Descriptive Evaluation in the Public Transport Service—A Study About of the Satisfaction of Customers

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1 Introduction

Nowadays the importance of customer satisfaction is not just to the private sector, but to the public sector too. According to Chen et al. [2] the "customer orientation" has become a popular slogan and now takes pride of place in the strategic statements of many public-sector and private-sector organizations. The authors added that in the UK, for example, public-sector organizations are increasingly demonstrating that "customer orientation" is no longer the exclusive preserve of the private sector. Gore emphasized that the situation is similar in the USA—National Performance Review Project entitled "Putting Customers First".

In the Brazilian context, the public management has been discussed increasingly. In other words, this theme becomes an important subject to Brazilian research. Conform Yamaguchi et al. [14], today Brazil needs better public management and it could follow in success models as private management, even this one aiming the profit. Ref-

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erent to the public transport services in the Brazilian context the overview is the same. Goulart [4] suggests that the quality of service provided by public transportation has been an important theme in debates, mainly due to the importance to people as a whole, both on the economic and the improvement of the population's quality life aspects. In general, we have several models, methods, and scales to evaluate. These evaluations are linked with three main stakeholders: customers, the enterprises, and the public system.

So the government should pay attention in the quality of the public transport service provided because the transit flow in the medium and big Brazilian cities has shown serious problems as slow mobility and accidents with victims [3]. In this sense, Hassan et al. [6] argue that the quality in the public transport is an essential responsibility of the engineers and public managers.

From these considerations, the purpose of the present empirical study is, therefore, describe and analyze the customers' expectations and perceptions levels referent to the public transport service as well identify the most important attributes of these services from customer's opinions. It is important to say that the customers' satisfaction is obtained from the difference between their expectations and perceptions levels.

2 Methods

Regarding the collect data process, it is important to highlight that were collected, in which the sample is sufficiently representative in relation to the population. The primary data were obtained from the survey undertaken in a probabilistic sample of 238 customers at some bus terminals/bus station in Aparecida de Goiânia city, middle of Brazil: Araguaia Station, Veiga Jardim Station, Vila Brasília Station, and Cruzeiro Station. These data were collected between January and February 2018. In this process, we have used a scale (shown as follows), which part one was presented in Soares et al. [12].

In this sense, Joewono et al. [7] highlight that service quality evaluation needs to be defined and carried out carefully since this term refers to a complex relationship between tangible and intangible characteristics of service (supply) and users (demand). According to the authors, this includes travelers' subjective perceptions, expectations, past experience, and well-being. They add that different travelers have different needs and priorities, and these influence their satisfaction and appreciation relating to various quality factors of provided services.

Research on research on the perception of the users about the quality of the services provided in the area of public transport (fourth version)

User,

This questionnaire comes from research that is being performed to evaluate the satisfaction/dissatisfaction on the quality of transport services of the municipality of Aparecida de Goiânia from the "expectation/perceptions" of the users of such services. This research is linked to the Industrial Engineering course Special Academic Unit of Sciences and Technology of Aparecida de Goiânia Campus of the Federal University of Goiás.

Part 1 – General data

1- Has any disabilities?

( ) Yes ( ) No

2- Genre

( ) Female

( ) Male

3- Age

( ) Up to 18 years

( ) 19 to 35 years

( ) 36 to 50 years

( ) 51 to 60 years

( ) Over 60 years

4- Frequency of use of public transportation

( ) Daily

( ) Often

( ) Sometimes

( ) Rarely

5- Reasons for use

( ) Work

( ) Studies

( ) Health

( ) Others

6- What is your degree of education?

( ) First degree incomplete (basic education)

( ) Incomplete high school (high school)

( ) Complete high school (ensino médio)

( ) Incomplete higher education

( ) Complete higher education

7- Place of interview:

( ) Veiga Jardim

( ) Araguaia

( ) Vila Brasília

( ) Garavelo

( ) Cruzeiro

Parte 2 – Expectations:

User,

This part of the questionnaire is part of a survey to be carried out on "expectations" of users of public transport in the city of Aparecida de Goiânia/GO. That way, in this step, it is a rating of "1 to 5" in which:

1	2	3	4	5
No importance	Little importance	Moderate importance	Important	Very important

ACESSIBILITY	
1- The distance between the points must meet the interests of all passengers.	
2- The points of sale and marketing of tickets must be safe and reliable.	
PRICE	
3- The price of tickets should not be abusive, but enough to provide a quality service.	
FREQUENCY	
4- The time between buses of the same line should be adequate according to the flow of passengers.	
REABILITY	
5- The bus must be punctual.	
TRIP´S TIME	
6- The time of the bus ride should be brief.	
BUSLOAD	
7- The buses should not be crowded.	
SECURITY	
8- Public transport should provide security as accidents and assaults.	
9- The stop locations must be safe.	
VEHICLES´ CARACHTERISTICS	
10- The buses should offer a good conservation status, comfort and cleanliness.	
CARACHTERISTICS OF BUS STOP	
11- Terminals and stopping points must have good signage, coverage and seat.	
12- The stop locations must offer access to information about lines and timetables to users.	
CONNECTIVITY	
13- There must be a facility in exchange for buses and good integration between the lines.	
COURTESY/CUSTOMER SERVICE	
14- Drivers, tax collectors and other bus workers must show good behavior and good education.	
ROAD QUALITY	
15- The routes where the buses travel must be good condition.	

Parte 3 – Perceptions

User,

This part of the questionnaire is part of a survey to be carried out on "perceptions" of users of public transport in the city of Aparecida de Goiânia/GO. That way, in this step, it is a rating of "1 to 5" in which:

1	2	3	4	5
Very Dissatisfied	Dissatisfied	Indifferent	Satisfied	Very Satisfied

Construct	Attribute	Score
	1- The distance between the points must meet the interests of all passengers.	
	2- The points of sale and marketing of tickets must be safe and reliable.	
	3- The price of tickets should not be abusive, but enough to provide a quality service.	
	4- The time between buses of the same line should be adequate according to the flow of passengers.	
	5- The bus must be punctual.	
	6- The time of the bus ride should be brief.	
	7- The buses should not be crowded.	
	8- Public transport should provide security as accidents and assaults.	
	9- The stop locations must be safe.	
	10- The buses should offer a good conservation status, comfort and cleanliness.	
	11- Terminals and stopping points must have good signage, coverage and seat.	
	12- The stop locations must offer access to information about lines and timetables to users.	
	13- There must be a facility in exchange for buses and good integration between the lines.	
	14- Drivers, tax collectors and other bus workers must show good behavior and good education.	
	15- The routes where the buses travel must be good condition.	

What is your level satisfaction with the public transport service?

1 – Very Dissatisfied _____ 5 – Very Satisfied.

We ask that choose three most important attributes conform your perception:

1º: _____

2º: _____

3º: _____

The quantitative data were treated statistically, especially referent to the customers' expectations and perceptions levels. It was obtained parameters inherent to descriptive statistic, particularly measures of central tendency and dispersion, such as average, standard deviation and coefficient of variation. After that, it was obtained the gaps referents each attribute from the difference between customers' expectations and perceptions levels. These results are shown in Table 1.

Table 1 Mean, standard deviation, coefficient of variation, and gaps

Attribute	Mean score		Gap	Standard deviation		Coefficient of variation (%)	
	Expectation	Perception		Expectation	Perception	Expectation	Perception
1	4.26	2.73	1.53	0.85	1.15	19.86	42.16
2	4.50	2.74	1.76	0.87	1.30	19.32	47.53
3	4.67	1.67	3.00	0.74	1.06	15.79	63.17
4	4.68	1.70	2.99	0.61	0.99	13.11	58.31
5	4.71	2.04	2.68	0.55	1.08	11.74	53.21
6	4.05	2.37	1.68	1.04	1.24	25.61	52.62
7	4.61	1.46	3.16	0.78	0.90	16.92	61.91
8	4.84	1.46	3.37	0.42	0.85	8.77	58.12
9	4.86	1.57	3.29	0.39	0.90	8.06	57.19
10	4.68	1.92	2.76	0.53	0.93	11.42	48.49
11	4.65	2.10	2.55	0.57	1.09	12.18	51.91
12	4.66	1.88	2.79	0.57	1.07	12.23	57.19
13	4.57	2.29	2.27	0.62	1.22	13.52	53.23
14	4.56	2.81	1.76	0.71	1.23	15.50	43.73
15	4.70	2.15	2.55	0.54	1.03	11.54	47.80

We also calculated the Cronbach's Alpha coefficient in order to estimate the scale reliability. Finally, we processed data referent to the importance level of the attributes/constructs obtained from the customers' opinions. In this sense, we determinate the relative importance to each construct, as shown in Table 2. So we undertake comparative analyses between importance's levels of the construct and the performances referent to each one from the perceptions levels.

To calculate the relative importance, we defined "weighting" referent to each importance level. For example:

- First more important: weighting 5
- Second more important: weighting 3
- Third more important: weighting 1

From these weightings, we got the relative weighting referent to each construct, using the choices of the customers. For example, if the "security" construct was chosen eight times as the most important (first more important—weighting 5), nine times as second more important (weighting 3) and six times as third more important (weighting 1), the relative weighting for "security" 1 will be

$$(76 \times 5) + (46 \times 3) + (67 \times 1) = 585$$

This process was applied for each construct, i.e., for "frequency", "price", and so on. After that, we got the total of the relative weightings, for example, 1972. Finally,

Table 2 Relative weighting and relative importance

Construct	Relative weighting	Relative importance (%)	Performance
Security	585	29.67	1.51
Frequency	388	19.68	1.70
Price	332	16.84	1.67
Busload	256	12.98	3.16
Reliability	118	5.98	2.04
Accessibility	83	4.21	2.74
Trip's time	64	3.25	2.37
Vehicles' characteristics	61	3.09	1.92
Characteristics of bus stop	32	1.62	1.94
Courtesy/customer service	23	1.17	2.81
Road quality	18	0.91	2.15
Connectivity	12	0.61	2.29
Total	1972	100.00	–

we calculated the relative importance regarding each construct. For example, for security the relative importance will be

$$585 \div 1972 = 0.2967\,(29.67\%)$$

3 Results and Discussions

3.1 Descriptive Analyses and Scale Reliability

The objective of this paper is also to measure and assess the satisfaction of public transportation in Aparecida de Goiânia city. In this sense, according to Tse and Wilton [13] the customer satisfaction is considered a function of the perceived performance relative to consumer's prior expectations. Conform to Grönroos [5] the European tradition posits service quality as resulting from a comparison between the customer's expectations of the service and the customer's perception of the service actually received. Additionally, Parasuraman et al. [9] defined and conceptualized service quality as a form of attitude, which results from a comparison of customers' expectations with perceptions of performance.

So Table 1 shows the values referent to the expectative, perceptions, mean, standard deviation, and coefficient of variation regarding each attribute of the scale in discussion and the gap referent expectative and perception levels.

First, it is possible to affirm that to all attributes the expectations levels are largest that the perceptions levels. Table 1 shows this reality, i.e., in general, the customers are unsatisfied with the public transport services. We can also observe that the largest gap is 3.37 and relates to question 8—"Public transport should provide security as accidents and assaults," referent to construct "security". The second and the third largest gap are related to the questions 9—"The stop locations must be safe," and 7—"The buses should not be crowded," regarding the constructs "security" and "busload", respectively. It means that in these attributes there are the main customers' dissatisfactions.

For the other hand, the three smallest gaps are regarding to attributes: "1—The distance between the points must meet the interests of all passengers," "6—The time of the bus ride should be brief," and "14—Drivers, tax collectors and other bus workers must show good behaviour and good education" relative to constructs "accessibility", "trip's time", and "courtesy/customer service", respectively. In other words, for these attributes, there are the smallest customers' dissatisfactions.

Observing particularly the expectations values, we can perceive that the three largest values are, respectively, referents to attributes 9—"The stop locations must be safe", 8—"Public transport should provide security as accidents and assaults", linked to "security" construct, and 5—"The bus must be punctual", regarding to "reliability" construct. In this sense, it is important to highlight that high values referent to expectations mean great importance to the customers. Therefore, these attributes (9, 8, and 5) are relevant to clients, but the performance (perception) for these attributes is low if compared with other attributes, mainly referent to the ninth and eighth attribute. This finding is obviously worrying because for these more important attributes the management of public transport should prioritize actions exactly achieve the best performances.

Table 1 also shows that parameters relative to the variation coefficient (VC). In relation to the VC, it is important to emphasize that this information is a statistic unit that corresponds to the standard deviation in average's percentage, being the statistic parameter mostly used by researches in relation to the accuracy quality of experiments [1]. Conform Gomes [10], in the field experiments, if the coefficient of variation is less than 10%, the same is low, between 10 and 20% is median, between 20 and 30 is high and above 30 is considered too much high.

Shimakura [11] underline that if we have low levels of VC this means that is more homogeneous data set. The VC is low when it is lower or equal to 25%. However, this standard can be different according to the application. It is hard to classify a variation coefficient as low, median, or high, according to Shimakura [11], but this can be good when you compare two variables or two groups which are impossible to establish comparisons.

Based on Table 1, we can observe that the values for the coefficient of variation (CV) are relatively low to the attributes of the user's expectation of public transport. However, these coefficients of variation become high when the attributes of the perception of users are taken into consideration.

The coefficient of variation to expectation's values is on average 14.37%, the average perception increases to 49.92%. Therefore, the values referent to expectations

are low or medium and the values of the perceptions are high. Based on these findings, regarding expectations values, most of the attributes present moderate variation coefficient, with values between 10 and 20%. For the other hand, the mostly values referent to the perceptions are high (above 40%), i.e., these perceptions, in terms of values, are more heterogeneous than expectations' values.

Finally, referent to the scale reliability analysis was calculated the Cronbach's Alpha coefficient. The value found was equal to 0.73. It means that the reliability of the scale is acceptable. According to Malhotra [8], the minimum value to be considered for this parameter is 0.60, for values lowers than it the reliability is considered weak.

3.2 Comparative Analyses Between Importance Levels and Performance

As commented before Table 2 shows the relative weighting and the relative importance inherent each construct.

According to Table 2, we can observe that the most important construct (security) has the lowest performance among all constructs. The referent performance to the second most important construct (frequency) is third lower among all constructs. The third most important construct's performance is the second lower.

For the other hand, Table 2 also shows the lower importance constructs. In this group are "courtesy/customer service", "road quality", and "connectivity". However, the performance inherent of these constructs is relatively superior if compared with others.

The findings obtained from Table 2 show a paradoxes situation, i.e., for high importance there are low performance and for low importance we have relatively high performance. Actually, we obtained similar find before when we compared the expectation levels with performance levels.

4 Conclusions

The purpose of this paper is to describe and analyze the customers' expectations and perceptions levels referent to the public transport service as well as identify importance levels of this service from customer's opinions.

In this sense, one can conclude that in general, the customers are unsatisfied with the public transport services, referents mainly to security and busload aspects. One can conclude also that the most important attributes are linked to "security" and "reliability" constructs. It means that these dimensions are the most relevant to clients. However, the performances (perceptions) inherent these dimensions are low if compared with others. This finding can be showing that the management of public

transport is prioritizing the wrong aspects in order to promote the best services to customers.

Regarding coefficient of variation, it was observed that the values referent to the perceptions are more heterogeneous than expectations' values. In terms of scale reliability analysis, the value found (Cronbach's parameter) shows that the reliability of the scale is acceptable.

Finally, we have established comparative analyses between importance levels and performance. In this sense, we perceived that to the most important constructs the performances are low and for the less important constructs, the performances are relatively high if compared with other performances. This finding corroborates the conclusion anterior obtained from the comparison between the expectation levels with performance levels.

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