had to close their businesses. In addition to, or even more importantly, instead of getting carried away with anecdotal information and brand names, a structured methodology is necessary to analyse a dealer's operation and identify strengths, weaknesses, and remedial actions needed for longer-term business development. All those day-by-day activities are incorporated into action plans executed within dealer organizations. Many of them must be redesigned from time to time until they become part of the dealer routine. As shown, in order to gain full insight into a dealer's operation and profitability, it is necessary to review KPI's. Above all, CF is vital in ensuring sustained operation, growth and profitability. The research presented proved that such a complex and time-consuming analysis is well worthwhile. The four dealers considered are quite different in many aspects, as shown through a structured methodology, and well-documented analyses. As their performances were monitored over a period of nearly a decade, it was possible to form a very thorough and detailed picture of their operation and profitability. This has avoided unsafe conclusions which are sometimes based on observations lasting for shorter periods. During the monitoring period, there was a worldwide COVID-19 Pandemic during 2019 - 2021, with nothing similar ever experienced. It was also interesting to observe the influence this event had on each dealer. The research shows how complex dealer operations are and how with good organization. Based on the research, several streams are proposed in order to develop results that lead to the profit increase without CF compromise. Interdepartmental cooperation and synergy are essential in order to challenge future transformations. At the same time, diversification is recommended. All departments need certain processes that secure organization maturation with increased effectiveness over time. Only a dealer who is well-managed and organised can successfully unveil new services and make them successful on the long run. Employees and managers need to be trained in order to continuously develop competencies. Whenever a client is waiting for a service, the dealer sales team gets an opportunity to spend more time with him/her which can be a place to improve client relations. The opportunity should be used for a better understanding of the client's "precious time", needs and desires, to show empathy to the client and to satisfy his/her demands in the highest percentage possible. A recommendation can be made to further develop known customer-oriented channels to secure sustainability. An example of such activities is used car sales, rent-a-car activity which was not part of the offer, or its contribution was low at examined dealers at that period. A set of measures for improving After Sales services is mentioned above in the paper. Dealers will be motivated either to invent new services, or to copy, accommodate, and offer from some other functional examples. New services will arise from the dealers' intention to follow clients who will be no more focused on product features but on product experiences. Examples of new services are connected to shared mobility opportunities as an extension of rent-a-car operations. Some services can be integrated, like vehicle transport to customers and maintenance or new car delivery. In this way, new packages of services can be developed and adapted to market needs. Dealers will remain positioned not as unique but as the only important touchpoint with the customer as long as they are able to secure and foster relations with end clients. The results presented in this paper are related to the automotive industry. Such approach for analysis and management can be used for: product development process, collection of product feedback, ICT bug reporting, support innovation process with new ideas from customers. Besides production and maintenance, it can be applied in warehousing, logistic, shipment and other services.

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Contact information:

Milan VELIMIROVIC, M. Sc. in Mechanical Engineering
(Corresponding author)
11070 104 Ljeska Street Belgrade
E-mail: Miveli20@gmail.com

DraganaVELIMIROVIC, PhD
Academy of Applied Technical Studies Belgrade, Section of Traffic,
Mechanical Engineering and Safety Engineering, Belgrade, Serbia
E-mail: dvelimirovic@atssb.edu.rs

Aleksandar MICOVIC, PhD
Faculty of Technical Sciences, University of Pristina,
Kosovska Mitrovica
E-mail: aleksandar.micovic@pr.ac.rs

Vladimir POPOVIC, PhD
Faculty of Mechanical Engineering,
University of Belgrade, Belgrade, Serbia
E-mail: vpopovic@mas.bg.ac.rs