



International Journal of Operations & Production Management

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Eliane Pereira Zamith Brito Ricardo Luís Beneduzzi Aguilar Luiz Artur L. Brito

Article information:

To cite this document:

Eliane Pereira Zamith Brito Ricardo Luís Beneduzzi Aguilar Luiz Artur L. Brito, (2007), "Customer choice of a car maintenance service provider", International Journal of Operations & Production Management, Vol. 27 Iss 5 pp. 464 - 481

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Customer choice of a car maintenance service provider

A model to identify the service attributes that determine choice

Eliane Pereira Zamith Brito and Ricardo Luís Beneduzzi Aguiar
Universidade Presbiteriana Mackenzie, São Paulo, Brazil, and

Luiz Artur L. Brito
FGV-EAESP, São Paulo, Brazil

Abstract

Purpose – This paper investigates the determinants of customer choice of a car maintenance service provider after the warranty period. It focuses on the alternative of using branded car dealers, who provide this service during the warranty period, or independent garages.

Design/methodology/approach – A comprehensive list of 30 service attributes is developed drawing on the service quality literature, specific previous studies on car maintenance services, and including other purchase behaviour determinants such as perceived value. Simple random sampling with replacement is used to collect data from 400 car owners using the actual choice of a service provider as the dependent variable. A quantitative analysis using a set of logistic regressions links directly customer choice to the service attributes.

Findings – Service attributes that determine customer choice are the ones consumers simultaneously consider important and perceive differences in performance between the service providers. The branded dealers service operation proved to be relatively weak, having only one of these attributes, while being better evaluated in less important ones. Independent garages have a much better offer justifying their gain in market share.

Research limitations/implications – Only economic cars (1,000 cc) were analysed. Convenience and location were only partially controlled and could play a more significant role in some decision settings. Logistic regressions could effectively predict customer choice in close to 90 per cent of the cases demonstrating the adequacy of including other service attributes beyond the ones covered in the service quality literature.

Practical implications – Directions for improvement in the operations of both branded dealers and independent garages could be derived and some recent moves by both types of players could be supported by the results.

Originality/value – Investigation of the Brazilian setting and the methodological approach of linking actual customer choice to the extended set of service attributes by the combination of logistic regressions and the importance rating of the attributes.

Keywords Brazil, Maintenance, Private cars, SERVQUAL, Operations management, Consumer behaviour

Paper type Research paper



Introduction

Although the automotive industry is a popular investigation setting in operations management, the related automotive services industry is rarely mentioned in the field. The automotive services industry includes car servicing, mechanical repairs, car body repairs and breakdown and recovery services. This paper looks at this service industry

and investigates customer choice of service supplier following the end of the warranty period.

The automotive industry is highly significant to the Brazilian economy; in 2005 it represented 11.5 per cent of the GNP or 13.4 billion USD (ANFAVEA, 2006). Similar statistics for the automotive services industry are not available; however, total sales of replacement parts – which represent a fraction of the market – reached 1.3 billion USD in 2005 (ANFAVEA, 2006). Additionally, the service activity seems to be increasingly relevant to dealers' overall business (FENABRAVE, 2001). Urdan (1999) studied the composition of the overall profit of branded dealers comparing the situation in 1996 against 1989. The share of profit accruing from parts and services rose from 15 per cent in 1989 to 46 per cent in 1996. In the USA, dealers' profitability is also dependant on service (Banks, 2006).

In 2005, the Brazilian fleet comprised 21.3 million units, with an average age of 13.4 years (FENABRAVE, 2005). Since the typical warranty period is one year, the owners of nearly 20 million cars face the choice of selecting their maintenance service provider. Their main options are branded car dealers and independent garages. The latter are clearly winning the battle given that 75 per cent of consumers choose independent garages over branded car dealers following the end of the warranty period (ABRIVE, 2003). Our study investigated why consumers choose independent garages or branded car dealers and what service attributes determine actual customer choice. This type of study joins a recent research trend that has shifted from studying drivers of customer satisfaction to examining drivers of customer behaviour intentions such as re-purchase habits (Ranaweera and Neely, 2003; Sureshchandar *et al.*, 2002). It is also in line with the call from Johnston (1995a) to look in further detail at linking operational performance to business drivers.

The research on service quality has established a positive association between quality and customer purchase intentions, but the relationship has proven to be complex, involving other constructs such as perceived value of the offer and customer satisfaction (Cronin *et al.*, 2000). This research used an extended list of service attributes related to operations and investigated their direct relation to customer choice. Service attributes were identified and evaluated drawing on the service quality literature and previous studies on car maintenance services (Rodrigues, 2001; Mersha and Adlakha, 1992; Bouman and Wiele, 1992).

A probabilistic sample of 400 car owners taken from Uberlandia, a medium-sized Brazilian city was used. A set of logistic regressions with the dependent variable "actual customer choice" was used as the main analytical tool. This was complemented by an initial factor analysis and a survey to rate the importance of each attribute from the customer's perspective. Results allowed identification of the service attributes that drive customer choice for both types of service providers and rating how well each service provider is performing in each of these attributes relative to the direct competitor. The analysis can be used to guide actions in the operations area linking them to the overall business drivers.

The next section reviews the relevant literature on service quality and determinants of customer purchase intentions and ends with a definition of the research question and how this research builds on previous work. The methodology section describes in more detail measurements and data collection procedures. Results are then presented and discussed and a conclusions section ends the paper.

Literature review

The service quality literature probably represents the main research stream related to the understanding and explanation of customer purchase intentions in service operations. However, there is still debate in the literature about how to operationalise and measure service quality. In this section, we first briefly review the measurement of service quality and then discuss studies that analysed the effect of service quality and other constructs on customer purchase intentions or actual behaviour.

Measurement of service quality

The concept of quality itself is complex and has been associated historically with multiple perspectives making theoretical and research advances difficult. Reeves and Bednar (1994) review four possible concepts of quality: excellence, value, conformance to specifications, and meeting and/or exceeding expectations. Each of these concepts has its strengths and weaknesses in relation to measurement and generalisability, managerial usefulness and consumer relevance. The debate in the service quality literature between the efficacy of the SERVQUAL scale based on the expectation-perception gap (Parasuraman *et al.*, 1988, 1994) and the SERVPERF scale based on performance measures (Cronin and Taylor, 1992, 1994) reflects the complexity of the quality concept.

The SERVQUAL scale is the result of a comprehensive study based on a series of focus group sessions that initially identified ten dimensions of service quality (Parasuraman *et al.*, 1985). Further work resulted in five dimensions – reliability, tangibles, responsiveness, assurance and empathy – measured across 22 items or service attributes (Parasuraman *et al.*, 1988). The gap between customers' expectation and customers' perception of service performance is measured for each of these 22 items. The scores are then grouped in the five dimensions providing an overall score for each dimension. It is also possible to estimate an overall score for service quality. In this case, the consumer is asked to evaluate the importance of each dimension. In this way, an overall service quality score can be calculated based on a weighted average of the dimension scores with the weights representing the declared importance to customers of each dimension (Parasuraman *et al.*, 1988).

The SERVQUAL scale can be used by operations managers in several ways. The scores in each dimension broadly identify areas of action for design and/or improvement giving operations a metric to use that reflects the quality as perceived by the customer. However, the use of dimensions, rather than the service attributes themselves, although useful in interpreting the results from the market perspective, does not offer operations specific guidance on where to act in the design or improvement of the service operation.

The approach taken by SERVQUAL was challenged by other researchers (Carman, 1990; Cronin and Taylor, 1992), thus establishing the debate on how to conceptualise service quality, customer satisfaction, and their relationships with customer behavioural intentions.

Based on a theoretical discussion of the concepts of satisfaction and attitude, Cronin and Taylor (1992) argued that the use of the expectation-perception gap approach was not adequate when measuring service quality. Only in the absence of prior experience with the service do expectations initially define the level of perceived service quality. The sequence of experiences with the service provider interactively revises the

perceived quality, taking into account previous perceptions of quality and actual performance. Cronin and Taylor (1992) advocated that the use of direct performance measures using an “adequacy-importance” model consistent with the attitude literature (Mazis *et al.*, 1975) was more efficient and useful in predicting purchasing intentions and actual purchasing behaviour. They proposed a new scale, SERVPERF, based on direct measurement of perceived performance on the same 22 items used in the SERVQUAL scale in substitution for the expectation-performance gap proposed by the latter. They also abandoned the five dimensions structure, demonstrating that all items can be loaded into one factor only, so items can be used directly in a summated scale. They supported this proposal with an empirical study demonstrating that SERVPERF could better explain the variation in a global measure of service quality as well as the fact that the SERVPERF model linking customer satisfaction, service quality and purchase intention had a better fit than SERVQUAL.

Cronin and Taylor (1992) concluded that the direct influence of service quality on purchase intention did exist, but customer satisfaction exerted a much stronger effect. The managerial implications are relevant to operations. Focusing on service quality alone may not be effective in promoting the ultimate objective of winning the order or retaining the customer. Other aspects such as value, convenience or availability may also be relevant and operations decisions have an impact on them too.

Our research has taken an approach consistent with SERVPERF in that it used the direct performance evaluation of each attribute and not the expectation-perception gap. It also expanded the list of service attributes well beyond the original 22 items used both in SERVQUAL and SERVPERF. The additional items covered specific attributes related to the nature of the car maintenance service, drawing from previous research (Mersha and Adlakha, 1992; Bouman and Wiele, 1992; Rodrigues, 2001). This addressed the warning of Cronin and Taylor (1992, p. 65) that items that define service quality in one industry may be different in another.

Service quality and other determinants of customer purchase intentions or actual behaviour

The link between service quality and customer purchase intentions or behaviour has been explored empirically with three different approaches. The first consists of confirming a direct positive relationship between service quality perception and purchase intention or customer retention. The second approach, closer to the operations management literature, consists of investigating how the different aspects of the broader service quality construct, or even its dimensions, influence customer behaviour. The third approach involves the inclusion of other constructs alongside service quality, creating a more comprehensive model and exploring the relative importance of service quality against, for example, price or value.

The work of Boulding *et al.* (1993) is a good example of the first approach and clearly established a positive relationship between perceived service quality and behavioural intentions of repurchase and recommendations. Zeithaml *et al.* (1996) also established the positive relationship, evaluated different strengths of this relationship for levels of service quality below, within and above the service quality tolerance zone and examined the effect of a previous negative critical incident. Results indicated that it is beneficial to strive to meet the customer’s desired level of service quality rather than merely perform at adequate levels. Benefits for exceeding the desired level were

less significant, and action in that direction should be done in a cost-effective way. The behavioural intentions construct was defined in a comprehensive way including not only repurchase intention but also other related aspects such as word of mouth communication, willingness to pay more and complaining behaviour. Cronin and Taylor (1992) went on to also determine a positive direct association between service quality and purchase intentions, but found this association to be relatively weak. They found, however, a relevant indirect effect: service quality affected customer satisfaction which, in turn, had a strong effect on purchase intentions. This also highlights the need to explore other factors that influence customer satisfaction. There seems to be little or no doubt that service quality positively influences purchase intentions.

The second approach abandons service quality as an overall construct and explores what attributes of service quality have more influence on purchase intentions or behaviour. Johnston (1995b) introduced the idea of satisfiers and dissatisfiers. Dissatisfiers are variables or service attributes where a low performance by the service provider causes dissatisfaction and results in complaining behaviour. Furthermore, higher levels of these service attributes did not appear to please the customer any further. These attributes, the dissatisfiers, are necessary, but not sufficient conditions for a service to achieve a high overall performance. In a way, they are similar to the concept of order qualifiers (Hill, 1993) or hygiene factors (Herzberg *et al.*, 1959). Satisfiers, on the other hand, are service attributes where exceptionally high performance elicits strong feelings of satisfaction, but sub-standard performance is not necessarily negative. Some attributes, namely dual attributes, could have both characteristics, and be able to both cause satisfaction and dissatisfaction. Identification of satisfiers and dissatisfiers leads to clear indications for operations in terms of service design or improvement.

Johnston (1997) emphasised the need to find an approach that assessed both the effect and importance of the quality attributes. He added the dimension of importance to previous work and was able to classify the service attributes more precisely using a framework linked to action. The retail banking industry in the UK was used as the research setting. For example, high importance dissatisfiers were a group called “no mistakes” where extreme care in service design and control was called for meeting minimum standards reliably.

The third approach introduces other variables that influence customer purchase behaviour, including price or its consequence – value. As operations decisions in the service business are likely to influence quality and cost simultaneously, this approach is also relevant to operations management. Unfortunately, this is the least developed stream of research so far. Cronin *et al.* (2000) investigated the effects of service quality, customer satisfaction and customers’ perception of service value on behavioural intentions. They found that the relationships between these concepts are complex. All three, service quality, value, and customer satisfaction have a direct and positive influence on customer behaviour. Value represents the strongest influence, closely followed by customer satisfaction. Service quality, however, is especially important since it also influences value perception and customer satisfaction, thus having an additional indirect effect on customer behaviour. Ranaweera and Neely (2003) also investigated the combined effect of service quality, price perception, inertia and indifference on customer retention on a mass service setting. They found service quality to have the strongest influence in isolation, but price perception and

indifference also had important direct effects; besides they moderate the relationship between service quality and customer retention. Service attributes related to value, as with price, seem to have an important contribution and their inclusion in the analysis effectively increases the usefulness of the results to operations management.

Research question and objectives

Our primary research question is:

RQ1. What service attributes determine customer choice of a car maintenance service provider?

To answer this question, we combined the second and third approaches reviewed in the previous section. First, following Johnston (1995b, 1997), we included an expanded list of service attributes related to service quality and used all these service attributes as direct independent variables in the logistic regressions. By using the service attributes directly, instead of a scale to measure a latent variable like service quality, the results are made more relevant to operations management as they indicate specifically which area of the service operation needs attention. Second, as the design of a service operation includes decisions that may involve trade-offs related to cost and consequently price, we included attributes that could affect the actual decision related to price and value. Third, rather than use purchase intentions as the dependent variable in the logistic regressions, we used actual customer choice.

Methodology

Data collection

The study was conducted in Uberlândia, a typical medium-sized city of the Southeast of Brazil with around 500,000 inhabitants in 2003 (IBGE, 2006). Annual average per capita GDP in this city is similar to other cities of the same size in the South and Southeast of Brazil, the most affluent regions of the country. The city was large enough to have dealers representing all major car manufacturers. This was important to the study as it allowed users of car maintenance service to choose equally between the two types of service providers: branded dealers and independent garages.

The sample consisted of residents who owned 1,000 cc powered engine cars manufactured between 1995 and 2003. Subjects were selected from the local authority database of car registrations. A simple random sample with replacement consisting of 400 car users was drawn. Sample size allowed a minimum of ten respondents per variable, thus ensuring stability to the statistical analysis. Only car owners whose car warranty period had already expired were included in the sample. Respondents were contacted at home, in a face to face encounter and replacement was done in case the contact was unavailable. Data collection procedures were determined by the authors, but the actual contact with respondents was done by a research firm, using trained interviewers, in November 2003. To ensure reliability, the authors subsequently contacted 20 per cent of respondents by phone and asked them to answer part of the questionnaire again.

The questionnaire was pre tested on a sample of 30 graduate students of Mackenzie University in São Paulo. The wording was checked and the difficulty of evaluating two types of service providers in sequence was taken into account. Minor adjustments were

made to the questionnaire and a second test was conducted with another group of graduate students. No further significant changes were deemed necessary.

The questionnaire consisted of three different parts. The first collected demographic data about respondents and their cars. Respondents were asked what type of car maintenance service provider they actually used and questions about their attitude toward price discounts, promotion and the role played by friends in recommending a car maintenance service provider. In the second part, respondents were asked to evaluate how they expected both branded dealers and independent garages to perform in each one of the 30 service attributes by giving a grade varying from zero to ten. This eleven-point scale was chosen to offer respondents discriminating power in the evaluation of the two types of service providers. Finally, respondents had to identify and rank, among the 30 service attributes, the six they considered the most relevant when choosing a car maintenance provider.

Measurements

Rodrigues (2001) conducted a study in Brazil, which measured consumer expectations of different types of service, including car maintenance. One of the author's concerns was to account for idiosyncratic characteristics of Brazilian consumers when evaluating service operations. His starting point was the 22-item SERVQUAL scale. Using focus groups with consumers, he eliminated five overlapping items and added ten new ones that covered aspects related to service provider honesty, time consumed to deliver the service, price and value, and trust in the service provider. Most of these aspects had also been covered by other researchers (Mersha and Adlakha, 1992; Cronin *et al.*, 2000; Ranaweera and Neely, 2003; Bouman and Wiele, 1992). The final scale proposed by Rodrigues (2001) had 27 items as service attributes. We used this 27-item list as a starting point and subjected it to a validation by a discussion with three senior managers of major car manufacturers, responsible for after sales services. As a result of this discussion, three new items were added to the scale, two relating to trust and one to service value. The final instrument had 30 items listed in Table I.

Results and discussion

Sample general characteristics

Respondents were predominantly men (75 per cent). One possible explanation for this could be that in most families the car maintenance role is still undertaken by men and one of the filters used in the study was the requirement that the respondent was responsible for car maintenance. Two thirds of respondents (66.5 per cent) were customers of independent garages, coinciding closely with the statistic published by ABRIVE (2003). Choice of service provider varied in a consistent way with car age as shown in Figure 1. Considering that the typical warranty period for this type of car is one year, and the maintenance service during this period is provided by branded dealers, the graph suggests independent garages gradually become the preferred choice as the car ages.

There were no significant differences between customers of independent garages and those of branded dealers in terms of price sensitivity. We evaluated this aspect by including a specific question regarding whether or not the customer was responsive to special offers and price promotions. Percentages of customers responsive to these offers were 43.6 per cent in the independent garages' group and 46.3 per cent in the branded dealers'.

1	Ability to absorb non-estimated costs generated by internal problems or failures
2	Ability to anticipate problems
3	Accuracy and correctness of invoice and receipt
4	Adequate opening hours
5	Attendants' cooperation and quick response
6	Attendants' trustworthiness
7	Attention to modifications demanded by the customer
8	Attention to service details
9	Employees' discretion
10	Employees' willingness to get to know customers
11	Employees' appearance
12	Employees' courtesy and politeness
13	Employees' knowledge and experience
14	General equipment condition
15	General site condition
16	Getting it right first time
17	Giving the customer individual and personal attention
18	Image of being reliable
19	Keeping promises
20	Keeping to agreed schedule
21	Keeping to original forecasted price
22	Mechanics' trustworthiness
23	Organization's climate and environment
24	Prompt price change communication
25	Value for money service
26	Willingness to adapt to customer schedule
27	Willingness to adopt specific solutions
28	Willingness to explain service development
29	Willingness to negotiate
30	Willingness to solve the customer's problems

Table I.
Service attributes

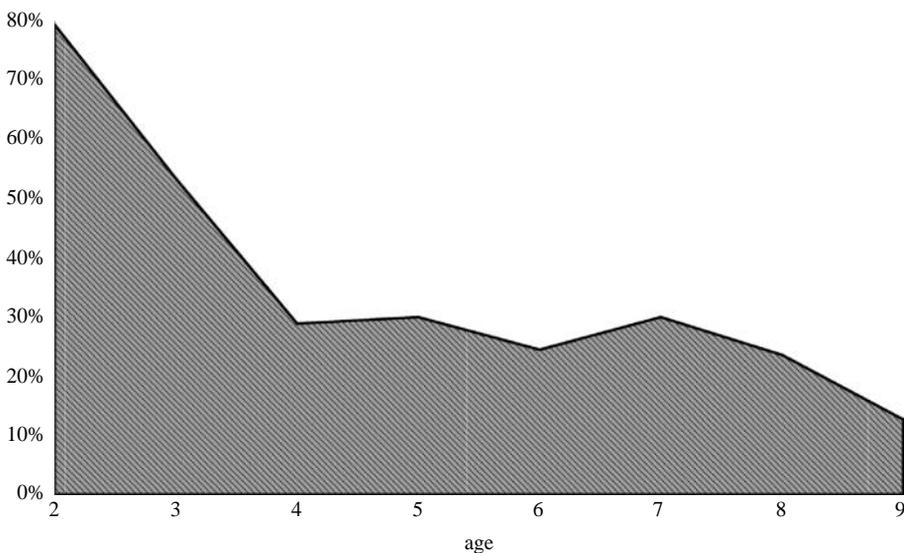


Figure 1.
Car age and market share
of branded dealers in the
car maintenance business

Factor analysis

Responses to the 30 service attributes were subjected to a factor analysis. Customers of independent garages and branded dealers were treated separately. Standard tests of sample adequacy (Bartlett's sphericity and Kaiser-Meyer-Olkin) were performed and no problems were identified. The principal components method with Varimax rotation was used.

Results indicated three factors corresponding to the dimensions identified by Rodrigues (2001) for the same service context (car maintenance). Tables II and III show the factor loadings and the values of Cronbach's α for the independent garages and branded dealers customers, respectively.

The first factor can be related to customer relationships and captures the elements related to the process of service delivery. The second factor can be associated with supplier responsibility and covers service content. The third factor refers clearly to the tangible elements dimension. These are the same factors identified by Rodrigues (2001). This was an expected result since most of the selected attributes were based on the tested and

	Components		
	1	2	3
Willingness to adapt to customer schedule	0.744	0.114	0.197
Employees' discretion	0.678	0.340	0.116
Value for money service	0.661	0.222	0.058
Employees' willingness to get to know customers	0.654	0.121	0.296
Adequate opening hours	0.653	0.167	0.062
Giving the customer individual and personal attention	0.625	0.312	0.271
Mechanics' trustworthiness	0.615	0.300	0.239
Employees' courtesy and politeness	0.589	0.488	0.176
Willingness to adopt specific solutions	0.584	0.330	0.119
Attendants' cooperation and quick response	0.576	0.493	0.213
Attendants' trustworthiness	0.573	0.473	0.189
Willingness to negotiate	0.543	0.248	0.336
Image of being reliable	0.542	0.321	0.378
Organization's climate and environment	0.537	0.480	0.184
Prompt price change communication	0.507	0.319	0.212
Ability to absorb non-estimated costs generated by internal problems or failures	0.432	0.261	0.363
Attention to modifications demanded by the customer	0.145	0.767	0.300
Keeping promises	0.238	0.744	0.346
Willingness to explain service development	0.406	0.678	0.050
Willingness to solve the customer's problems	0.387	0.631	0.307
Getting it right first time	0.305	0.630	0.382
Accuracy and correctness of invoice and receipt	0.260	0.592	0.266
Keeping to original forecasted price	0.210	0.583	0.270
Ability to anticipate problems	0.471	0.552	0.147
Attention to service details	0.491	0.532	0.174
Employees' knowledge and experience	0.445	0.496	0.346
General site condition	0.133	0.286	0.815
General equipment condition	0.171	0.230	0.814
Employees' appearance	0.235	0.247	0.680
Keeping to agreed schedule	0.325	0.396	0.479
α Cronbach	0.932	0.917	0.808

Table II.
Independent garages –
factor analysis

	Components			Car maintenance service provider
	1	2	3	
Willingness to adapt to customer schedule	0.763	0.135	0.120	473
Adequate opening hours	0.688	0.097	0.161	
Giving the customer individual and personal attention	0.659	0.251	0.089	
Employees' willingness to get to know customers	0.655	0.232	0.090	
Employees' discretion	0.653	0.171	0.315	
Willingness to negotiate	0.641	0.266	0.205	
Willingness to adopt specific solutions	0.634	0.260	0.118	
Value for money service	0.533	0.453	0.153	
Willingness to explain de service development	0.500	0.464	0.141	
Keep promises	0.154	0.766	0.211	
Get it right first time	0.112	0.718	0.226	
Attention to modifications demanded by the customer	0.145	0.713	0.282	
Attendants' trustworthiness	0.318	0.685	0.172	
Keeping to agreed schedule	0.154	0.611	0.239	
Mechanics' trustworthiness	0.390	0.598	0.189	
Willingness to solve the customer's problems	0.387	0.573	0.192	
Ability to anticipate problems	0.234	0.567	0.207	
Attendants' cooperation and quick response	0.519	0.563	0.138	
Employees' knowledge and experience	0.242	0.539	0.388	
Attention to service details	0.505	0.524	0.176	
Employees' courtesy and politeness	0.459	0.507	0.295	
Prompt price change communication	0.165	0.501	0.004	
Image of being reliable	0.183	0.499	0.339	
Organization's climate and environment	0.309	0.420	0.407	
General site condition	0.027	0.167	0.824	
General equipment condition	0.067	0.189	0.790	
Employees' appearance	0.225	0.330	0.586	
Keeping to original forecasted price	0.285	0.209	0.548	
Accuracy and correctness of invoice and receipt	0.394	0.147	0.467	
Ability to absorb non-estimated costs generated by internal problems or failures	0.279	0.251	0.384	Table III. Branded dealers – factor analysis
α Cronbach	0.879	0.922	0.752	

validated instrument developed by Rodrigues (2001) which also had its origins in the validated SERVQUAL scale developed by Parasuraman *et al.* (1988). These results and the process of construction of the research instrument indicated the comprehensiveness of the list of service attributes and its alignment with previous research.

Importance of each attribute

At the end of the interview, respondents indicated the importance of each attribute by selecting and ranking what they considered the six most important attributes when making a decision. Attributes ranked first received a weight of six, attributes ranked second received five, the third four and so on, as per the ranking system used by Carvalho and Leite (1997). The ten most important attributes are presented in Table IV for both customer groups which showed similar patterns.

This type of analysis has several limitations. First, consumers may not be telling the whole truth. They may say they value these aspects but their actions may not support that. The fact that both groups identify the same aspects but make different choices illustrates

Table IV.
Most important service attributes indicated by consumers groups

Customers of independent repair garages	Customers of branded dealers
Keeping to original forecasted price	Getting it right first time
Value for money service	Value for money service
Getting it right first time	Mechanics' trustworthiness
Mechanics' trustworthiness	Keeping to original forecasted price
Keeping promises	Employees' knowledge and experience
Willingness to solve customer's problems	Keeping to agreed schedule
Keeping to agreed schedule	Keeping promises
Employees' knowledge and experience	Attention to modifications demanded by the customer
Attention to modifications demanded by the customer	Willingness to solve customer's problems
General equipment condition	General equipment condition

the point. Second, some aspects may be deemed important, but if all providers have similar offers these aspects will not determine the decision. In operations management jargon, they will be order qualifiers, not order winners. Further analysis is necessary.

Logistic regressions

The next step was to use a logistic regression with the choice of service provider as the dependent variable and the consumer evaluation of his/her current supplier in each of the 30 attributes as independent variables. Forward stepwise variable selection was used. The logistic regression is perfectly suited to this application since the outcome is a dichotomous choice. The coefficients of the logistic regression indicate which attributes are associated with an increase or decrease in the probability that a customer will chose one or other service supplier.

The dependent variable was coded 0 – independent garage and 1 – branded dealer. The sign of the coefficient of the logistic regression for each attribute indicates its association with one or other service provider. Coefficients with a negative sign contribute to the regression leading to zero. These attributes are associated with the choice of an independent garage. On the other hand, positive coefficients show attributes are associated with the choice of a branded dealer.

Table V presents the results of the logistic regression. It includes the coefficients for each variable selected by the step-wise approach, its respective standard deviation, the

Table V.
Service attributes associated with customer choice – logistic regression

	B coefficient	Std error	Wald statistics	p-value
Employees' appearance	0.792	0.154	26.400	0.000
Image of being reliable	0.585	0.130	20.317	0.000
General equipment condition	0.521	0.188	7.691	0.006
General site condition	0.368	0.164	5.025	0.025
Attendants' cooperation and quick response	0.352	0.137	6.637	0.010
Willingness to negotiate	-0.362	0.112	10.476	0.001
Value for money service	-0.468	0.097	23.438	0.000
Willingness to solve customer's problems	-0.475	0.128	13.679	0.000
Constant	-11.365	1.423	63.798	0.000

Wald statistics (ratio between the coefficient and its standard deviation, squared) and the statistical significance. Only attributes with p -values less than 0.05 were included.

The attributes associated with the customer's choice of a branded dealer relate to visual and appearance attributes: employees' appearance, general equipment condition, and general site condition. High ratings on company's image of being reliable and attendants' cooperation and quick response also characterise the evaluation of those who opt for a branded dealer. Willingness to solve the customer's problems, willingness to negotiate, and value for money service are attributes associated with choosing an independent garage.

The logistic regression indicates the attributes where differences in performance evaluation by customers who chose different service providers do exist. It does not, however, imply a causal relationship between these differences in performance and choice of service provider. One attribute may be valued differently simply because two suppliers have different characteristics. For example, employees' appearance is clearly better evaluated by customers of branded dealers given the high positive coefficient, but this may be simply a consequence of common practice by all branded dealers. Since all of them have employees with better appearance, the factor becomes a differentiating factor. The important question to ask is which of these factors (where the differences are perceived) truly determines the customer decision? The solution is to cross check the list of attributes where performance differs between the two service provider alternatives (Table V) with the attributes deemed important by customers when making a decision (Table IV). The intersection of these two sets of attributes constitutes the attributes that are important and where customers perceive a difference in performance.

Only value for money, willingness to solve the customer's problems and general site condition meet both these criteria. Most of the attributes where consumers evaluate the branded dealers better are not in the list of important attributes. This indicates a serious flaw in the strategy of branded dealers. They are being different (and better) at attributes the customer does not include as important decision criteria. An exception to this is the general site condition where branded dealers perform better and which customers consider an important attribute. On the other hand, independent garages are performing better in two highly valued attributes: value for money and willingness to solve the customer's problems. These are the two service attributes that are determining choice of independent garages over branded dealers.

These results are based on the evaluation that customers have of their current service provider. We also explored the evaluation that these customers have of the alternative service provider using the same attributes. A similar logistic regression was carried out for the not-chosen provider and the result is a group of attributes that indicate why a type of provider was not chosen. Table VI presents the results of this regression.

The coefficients of the regression identify the attributes valued (expectation) differently by consumers not choosing a certain type of service provider. Since the valuation of the attributes refers now to the supplier not chosen, the more negative the coefficient, the more the attribute is contributing towards independent garages not being chosen. By the same token, the more positive the coefficient of an attribute, the more this attribute is contributing towards branded dealers not being chosen.

Branded dealers evaluation by their non-customers is similar to the evaluation made by their own customers. Image of being reliable, general site condition and general equipment condition appear in both regressions. Consumers who choose independent

Table VI.
Service attributes
associated with loss of
customers – logistic
regression

	B coefficient	Std error	Wald statistics	p-value
Image of being reliable	-0.941	0.148	40.493	0.000
General site condition	-0.828	0.165	25.162	0.000
General equipment condition	-0.442	0.167	7.003	0.008
Employees' discretion	-0.283	0.130	4.741	0.029
Prompt price change communication	-0.223	0.097	5.240	0.022
Ability to absorb non-estimated costs generated by internal problems or failures	-0.221	0.092	5.792	0.016
Mechanics' trustworthiness	0.275	0.112	6.015	0.014
Keeping to original forecasted price	0.358	0.107	11.109	0.001
Employees' willingness to get to know customers	0.394	0.111	12.641	0.000
Employees' courtesy and politeness	0.403	0.151	7.112	0.008
Value for money service	0.537	0.118	20.690	0.000
Constant	7.469	1.076	48.220	0.000

garages expect the branded dealers to perform better in these attributes, but despite this, choose otherwise. This is understandable since only the general equipment condition attribute was included in the list of most important attributes by this group of customers – and it was ranked last. Attributes where independent garages score higher are value for money, employees' courtesy and politeness, employees' willingness to get to know the customer, keeping to original forecasted price, and mechanics' trustworthiness. These are performance perceptions from customers currently patronizing branded dealers and so represent their evaluation of a possible supply alternative.

The first logistic regression model was able to predict customer choice in more than 88.4 per cent of the cases. Omnibus and Hosmer and Lemeshow tests indicated good model performance. The values of R^2 of Cox and Snell and the R^2 of Nagelkerke were 0.498 and 0.692, respectively. The second logistic regression, relating the performance expectation of the alternative supplier showed also a good model performance. The analysis of R^2 of Nagelkerke was above 0.74. This model showed a correct prediction level of 89.9 per cent.

Combining attributes performance and importance

The results of importance given to the attributes and the two logistic regressions are presented in a combined form in Table VII. First, it shows the attributes where consumer evaluation is different, as determined by the two logistic regressions. Second, it highlights the attributes included in the list of what consumers consider most important when making their choices. These are the attributes where performance is different and important, the true order winners.

Table VII groups the attributes in four cells. The top left cell contains the evaluation of branded dealers by their current customers. A first comparison can be done with the bottom left cell which represents the evaluation of independent garages by customers currently opting for branded dealers as service providers. Although branded dealers perform better in several attributes, these are not the ones consumers consider as most important. Branded dealers are probably excelling in attributes that are only qualifiers and have only one attribute deemed important in their favour: general equipment condition. Customers currently being served by branded dealers perceive the offer of

		The chosen type of service provider		Car maintenance service provider
		Branded dealers	Independent garages	
<i>Evaluated service provider</i>				
Branded dealers	Employees' appearance	Image of being reliable	General site condition	477
	Image of being reliable	General site condition	<i>General equipment condition</i>	
	<i>General equipment condition</i>	Employees' discretion	Prompt price change communication	
	General site condition	Ability to absorb non-estimated costs generated by internal problems or failures	<i>Willingness to solve customer's problems</i>	
	Attendants' cooperation and quick response	<i>Value for money service</i>	<i>Willingness to negotiate</i>	
Independent garages	Employees' courtesy and politeness	<i>Value for money service</i>		
	Employees' willingness to get to know customers			
	<i>Keeping to original forecasted price</i>			
	<i>Mechanics' trustworthiness</i>			

Table VII.
Explaining the choice or the non-choice of service provider

independent garages to be a better value for money option, that prices of branded dealers change more often than those of independent garages (keeping to original forecasted price) and that they are served by less trustworthy mechanics. Additionally, these three attributes were included in the list of most important attributes influencing their decision. This explains the comparative weakness of the branded dealers' offer and the risk that their customers will defect to independent garages, as they seem to actually do (Figure 1). In the first year following the end of the warranty period, branded dealers still have close to 80 per cent of the market. This figure drops, however, to the 30 per cent level over the two subsequent years. These results indicate the weakness of the branded dealers' offer, the need to redesign their operations, and where attention is needed.

The bottom right cell contains the evaluation of independent garages by their current customers. It can be compared with the top right cell which represents the evaluation of branded dealers by customers currently opting for independent garages as service providers. These customers recognise their suppliers (independent garages) perform better in terms of value for money and willingness to solve the customer's problems. These are considered important attributes and thus justify their choices. They are also aware that the alternative suppliers, branded dealers, perform better in a number of attributes they do not deem so important. The only aspect they judge important and the branded dealers do better at is general equipment condition.

A horizontal comparison of the four cells of Table VII is also useful and shows that the perception of both groups of customers is quite similar indicating that choice is not influenced by any type of communication problem.

Conclusion

We aimed to study the decision a customer faces when choosing a car maintenance service provider. In Brazil, this choice involves mainly two options: using a branded dealer as a continuation of the service provided during the warranty period or opting for independent garages.

The study's analytical approach allowed us to identify the critical service attributes associated with customer choice based on a comprehensive list that encompassed typical service quality characteristics as well as items of particular relevance to the car maintenance industry – convenience and value perception. Integrated analysis combining perceived differences in each attribute's performance with the importance given to each attribute (Table IV) enabled us to better understand the current picture and recommend guidelines on how operations could be improved for each type of service provider.

The analysis explains the reasons behind the weak position of branded dealers in the market. It helps to understand their low market share (only 25 per cent) despite the opportunity the warranty period presents to them of demonstrating to all future customers the quality of their offer. Current branded dealers' customers evaluate them favourably in only one important attribute: better equipment condition. No other attributes where the branded dealers obtained better evaluation seem to matter to customers. These attributes may be order qualifiers (Hill, 1993) or the dissatisfiers as defined by Johnston (1995b) where a better performance has a limited contribution. On the other hand, these very customers expect the competitor (independent garages) to perform better in three attributes they consider important: value for money, adherence to forecast prices and mechanical reliability. In other words, they see the competitor offering a lower cost – same value service, as more likely to maintain the prices they initially promise, and have more confidence in the mechanical expertise they offer. Additionally, they say these are important factors influencing their choice. The most likely outcome is future customer defection to independent garages.

An additional point is that the only attribute where the branded dealers perform better, namely better equipment condition, is not difficult to replicate. The resource-based view of strategy (Barney, 1991; Peteraf, 1993) states that easily copied resources cannot be a source of sustained competitive advantage. They lead at most to a temporary advantage and with time to competitive parity.

The results can be used to review the design of service operations for both types of service providers and better reconcile market demand with operational resources – Slack and Lewis' (2003) idea of operations strategy. Branded dealers need to change their approach or they will continue to lose customers to independent garages. First, they need to neutralise their disadvantage regarding some order winning attributes. One of the key problems is the perception that independent shops offer better value for money. The lack of economies of scale in service is a challenge, but co-operation with car manufacturers integrating the supply chain, getting auto-parts manufacturers onboard and utilising the benefits of such integration could be a promising area. A cost advantage in terms of auto-parts would not only play a part in the ability to offer better value, but also could be made more difficult to imitate given the relationship with car manufacturers, potentially a sustainable competitive advantage (Barney, 1991). Other important attributes are relatively easier to improve by modifying service design and modularity. Possible initiatives could include guaranteeing prices and estimates for certain service packages and revising service flow promoting direct contact between the customer and the mechanic, rather than between the customer and an attendant with limited technical knowledge. In fact, some branded dealers are currently moving in this direction and have started to advertise fixed price service packages.

Second, branded car dealers could try to leverage the attributes for which they are recognised for good performance. They could try to increase the importance given to these attributes by the consumer. Exploiting the relationship with the car manufacturer, they could try to give more importance to an image of a more updated technology and reliability.

The results of the research can also be used to guide independent repair garages. Here, the focus point is clearly identified. They need to improve the general condition of their equipment and site. This move has already been taken by some repair shop chains such as Precision Tune Auto Care, a global chain of repair garages with more than 650 garages worldwide who has been active in Brazil since 1999.

Some limitations must be considered when interpreting the results of this research. The sample included only cars with 1,000 cc engines. Although these represented 66.7 per cent of the sales of new cars in 2002 (ANFAVEA, 2006), the decision drivers of owners of other car types may be different, especially relating to more expensive cars. The sample was also filtered by year of car manufacture and cars manufactured before 1995 were not included. Results can be considered to have full external validity only for the investigated city. Other regions of the country may have specificities that lead to different results. Other variables like convenience related to proximity to customer home or work address, type of maintenance (preventive or corrective) would enrich the study and could be explored in future work. Future studies could also explore the decision moment that occurs at the end of the warranty period when the consumer has to make the decision as to whether or not to switch to a different service supplier. Another alternative would be to investigate specifically the customers who opt for a change and determine the reasons behind their decision.

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Corresponding author

Eliane Pereira Zamith Brito can be contacted at: elianebrito@mackenzie.com.br

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