INCIDENCE OF THE COMMON CASH SYSTEM IN THE PREDICTIVE STUDY OF COSTS AND REVENUES OF URBAN PUBLIC TRANSPORT OPERATORS IN THE CITY OF RIOBAMBA

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SUMMARY

This research aims to determine the impact of the Caja Común system in the predictive study of costs and revenues of Urban Public Transport operators in the city of Riobamba, to improve profitability; The methodological scaffolding was based on a descriptive, exploratory and correlational research, in addition the design was Non-experimental because the variables are not deliberately manipulated, it was with a cross-sectional or transsectional design whose main characteristic was the collection of data through the survey and direct observation to later proceed to validation and reliability. With the above, it was evident that the incidence of the Common Cash system on the costs and revenues of the operators is positive since there is an increase in the economic and financial profitability of the owners of the transport units by 5.36% and 17.89, respectively; which represents an improvement in the profitability of the operators.

Keywords: Costs, revenues, profitability, operators, urban public transport, Common Fund.

ABSTRACT

The present research aims to determine the incidence of the Common Box system in the predictive study of costs and revenues of the public urban transport operators of the city of Riobamba, to improve profitability; The methodological scaffolding was based on a descriptive, exploratory and correlational research. In addition, the design was not experimental because the variables were not manipulated deliberately, it was with a transectional or transectional design whose main characteristic was the collection of the data through the survey and the observation Direct to later proceed to validation and reliability. With the above, it was evidenced that the incidence of the Common Cash system in the costs and revenues of the operators is positive since there is an increase in the economic and financial profitability of the owners of

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the transport units by 5.36% and 17.89, respectively; which represents an improvement of the profitability of the operators.

Keywords: Costs, revenues, profitability, operators, urban public transport, Common Box.

I. INTRODUCTION

At present, the urban public transport system occupies an essential role in the economic and social structuring of cities and population centers around the world and also in our country, for this reason we intend to carry out this predictive study of costs and income, through the application of the Common Box system in the operators of the public transport system of the city of Riobamba to determine the impact on economic profitability and financial.

The urban public transport system in the city of Riobamba, as in the vast majority of medium and small cities in the country, presents serious problems in the provision of the service, both in the operational part and in the administration, since there is no adequate structure that allows to provide a public service of quality and warmth, This has caused this service to be slow, unsafe, polluting and on the other hand those who provide it have a low economic and financial profitability.

The existing sensitivity in the collective urban transport sector, both in relation to the achievement of levels of progressive improvement in the rigor and professionalism of the economic-technical management of the public passenger transport service, and with respect to the achievement of a transparent and efficient system to justify adequate and sustainable public financing, It has led to our interest in deepening our knowledge of its cost and financing structure, as well as its evolution(Lara M. , 2013) .

In Spain, the public urban transport service, which is a municipal competence, suffers from common and objective guidelines for financing it. The fact of being a public service implies tariffs subject to political prices, which do not cover operating costs and therefore an excessive dependence on the contributions of the Administrations. This characteristic, together with the lack of a law on the financing of urban transport that guarantees

adequate transfers, with criteria of economy and equity throughout the territory, together with the current economic and financial crisis that, at the same time, bring with it a decrease in income (lower revenue collection and lower subsidies), entails the need to seek new sources of financing for the provision of the service or new formulas for the allocation efficient of such financing (Lara, 2013).

To understand why it is possible to make such large profits, it is useful to know some basic principles of the market. Efficient markets have certain requirements, including consumer choice, cost-based price competitions, economic neutrality in public policy. Most markets generally reflect these principles, with consumers paying directly for housing, food, and clothing. But transportation markets tend to violate these: consumers often have very few viable options, costs are external or fixed, and government policies favor one mode over others. Mobility management strategies can help correct these market distortions, creating a more efficient and equitable transport system. (Litman, 2004)

Evaluate the costs and benefits of each strategy (including indirect impacts, if any), and place them on a ladder according to their profitability or cost-benefit ratios (Litman, 2004)

 These new difficulties in urban public transport in cities seem to be part of a process of crisis and transformation of a deeper nature, resulting mainly from the need to adapt to new economic and social conditions and to the new characteristics of urban development.

The relatively permanent process of crisis in urban transport systems that has been installed during the last twenty years in Latin American cities, has been expressed in an instability of their formal and legally established public transport services; in a decrease in system performance, with customer losses; in cost and tariff increases, with aggravated

congestion conditions; and an abundance of private cars and new precarious and unsafe forms of mass transport. (Figueroa, 2005)

These new paradigms that today are presented in our daily lives, induces us to be much more efficient in the services we offer, even more so when our lives accelerate more and more and we feel the need to mobilize within our environment, then our research makes sense and it is necessary to talk about urban mobility in cities.

Globalization, transnationalization, the new global culture, etc. bring to light the hypermobile society. Unlike the first analyses of globalization, strongly linked to transport networks and flows, infrastructures and links, the hypermobile society places the ideology of speed in debate, raising lights and shadows of the global "connection" from a micro, subjective approach of analysis of displacement in the territory. Thus, a more macro and technical vision that refers to transport, is giving rise to a more micro and subjective vision that refers to mobility (Urry, 2005).

The determination of the investment is given by the monetary value in which it is incurred to obtain the good (passenger transport vehicle approved to provide this service), to be used in the production process. In this particular case, it corresponds to obtaining the urban bus. (Villa, 2015)

According to, and (Báez, 2012, p. 10)finely(Moncayo, 2011, p. 11)n "The Common Cash system or single box as a management model, whose objective is to centrally manage the productive and operational activity of an organization in such a way that the distribution of income generated in a given period is carried out equitably for all members. This institutional practice is applicable in different types of organization regardless of their economic activity."

With all these theoretical bases, reference is made to urban public transport, its reality and the problems that affect both the service provider, becoming necessary to propose a predictive study of costs and income, through the application of a Common Cash system model to improve the economic and financial profitability of operators.

2. METHODOLOGY

For this reason, the present research was descriptive and exploratory and correlational; It is descriptive because it considers the phenomenon studied and its components, also defined the variables of dependent and independent study; It was exploratory because they are little studied problems and has an innovative perspective the application of the Caja Común system in the operators of the urban public transport system of the city of Riobamba; It was correlational because the relational between the dependent and independent variable was measured, in this case the Income and Costs in the Common Cash system.

In the same way, Arias considers that an investigation is a feasible project when it is carried out in order to respond to a problem with a practical solution. , According to these considerations, this research can be classified as an empirical study that seeks the predictive study of costs and revenues for the operators of the urban public transport system of the city of Riobamba, to improve their financial profitability(Arias, 2012)

The Research Design was experimental because the variables were deliberately manipulated, it was with a cross-sectional or transitional design whose main characteristic was the collection of data through the survey at a single time, the contrast of the hypothesis was made with the criterion of significance.

For (Hernández, Fernández, & Baptista, 2010) the Types of exploratory, descriptive and correlational research fall back on the pre-experimental design that is then synthesized with the following format:

GO: O1   --------------- X

GO: Grupo Observación formed by the owners of the urban public transport operators of the city of Riobamba.

O1: Diagnosis to the owners of the urban public transport operators of the city of Riobamba

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X: Common Box System in urban public transport.

The unit of analysis was the operators of the urban public transport system of the city of Riobamba, which is constituted by a universe of 184 transport units, which is why the analysis unit will be the owners of the operators of the urban public transport system, since it will be in this area where the variables selected for this research will be applied.

For (Oviedo and Campo, 2005) point out that a value of Cronbach's Alpha between 0.70 and 0.90 indicates a good internal consistency for a one-dimensional scale, the instrument has a good reliability for the present research a result of Cronbach's alpha of 0.851 or 85.1% was obtained, which means that the reliability of the Instrument is good.

3. RESULTS AND DISCUSSION

Once the fieldwork has been carried out, the results obtained with the intervention of the researcher are presented below.

Table 1 shows the composition of the vehicle fleet of urban public transport operators in the city of Riobamba, noting that the PURUHÁ cooperative has the largest participation, with 56 transport units, and the one with the lowest participation is the URBESP LTDA Company, with 6 transport units.

Table 1. Vehicle Fleet

OPERATOR	No VEHICLES
PURUHA Cooperative	56
LIRIBAMBA Cooperative	41
Cooperative EL SAGRARIO	31
Company BUSTRAP S.A.	13
Company UNITRASEEP S.A.	28
ECOTURISA Company S.A.	9
Company URBESP LTDA.	6
TOTAL	**184**

Fountain. Author's own elaboration

InTable 2, the average age of the vehicle fleet is displayed, which is 11 years, which means that the entire fleet is in conditions suitable to provide the service, however, there is a certain number of units that have to be changed very soon, since the useful life of operation is 20 years according to resolution No. 111-DIR-2014- ANT.

Table 2. 1 Average Age of the Vehicle Fleet

YEAR	TOTAL	VEHICLE AGE
1997	3	20

1998	1	19
1999	1	18
2000	1	17
2001	13	16
2002	37	15
2003	15	14
2004	19	13
2005	15	12
2006	12	11
2007	9	10
2008	11	9
2009	7	8
2010	1	7
2011	8	6
2012	6	5
2013	7	4
2014	11	3
2015	4	2
2016	1	1
2017	2	0
TOTAL	**184**	**210**
AVERAGE AGE VEHICLE FLEET = **11 YEARS**		

Fountain. Author's own elaboration

Table 3 summarizes the information on the existing lines in the city of Riobamba, distances, and travel time, information that was obtained by monitoring within the urban transport units themselves; and the determination of the vehicle fleet that was carried out by verification in the parking lots of each line.

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Table2. Distance traveled and travel time per service line.

LINE N°	DENOMINATION	DIST. (Km)	T. REC (min)	FLEET
Line 01	Santa Anita – Bellavista	22.5	87	12
Line 02	May 24 – Bellavista	17.0	77	12
Line 03	El Carmen – Camal – Wholesaler	24.8	93	12
Line 04	Lican – Bellavista	25.0	85	8
Line 05	Royal Crown – Bellavista	31.0	110	8
Line 06	Miraflores – Bellavista	26.0	87	8
Line 07	Immaculate – El Rosal	31.0	100	14
Line 08	Yaruquies – Las Habras	18.5	89	14
Line 09	Cactus – Lican	24.0	102	10
Line 10	Pinos – San Antonio	28.4	101	12
Line 11	Interparish Terminal – Wholesaler	19.0	72	6
Line 12	San Gerardo – The Batan	21.3	90	12
Line 13	Sixto Duran – May 24	23.0	94	14
Line 14	San Luis Park – May 24	25.6	119	14
Line 15	Lican – ESPOCH – UNACH	19.6	85	8
Line 16	Calpi – La Paz	22.8	90	6

Fountain. Author's own elaboration

Table 4 presents the frequency expressed in laps per bus and per line, from this it is concluded that the average number of turns of each bus is 5.8 laps per day.

Table3. Number of bus turns per line

LINE N°	DENOMINATION	FLEET	No TOURS BY BUS
Line 01	Santa Anita – Bellavista	12	6
Line 02	May 24 – Bellavista	12	6
Line 03	El Carmen – Camal – Wholesaler	12	6
Line 04	Lican – Bellavista	8	6

Line 05	Royal Crown – Bellavista	8	4
Line 06	Miraflores – Bellavista	8	6
Line 07	Immaculate – El Rosal	14	6
Line 08	Yaruquies – Las Habras	14	6
Line 09	Cactus – Lican	10	6
Line 10	Pinos – San Antonio	12	6
Line 11	Interparish Terminal – Wholesaler	6	7
Line 12	San Gerardo – The Batan	12	6
Line 13	Sixto Duran – May 24	14	6
Line 14	San Luis Park – May 24	14	4
Line 15	Lican – ESPOCH – UNACH	8	6
Line 16	Calpi – La Paz	6	6

Fountain. Author's own elaboration

Table 5 shows the results obtained in this research, it is worth mentioning that the analysis is carried out between the current situation with new bus and the proposed situation (common box system) with new bus; consideration that is made to observe the impact of the financing rates of the current situation and the proposed situation. With this background we analyze the three established dimensions.

Table 5: Profit and Loss Statement

	SITUACIÓN ACTUAL	SITUACIÓN ACTUAL (BUS NUEVO)	CAJA COMÚN (BUS NUEVO)
Ingresos	68.440,71	68.440,71	68.440,71
(-) Costos fijos	19.966,80	23.386,44	21.189,89
(-) Costos variables	28.634,92	28.634,92	26.600,02
(=) Utilidad Bruta	19.838,98	16.419,34	20.650,80
(-) Gastos financieros	3.547,70	6.771,65	3.301,29
(=) Utilidad antes participación trabajadores	16.291,29	9.647,69	17.349,51
(-) Participación utilidades trabajadores (15%)	2.443,69	1.447,15	2.602,43
(=) Utilidad antes de impuestos	13.847,59	8.200,54	14.747,09
(-) Impuesto a la renta	127,88	-	172,85
(=) Utilidad neta	13.719,71	8.200,54	14.574,23
ROA	16,23%	6,91%	12,27%
ROE	33,45%	23,02%	40,91%

Fountain. Author's own elaboration

Cost dimension, in this dimension it can be evidenced that in the current situation the fixed cost is $ 23,386.44 and the variable cost of $ 28,634.92; which are higher than the costs obtained with the common cash system which are estimated at $ 21,189.89 as fixed cost, and $ 26,600.02 of variable cost, which shows a positive impact on costs with the common cash system.

Income Dimension, As can be seen the income remains constant in both situations, although according to applications of the common cash system in other locations it has been determined that income grows due to the improvement of the service that occurs with the application of the common cash system, however in our study it has been preferred to be cautious in this issue before the impossibility of demonstrating the increase without the application of the aforementioned system.

Profitability dimension, The profitability has been established by service unit, obtaining an Economic and Financial profitability in the current situation of 6.91% and 23.02% respectively, and in the proposed situation we have an ROA of 12.27% and an ROE of 40.91%, which shows a positive impact of the common cash system in the Profitability dimension of the urban public transport operators of the city of Riobamba.

Prior to statistical inferences, reliability or reliability coefficients were established for the database. The coefficients found are Cronbach's alpha, KMO test and Bartlett's sphericity test. For the interpretation of the Cronbach's alpha coefficient obtained, the internal consistency reference of Oviedo and Campo was used.

For (Oviedo and Campo, 2005) point out that a value of Cronbach's alpha between 0.70 and 0.90 indicates a good internal consistency for a one-dimensional scale, the instrument has a good reliability for the present research a result of Cronbach's alpha of 0.851 or 85.1% was obtained, which means that the reliability of the Instrument is good.

To measure the validity of the instrument was performed through factor analysis which is a statistical technique that serves to find homogeneous groups of variables from a set of numerous variables, with this technique we want to know if the questions of the survey questionnaire are grouped in any way, characteristic or dimension. For the validity of the construct, the statistical test of the KMO (Kaiser - Meyer - Olkin), and the Bartlett sphericity test were used; if the KMO value is greater than 0.5 and the significance level is less than 0.05 it is said to show a certain correlation structure between the variables

According to the data provided by the SPSS statistical software, the validity of the construct for each of the dimensions is determined:

Cost dimension, The Kaiser – Meyer – Olkin KMO Measure has a value of 0.58 so it is greater than the value of 0.50 and the significance value is 0.00 less than the significance value of 0.05 therefore it is valid to perform the factor analysis and it is demonstrated that the items of the construct of the Costs dimension have validity

Table 6 shows the comunalities of the cost dimension, that is, how much each question contributes to the instrument, each of the questions of the operational dimension is higher than the value of 0.4 obtained in the Extraction, it is demonstrated that the variables are homogeneous and valid. Therefore, questions of this dimension are valid.

Table 6 Comunalities Dimension Costs

Comunalidades		
	Initial	Extraction
The collaborators of your unit are	1,000	,822
The monthly contribution made to the operator (cooperative)	1,000	,586

Consider yourself. than the cost per registration and vehicle inspection per year	1,000	,986
Considers that the route of the route affects the consumption of fuel and tires	1,000	,915
You perform preventive maintenance on your unit	1,000	,986
How % do you increase operating costs when performing preventive maintenance on your unit?	1,000	,917
Perform corrective maintenance on your unit	1,000	,986
How % do you increase operating costs when performing corrective maintenance of your unit?	1,000	,701
The expenses incurred in the maintenance of the units are currently	1,000	,547
I make credit to acquire your work vehicle	1,000	,702

Extraction method: principal component analysis.

Source. Author's own elaboration

Income dimension, the Kaiser – Meyer – Olkin Measure has a value of 0.57 so it is greater than the value of 0.5 and the significance value is 0.002 less than the significance value of 0.05 therefore it is valid to perform the factor analysis and it is demonstrated that the items of the construct of the Income dimension if it has validity.

In Table 7 we have the commonalities of the income dimension, as a correlation this means how much each question contributes to the instrument, if each of the questions of the Income, have a value obtained in the Extraction, is higher than the value of 0.4 it is shown that the variables are homogeneous and valid. Therefore, questions of this dimension are valid.

Table4. Commonalities Income Dimension

Comunalidades		
	Initial	Extraction
Daily income depends on the Route	1,000	,950
How your income is currently formed:	1,000	,830
The average number of passengers you carry in your unit is:	1,000	,562
The current rate you charge for providing the transportation service is:	1,000	,579

Extraction method: principal component analysis.

Fountain. Author's own elaboration

Profitability dimension, the Kaiser – Meyer – Olkin Measure has a value of 0.511 so it is greater than the value of 0.5 and the significance value is

0.000 less than the significance value of 0.05 therefore it is valid to perform the factor analysis and it is demonstrated that the items of the

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construct of the Profitability dimension do have validity.

In Table 8 we have the commonalities of the profitability dimension as a correlation this means how much each question contributes to the instrument, if each of the questions of the Profitability, have a value obtained in the Extraction, is higher than the value of 0.4 it is demonstrated that the variables are homogeneous and valid. Therefore, questions of this dimension are valid.

Table5. Commonalities Dimension Profitability

Comunalidades

	Initial	Extraction
The current profitability in your transport unit is	1,00	,635
If you reduce the operating costs of your transport unit you believe that the impact on your profitability would be:	1,00	,840
If the number of passengers of your transport unit is increased, you believe that the impact on its profitability would be:	1,00	,844
If you reduce the financing costs of your transport unit you believe that the impact on your profitability would be:	1,00	,497

Extraction method: principal component analysis.

Fountain. Author's own elaboration

Common Box Dimension, the Kaiser – Meyer – Olkin Measure has a value of 0.643 so it is greater than the value of 0.5 and the significance value is 0.000 less than the significance value of 0.05 therefore it is valid to perform the factor analysis and it is shown that the items of the construct of the Coordination dimension do have validity.

In Table 9 we have the communalities of the common box dimension as a correlation this means how much each question contributes to the instrument, if each of the questions of the common box, have a value obtained in the Extraction, is higher than the value of 0.4 it is shown that the variables are homogeneous and are valid in addition it has been observed that the item. Therefore, questions of this dimension are valid.

Table6. Commonalities Dimension Common Box

Comunalidades

	Initial	Extraction
Know the benefits of implementing a Common Box system	1,000	,523
You believe that the implementation of a common cash system can reduce the operating and financial costs of your transport unit.	1,000	,508

It is agreed that the income be distributed by a common cash system	1,000 ,577
Costs incurred in maintaining the units should derive from the Joint Fund	1,000 ,971
Do you believe that profitability will improve with a Common Cash System	1,000 ,971

Extraction method: principal component analysis.

Source. Author's own elaboration

The results obtained from the KMO and Bartlett sphericity coefficients indicate favorable conditions for any type of statistical analysis. With this propitious and favorable antecedent, we proceed to the contrast of hypotheses through the statistical criterion of significance. (see Table 10)

Table 10. Testing of General Hypothesis

HYPOTHESIS TESTING	
1	Statement of statistical hypotheses (H_0 - H_1): **H_0**: The Caja Común system will not affect the predictive study of costs and revenues of urban public transport operators in the city of Riobamba. **H_1**: **The Caja Común system will affect the predictive study of costs and revenues of urban public transport operators in the city of Riobamba.**
2	Setting the significance level: Significance level alpha () = (0.05) equals 5% α
3	Selection of the test statistic: T-Student for a sample
4	P-value and p-value reading: You get in the software $0.000 = 0\%$ With a probability of error of 0% The Common Box system will affect the predictive study of costs and revenues of urban public transport operators in the city of Riobamba
5	Decision making Having a Sig. (bilateral) 0.000, which is a value at 0.05, rejects $H<_0$ and accepts H_1.

Source. Data taken from SPSS (Statistical Package for the Social Sciences) software

From this it follows that: The Caja Común Si system will affect the predictive study of costs and revenues of urban public transport operators in the city of Riobamba, with a significance level of p-value $= 0.00$ that is, p-Value < 0.05. Therefore, the null hypothesis H_0 is rejected and the alternative hypothesis H_1 is accepted.

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This ritual of the statistical significance of hypotheses is proposed by Dr. José Supo from Peru.

4. CONCLUSIONS

• In the study of the cost prediction of urban public transport operators in the city of Riobamba under the Caja Común system, it has been determined that there is a positive impact of this system on operating costs, that is, they are reduced, from $ 48,601.73 current dollars to $ 47,789.91 dollars, which means savings for operators.

• If we consider the financial costs, through the investigation it was determined that significant savings are generated for the owners of the Buses, since the financing rates are reduced from 14.54% in the current situation, to 7.37% estimated in the Common Fund. Benefit obtained if it is negotiated as a corporation, which implies savings for operators, although in our case the values are negative, situation occurs for the value of the credit, so in the current situation we have $ 43,539.13 of financing with a monthly fee of $ 1,157.49 and in the proposed situation the financing is $ 83,125.00 dollars and the payment fee is $ 1,660.52.

• The prediction of the revenues of the urban public transport operators of the city of Riobamba under the Caja Común system generates similar results in the current situation and in the proposed situation, since it is estimated that the same number of passengers currently transported will be transported with the Caja Común system. It is worth mentioning that, according to experiences of application of the Common Fund system in other places, the number of passengers increases when the service improves, which is a premise of the Common Cash system.

• The predictive study of costs and revenues with the Caja Común system generated a positive impact on the profitability of urban public transport operators in the city of Riobamba, so in the current situation there is an ROA of 16.23% and an ROE of 33.45% and in the situation there is an ROA of 12.27% and an ROE of 40.91 %, which implies an improvement in financial profitability, but a decrease in economic profitability, a situation that occurs due to the value of the investment, since in the current situation the buses on average have a value of $ 84,553.60 dollars and in the proposed situation $ 118,750.00 dollars, therefore if in the current situation a new bus would be purchased the ROA would be 6.91%, performance much lower than that calculated with the Common Box system.

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