9TH CONFERENCE ON COMPETITION AND OWNERSHIP IN LAND TRANSPORT

A COMPARATIVE STUDY OF THE QUALITY OF SERVICES OF PUBLIC TRANSPORTATION IN THE CITY OF CAMPOS DOS GOYTACAZES, BRAZIL

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ABSTRACT

In our previous work, we analyzed the performance level reached by a certain public transportation bus company, nominated Company (A), operating in the city of Campos dos Goytacazes, Rio de Janeiro State, Brazil. That study was undertaken because in the last years Brazilian public bus transportation companies have lost revenue due to their lack of quality services and focus on customer satisfaction. As an immediate consequence of this fact, low customer satisfaction has led to client loss to competition. Based on customer opinion, we will now analyze the quality level reached by other public transportation bus companies operating in Campos. Again, a research opinion questionnaire will be used to collect data for this analysis, with customer selected randomly. Using the same questionnaire for these other bus companies that was previously used for Company A, we compare the results between Company (A) and the other group. Applying an equation that would define weight for each one of the analyzed items (attributes), a number was calculated representing a quality level based on customer satisfaction. The results show that Company A, as well as the other companies, need to urgently better their level of services. The quality level was bed for all of them, showing a great dissatisfaction among the public transportation users in the city of Campos.

INTRODUCTION

According to the National Urban Transport Association- NTU (1998), "Bus transportation has a higher priority than car transportation and can be easily verified by an example. In order to transport 70 people, an average of 50 cars or only one bus would be needed. A bus transporting 70 people pollutes 8 times less than 50 cars, is safer and less costly to the riders and the city."

In the city of Campos dos Goytacazes, as well as in the great majority of Brazilian cities, as was mentioned in a previous article, the demand for bus transport has declined since the 90´s. In 2002, there was a brief recuperation in demand, but passenger volume fell strongly in 2003.

The decline in demand, according to Martins, et al. (1998), has happened because, "as a general practice the needs of the riders has been neglected over the years, and the thought by the bus companies was that the riders were 'captive'. Therefore, marketing strategy was never an issue in the thoughts of the transportation companies."

"Profit has always been the objective of the industry, while the rider is concerned with issues such as reliability, comfort, reasonable fares, and others." (Raia, A., Moreira, F. 1999).

According to Duarte, P. (2003) "these differences in interests have as a consequence the rider's frustration with service as the companies don't realize that, in order to generate profits, they must fulfill the needs of their riders."

As an immediate consequence, the riders turn to alternative modes of transport, such as, private cars, bicycles, motor bikes, etc. The transportation companies' crisis can be resolved by attracting the riders back to their service, by fulfilling the riders' needs.

In this work we will be addressing the satisfaction level of bus riders of a company (Company A,) in the city of Campos dos Goytacazes. This evaluation will be developed through the analysis of Company A's riders needs and we will compare these results with the needs of riders of other companies in Campos (called in this work Other Companies.

COLLECTIVE TRANSPORTATION IN BRAZIL

According to the National Urban Transport Association, (2004), "in Brazil, on average, the public transportation system is carrying 40% less passengers then they carried in 1995." This situation creates a vicious circle, shown in Figure 1. The IPK (Number of Passengers per Kilometer,) in 2003 was approximately 66% lower then in the beginning of the 90's, before the boom in the car industry and the creation of illegal (not authorized) bus or van transport.

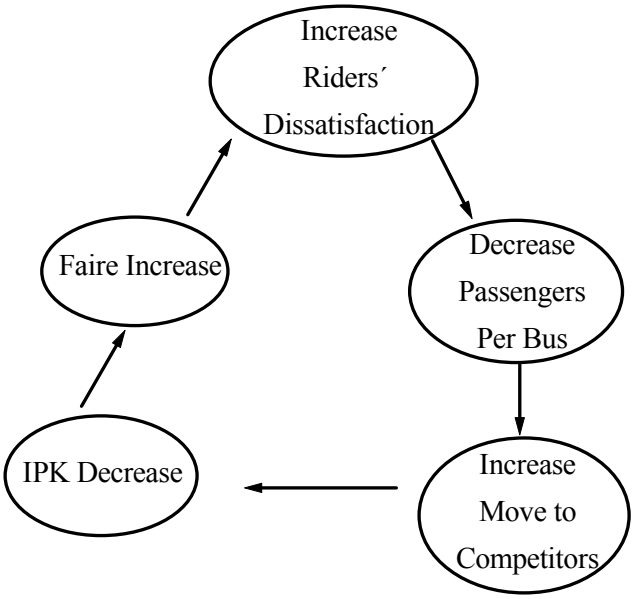

Figure 1. The vicious circle faced by public bus companies in Brazil

Another indicator of the decline in bus transport is the average number of passengers transported by day per bus, which at the beginning of the 90's was 600 and has declined to 400 today. As the number of riders decline, the operational cost of the buses falls to the remaining passengers, who become more unhappy and more willing to use other transportation options, which powers the vicious circle (National Urban Transportation Association, 2004.)

The bus companies must take measures to change this picture. Breaking the vicious circle will bring direct and indirect benefits to society. According to Special Secretary of Public Transportation (SEDU/PR, 2002,) "any program to better the performance of urban transportation could affect 39 million direct users in 224 cities with a population of 86 million. Presently, 25 million people use public transportation systems daily. These numbers show the social importance of urban transportation and the repercussions in the economically active population that such positive measures in improving urban transportation could cause."

A good starting point to change the vicious circle is to focus on the riders opinions, verifying their needs and their satisfaction with the service they are offered and by changing the idea that the riders are captive. These changes offer a good way to move forward in improving customer service.

QUALITY

What is quality? This is the first question we should ask ourselves when dealing with quality. A concise definition of quality is given by Feigenbaum (1994): "The word 'quality' does not

have the popular meaning of ‘best’ in any abstract sense. To industry, it means ‘best for satisfying certain costumer conditions,’ whether the production is tangible (an automobile, a refrigerator, a microwave oven) or intangible (bus route schedule, restaurant service, hospital care).”

We are facing very competitive world marketing, demanding us to provide, more and more, products and service with less variation. To reach this objective, there are some guide lines recommended by the ISO 9001:2000: These guide lines are:

1. Focus on the customer;
2. Leadership;
3. People Commitment;
4. Emphasis on the process;
5. Emphasis toward quality;
6. Continuous improvement;
7. Emphasis on decision making based on facts;
8. Mutual benefits in the relationship with the suppliers.

In this work, we will address the first and most important objective, that is, “Focus on the customer”, because as we know, without customers there will be no business.

The bus companies are highly dependent on their customers; so, it is in their best interest to fulfill and even exceed their expectations and needs. To achieve this objective, a practical approach is to determine the “customer’s satisfaction level” based on their opinion concerning the service received, and work in solving the observed problems. This is the main focus of this work.

The form chosen to evaluate “customer’s satisfaction level” in this work was an opinion poll. This approach is commonly used by most industries in determining whether the service they provide is acceptable to their customers.

METHODOLOGY

The research method used in this work was a questionnaire asking the customer's opinion about the service given by the bus companies in the city of Campos dos Goytacazes. A bus company (one of several surveyed, called Company A,) had their results compared with the results of the other bus companies. Company A was chosen because the majority of their customers are students and professors.

From the population of riders in Campos, a random sample of 100 was selected from Company A and a random sample of 100 was taken from the other bus companies.
This research was carried out during the months of May, June, July and August, 2002, in the morning and, again, in the afternoon.

Tables 1 and 2 show results obtained from both Company A and from the other bus companies.

Table 1. Results obtained from Company A

Average Number of Customers of Company A	Sample
An average of 98,648 passengers per month, or 2,242 passengers per day (traveling twice a day for 22 days per month.).	A total of 100 passengers from any one of three routes ≈ 4.46% of the daily total.

Table 2. Results obtained from the Others Bus Companies

Average Number of Customers of the Other Bus Companies	Sample
An average of 2,844,036 passengers per month, or 64,637 passengers per day (traveling twice a day for 22 days per month.).	A total of 100 passengers from any one of the routes ≈ 0.155% of the daily total.

The results of the questionnaire used in this research can be seen in Table 3. These results will allow us to compare the satisfaction levels of Company A's customers with the other companies customers. We will also be able to determine the satisfaction level of all the customers in relation with each one of the items surveyed.

RESULTS OF THE SURVEY

a. Comparison of the results of company a with the results of the other companies

Table 3 shows the results of the opinions of the customers of all the bus companies on twelve items included in the survey.

Table 3. Results of the 12 Items in the Survey

ITEMS	COMPANY A			OTHER COMPANIES		
	EVALUATION (100 CUSTOMERS PER ITEM)					
	Good	Average	Bad	Good	Average	Bad
Average Trip Time	11	49	40	15	55	25
Bus Routes	26	41	33	5	46	44
Waiting Time Between Buses	8	34	58	11	37	51
Number of Buses Per Route	8	43	49	7	33	58
Cleanliness	13	37	50	19	45	36
Condition of Buses	14	31	55	21	36	36
Comfort	11	38	51	14	48	35
Security	12	48	40	23	42	32
Noise and Air Pollution	5	35	60	20	28	52
Fare	24	41	35	20	36	44
Scheduling	21	41	35	29	29	40
Politeness of Bus Employees	17	58	25	19	41	40
Total	170	496	531	203	476	493

Note: The sum of "Good, Average and Bad," does not add up to 100, in some cases, for some of the items, due to invalid customers' responses.

Company A shows the worst results for 8 of the 12 items when compared with the other companies. These items are: Average Trip Time, Waiting Time between Buses, Cleanliness, Condition of Buses, Comfort, Security, Noise and Air Pollution and Scheduling. These results, however, don't mean that the other bus companies are delivering quality service; it only means that they are in a situation only a little bit better than Company A.

b. Quality level

Using the results obtained from Part A it is possible to determine the overall quality level of the service provided by the bus companies in the city of Campos dos Goytacazes. These results could be used in the future to evaluate whether the researched bus companies have improved their service and fulfilled their customers´ needs.

To determine the overall quality level the following steps should be followed:

1. Determine the total number of customers that

a. S_g Considered the items researched as good;

b. S_{ave}: Considered the items researched as average;

c. S_b: Considered the items researched as bad.

The following weights were used for each of the classifications:

d. Good: $p_g = 2$;

e. Average: $p_{ave} = 1$;

f. Bad: $p_b = 0$.

2. Multiply the obtained values for each of the classifications by its corresponding weights. As a result we will have the overall quality level (OQL) given by equation 1:

$$OQL = S_g \times p_g + S_{ave} \times p_{ave} + S_b \times p_b \quad (1)$$

Now, with $p_g = 2$, $p_{ave} = 1$ and $p_b = 0$, we will have:

$$OQL = 2S_g + S_{ave} \quad (2)$$

3. Compare the obtained OQL value with the "maximum theoretical value" that equation (2) could have, that is, the total number of items multiplied by the number of customers surveyed, (in this work, 12 items and 100 customers per bus company researched), multiplied by 2, the corresponding weight for the classification "good." Since in this "optimal theoretical case" all the customers surveyed gave the classification "good" to all the items researched, the value of S_{ave} in equation (2) will be equal to zero. This comparison is given by:

$$OQL \leq T_V = 2 \times 12 \times n \quad (3)$$

Here, *n* is the number of customers per bus company researched (100), T_V is the "optimal theoretical value" that equation (3) could have, 2 is the corresponding weight for the classification "good" and 12 is the number of items surveyed in this work.

Then:

$$T_V = 2 \times 12 \times n \quad (4)$$

4. Now, to compare the obtained OQL value with the "maximum theoretical value" that equation (2) could have, we will use the following classification:

a. The OQL value is located between 90% and 100% of the T_V value: The service level is considered to be "good"; the customers´ needs are being fulfilled. The bus company should keep up the good work.

b. The OQL value is located between 70% and 89% of the T_V value: The service level is considered to be "satisfactory". However, the service level should be improved in order to exceed the customers´ expectation.

c. The OQL value is located between 40% and 69% of the T_V value: The service level is considered to be "reasonable", but there are complaints about some areas of service rendered by the bus company.

d. The OQL value is located between 10% and 39% of the T_V value: The service level is considered to be "bad", and urgent measures should be taken by the bus company in order to continue operating.

e. The OQL value is located below 10%. The service level is considered to be "very bad". The city authorities should immediately consider canceling the bus company's concession.

The overall quality level for Company A and for the Other Bus Companies

Company A

Using equation (2), with $S_g = 170$, $S_{ave} = 496$ and $S_b = 531$, we will have:

$$S = 2S_b + S_{re} + 0 \times S_b = 2 \times 170 + 496 = 340 + 496. \text{ Then: } S = 836$$

Verifying if $S \leq T_V$:

$T_V = 2 \times 12 \times n = 2 \times 12 \times 100 = 2400$. As a result, $S \leq T_V$, since $836 \leq 2400$.

Therefore: S = 836, which represents 34.8% of T_V.

This OQL value of 34.8% is located between 10% and 39% of the T_V value. The service level is considered to be "bad", and urgent measures should be taken by Company A in order to raise their level of service.

Other Bus Companies

Using again equation (2), with $S_g = 203$, $S_{ave} = 476$ and $S_b = 493$, we will have:

$$S = 2S_b + S_{re} + 0 \times S_b = 2 \times 203 + 476 = 406 + 476. \text{ Then: } S = 882$$

Verifying if $S \leq T_V$:

Once again, $T_V = 2 \times 12 \times n = 2 \times 12 \times 100 = 2400$. Thus, $S \leq T_V$, since $882 \leq 2400$.

Consequently: S = 882, which represents 36.75% of T_V.

This OQL value of 36.75% is located between 10% and 39% of the T_V value. The service level is considered to be "bad", the same result presented by Company A, and urgent measures should be taken by the Other Bus Companies in order to increase their service level.

CONCLUSIONS

Company A, as well as the Other Bus Companies operating in the city of Campos dos Goytacazes, need to take urgent measures in order to raise their service level. They should initially focus their efforts on the items that have presented the "worst" evaluation by their customers, for example; Noise and Air Pollution, Waiting Time between Buses and Number of Buses per Route. Company A has also shown low performance on the items Condition of Buses, Comfort and Cleanliness.

There is a very simple explanation for the low performance level given to Company A in the three items above mentioned (Condition of Buses, Comfort and Cleanliness). Company A's routes serve the largest university of Campos dos Goytacazes, the "North Fluminense State University". Due to this fact, Company A's customers are mainly students, professors and employees of the university. These customers are generally more demanding about those

items than the average customer of the Other Bus Companies, who are, perhaps, people with low education levels.

The lack of focus on customers' satisfaction is the main reason for the bus companies' customers moving away to informal and alternative forms of transportation, such as: personal car, motorcycle-taxi, private bus and travel by foot or by bicycle.

Company A, as well as all the Other Bus Companies of the city of Campos dos Goytacazes, need to immediately begin the process of changing their attitude in order to improve the quality of their offered services. They should focus on customer's satisfaction, or their future operations could be bleak.

As mentioned before by Duarte P. and De Souza, D.I., (2005), the survey was performed while the users were waiting for the bus in a certain location and during a certain time period and the combination of these two factors could have guided the users to answer the questions in a more "severe" way.

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