

APPLICATION OF THE BIG DATA MODEL IN THE COMMON CASH SYSTEM OF TRANSPORT COOPERATIVES

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SUMMARY

The research is based on a BIG DATA model for the implementation of the common box for public transport operators. The main objective is to improve the service, with the implementation of the use of the necessary tools to improve the resources from the collection of a fee through a contribution made by all the members of the cooperatives to a single fund from which an equitable distribution will be made among all.

The common box system through the foundation of BIG DATA systematization, allows to improve the service in an adequate and safe way provided by the Passenger Transport Cooperative.

KEY WORDS: *BIG DATA Model, Common Cash System, Data Management, Administrative Management.*

INTRODUCTION

Transport today is of great importance for the population which has led to the development and evolution of it in all its forms, being land transport the most used by the inhabitants, due to its easy accessibility and the reduction of costs, in order to optimize resources, reduce traffic congestion rates and generate greater comfort for the user.

There are problems such as the "penny war" which is a competition of all operators to get passengers, without respecting the stops causing environmental pollution, the lack of comfort to users due to disrespect for the law and routes; the lack of solidarity to distribute income equitably.

Public Transport Operators immobility have a greater impact on the quality of life of people, either because of the conditions of comfort, safety, accessibility, among others, in which the service is provided; because of its frequency of use that entails travel times; and in general because of its negative effects on the service.

It is determined that in 2018 the Law of Land Transport, Traffic and Road Safety enters into force in the thirteenth provision the following "The Cooperatives of public land transport that are legally constituted from the issuance of this law, must obligatorily do so under the CAJA COMUN system, prior to obtaining the enabling document that authorizes the provision of the service in the different types of transport".

For this reason the cooperatives are in need of having a Common Cash system, it is intended to organize in a real way the resources that the cooperative possesses, which allows to overcome most of the problems that currently afflict the transportation of the country. Since Public Transport is a service that is part of the daily life of most people to be able to fulfill their activities either for work, study and other activities to meet their needs, therefore, it is important that public transport of a quality service to users.



DEVELOPMENT

TRANSPORT OPERATORS: These are all persons, natural or legal, who, after accreditation of the requirements established in this Law and its implementing regulations, are engaged in providing transport services for people and goods on behalf of others.

PASSENGERS: It is one that is used to designate all the people or individuals who are traveling from one point or location to another.

PRODUCTION: It is the main activity of any economic system that is organized precisely to produce, distribute and consume the goods and services necessary for the satisfaction of human needs.

PROFITABILITY: It is the ability that something has to generate enough profit or profit; for example, a business is profitable when it generates greater income than expenses, a client is profitable when it generates greater income than expenses, an area or department of company is profitable when it generates greater income than costs.

TARIFF: It is the price established by the rulers for public services.

TRANSPORT

Medante the opinion of Reyes Spindola & Cárdenas Grisales (1994) defines transportation "as a decision-making process that begins with the need to develop an activity in a place other than the one where the individual is located", in order to reduce the time it would take the passenger to go to the different places of departure.

The respective term of transport is used by designating the movement made by the person from one place to another, that is, those means of land transport that serve or are used to move.

Transportation is used in two ways; for professional purposes and in the interest of profit or amusement. When people travel for work it is not the same as moving for fun purposes and where it allows you to know new places, today transport is very varied, with special and particular characteristics that allow you to provide a better quality service to passengers.

Ground Transportation.

Land Transport has its origins in the invention of the wheel as a means of aid for the transport of your belongings from one place to another through the use of roads that over the years have been extended and in the same way the medium in this case the vehicle has evolved, taking several classifications according to the use that is given.

Classification of Land Transport.

Private transportation.

"It is provided in vehicles operated by the owner of the unit, circulating on the road provided, operated and maintained by the State. Among these means of transport are the bicycle, the motorcycle and the pedestrian" (Molinero Molinero & Sánchez Arellano, 2002)

Rental transport (commercial).

Which can be used by anyone who pays a fare in vehicles provided by an operator, driver or employee adjusting to the user's mobility wishes. These services include taxis, demand response services and in some cases bus services (Molinero Molinero & Sánchez Arellano, 2002).

Public Transport.

Public Transport includes the means of transport in which users or passengers are served by third parties, the provision can be by public, private or mixed companies (Molinero Molinero & Sánchez Arellano, 2002). They operate with fixed routes and predetermined schedules and that can be used by anyone in exchange for the payment of a previously established fare.

Public transport or common transport is the term applied to collective passenger transport. Unlike private transport, public transport travellers

According to Molinero & Sanchez (2002) "they define public transport as a transportation system that operates with fixed routes, predetermined schedules and that can be used by anyone in exchange for the payment of a previously established rate".

Public transport is a mobilization service with routes, frequencies, schedules and stops determined so that people who need to move from one place to another use this service at an affordable cost and can meet their mobility needs.



- Physical components of transport systems A transport system is mainly composed of three physical elements, these being (Molinero & Sánchez Arellano, 2005):
- Vehicle: These are the transport units and normally their set is described as a vehicle fleet in the case of buses, trolleybuses and rolling equipment in the case of rail transport.
- Infrastructure: It is composed of the rights of way in which the transport systems operate, their stops and / or stations - whether terminal, transshipment or normal - garages, warehouses, enclosures or yards, maintenance and repair workshops, control systems - both vehicle detection and communication and signaling - and energy supply systems.
- Transport network: It is composed of bus routes, branches of bus and minibus systems and trolleybus, light rail and metro lines that operate in a city.

Benefits of public transport:

- "They optimize land occupation, being able to transport more passengers from one place to another.
- Decrease in the level of pollution.
- Public transport circulates in exclusive lanes or it is what it intends, reducing time for users. " (Molinero Molinero & Sánchez Arellano, 2002)

Types of Public Transport.

Common Urban Transport.

Population growth means that better conditions are adapted for the mobility of people (Instituto de Normalización, INEN, 1993).

Intracantonal Urban Transport.

It is one that operates within the cantonal limits. The conclusion of contracts and/or operating permits (Constitution of the Republic of Ecuador, 2008).

Quality in services

Since ancient times it has been understood that the philosophy and techniques of quality were only applicable to industrial companies. But there have always been organizations that have distinguished themselves from the competition by a better service policy that has led them to achieve a differential advantage in the market. Currently, due to the high standard of living that humanity has reached, services have developed covering large areas.

The service is a process whose purpose is the full satisfaction of the client which will be measured from start to finish, regardless of the merely material aspects, the management of purchase, operations and the functioning of the factors that interact in the process.

Johnston (1997) states that in service provision companies there is the quality of the products, that is, the quality of the tangibles that would be the annexations that are provided for the use or consumption of the client in the system. It also refers to the quality of intangibles, which would be the way in which the service is offered and the treatment given to the client. Apparently, this author integrates the two aspects to define this construct.

The quality in the provision of services interrelates common aspects of the activity itself, of an economic, technical-organizational, socio-cultural and socio-psychological order. There are elements that interact in the process of providing the service such as: humans, represented by the members of the work group that serves users; organizational, described by qualitative dynamic aspects of the organization (procedures, shifts, routes, working methods, etc.); of environment, formulated by physical, hygienic and aesthetic conditions.

BIG DATA Management System

A BIG DATA management system is an indispensable tool which helps to obtain clear and evident information from the respective company in relation to the data system that provides relevant financial information, which allows the realization of appropriate decision making, which helps the benefit of the cooperative.

The accounting system is responsible for providing information quantitatively and qualitatively with three main purposes:

1. Information for the management that will be used in the planning and control of the operations that are carried out.

2. Internal information to managers, for use in strategy planning, decision-making and formulation of general policies and long-range plans .

3. External information for shareholders, government and third parties.

The system contains the classification of accounts and accounting books, forms, procedures and controls, which serve to account for and control assets, liabilities and equity, income, expenses and the results of transactions. (Bravo, 2009, p. 16)

This management system is used to obtain clear, orderly information and emphasizes the control of the different operations in the periodic manner, through the proper classification and management of accounting, responsible for transmitting all timely information to the manager of the cooperative. The accounting systems adapted to each type of company, range from manual systems that use special journals to facilitate the processes of daily and mayorization, to sophisticated computer systems that process information in an orderly and systematic manner, offering automatic and instant results. The accounting system used by a company must be specially adjusted to its size and the information needs that the business may have (Vasconez, 2005, p. 267).

This system is based on the planning processes and designed in the execution of different operations, with which you can control and make proper use of the information established by it, as well as being used as an effective mechanism in obtaining the results of the progress of the company.

The factors that affect the data structure of the BIG DATA system are the information needs of the institution and the resources available for the operation of the system". (Garcia & Solano, 2011)

The objective of the data management system lies in the fulfillment of the goals established by the members of the cooperative, through the adequate control of each movement made through appropriate mechanisms, in obtaining the necessary and very relevant information for it.

Data and information management

Through the opinion of Arcia Cáceres in (2011) relation to Taylor's contribution, he determines that administrative management through his classical theories, is characterized by the one that is developed in the organization. "The respective efficiency in the organization is obtained through the rationalization of the work of the operator and in the sum of individual efficiency. However, in classical theory, on the contrary, it starts from an organizational whole and its structure to guarantee efficiency in all the parts involved, whether they were organs or people.

It is determined that every company is part of six groups:

- Technical functions.- It is directly related to the production of bins and the services of the company.
- Commercial functions.- Purchases, sales and respective exchanges.
- Financial functions.- It is responsible for the search and management of capital.
- Security functions.- Protection of property and the respective persons.
- Accounting functions.- It is related to inventories, registration, balance sheets, costs and statistics.
- Administrative functions.- It is responsible for the coordination and synchronization of the functions of the company, in relation to the other functions specified above.

Data management "is used to plan, organize, direct, coordinate, and control. Administrative functions encompass the elements of administration. These same elements constitute the administrative process that can be found in any area of the company, that is, that each one performs activities (Arcia Cáceres, 2011) ".

The following are the important activities of the planning, organization, execution and control of the massive data that will be used in the BIG DATA system:

Table N° 1: Important activities

Important Activities of:	
Planning	Execution
<ul style="list-style-type: none"> • Subdivide work into operating units (departments) 	<ul style="list-style-type: none"> • Put into practice the philosophy of participation by all those affected by the decision.

<ul style="list-style-type: none"> • Group operational obligations into positions. • Gather operational positions into manageable and related units. • Clarify the requirements of the position. • Select and place individuals in the right position. • Use and agree on the appropriate authority for each member of the administration. • Provide personal facilities and other resources. • Adjust the organization in light of the results of the control. 	<ul style="list-style-type: none"> • Lead and challenge others to do their best. • Motivate members. • Communicate effectively. • Develop members to realize their full potential. • Reward with recognition and good pay for a job well done. • Meet the needs of employees through efforts at work. • Review enforcement efforts in light of control results.
Organization	Control
<ul style="list-style-type: none"> • Subdivide work into operating units (departments) • Group operational obligations into positions. • Gather operational positions into manageable and related units. • Clarify the requirements of the position. • Select and place individuals in the right position. • Use and agree on the appropriate authority for each member of the administration. • Provide personal facilities and other resources. • Adjust the organization in light of the results of the control. 	<ul style="list-style-type: none"> • Compare results with overall plans. • Evaluate results against performance standards. • Devise effective means to measure operations. • Communicate what are the means of measurement. • Transfer detailed data to show comparisons and variations. • Suggest corrective actions when necessary. • Inform the members responsible for the interpretations. • Adjust the control in light of the results of the control.

Prepared by: The Authors

Big data grouped into management system structures

The application of the management of massive data structure, allows to help in the collaboration and its respective progress, which is carried out at work, in the same way it is responsible for providing the information to the management which is responsible for the realization of the correct decision making, through the application of the policies and programs of the administration.

It is responsible for establishing training plans and training for people according to their needs. Improve the relationships that the members of the cooperative have, and be able to evaluate their collaboration.

It is determined that there are several factors that are used to apply administrative management in relation to the evaluation method, but generally those that are used are:

Quality of Work: Provides adequate documentation when needed. It goes beyond the requirements demanded to obtain a product or result better evaluates the accuracy, seriousness, clarity and usefulness in the tasks entrusted. Produces or performs high-quality work.

Amount of Work: Fulfills the work objectives, following the orders received and on its own initiative, until its completion. Performs an acceptable workload compared to what can reasonably be expected in the current circumstances of the position. Reasonably adheres to the delivery schedule.

Job knowledge: Measures the degree of knowledge and understanding of the job. Understands the principles, concepts, techniques, requirements, etc. necessary to perform the tasks of the position.



It is ahead of trends, evolutions, markets, product innovations and/or new ideas in the field that can improve the ability to perform the position.

Initiative: Act without needing to be instructed. It is effective in dealing with infrequent situations and problems. Has new ideas, initiates action and shows originality when facing and handling work situations. You can work independently (Sánchez Angulo, 2012, p. 22).

Importance of the Management of BIG DATA Systems

It is in charge of the supervision of the cooperative that fulfills the administrative functions; in relation to the determination and satisfaction of having fulfilled the economic, social, and political objectives in relation to the competitive market.

Through the opinion of Sánchez (2012, p. 22) This fact occurs in the public administration since given its important role in the economic and social development of a country and increasingly accentuated activities that were previously relegated to the private sector, public administrative machinery have become the most important company in a country.

It is determined that the importance of administrative management is reflected in complex situations, where there must be greater collection of material and human resources, in order to meet the objectives set by the transport cooperatives.

COMMON BOX

The Caja Común is a management model that centralizes, under principles of efficiency, equity and quality, the administration and operation of all the means (human resources and bus fleet) necessary for the provision of the transport service; where the origin of the provision of the means defines its scope of application.

The common fund is a centralized management model; A unique way of managing and operating a fleet that provides public transport service.

This administration (made up of several areas and qualified people) centrally plans and organizes how the fleet operates: schedules, routes, maintenance, etc., with the aim of minimizing costs, optimizing the availability of the units and performing efficiently in all areas.

In the common box model, all those who make up the fleet operate under the same parameters, in an organized manner and fulfilling their responsibilities. The income from the tickets enters a common fund, from where the income is then distributed equitably, with previously defined and agreed rules.

Current literature (Torres, 2013; Báez, 2012, Moncayo, 2011) defines the Common Cash or Single Fund system as a management model, whose objective is to centrally administer 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 organizations, regardless of their economic activity; However, the most common implementation experiences are reflected in the urban public transport services sector.

In Latin America there are experiences related to the implementation of Integrated Collection Systems (SIR), through Common Fund in the urban public transport sector. Thus, for example, Brazil has a history of more than two decades in the implementation of 250 projects in this type of initiatives culminated with public and private investments) followed by Colombia with 17 projects of the same nature (in the departments of Pasto, Neiva, Santa Marta, Armenias and Medellín); and Mexico and Argentina; each with five working boxes.

All these experiences in the urban passenger transport sector converge in a double objective: a) to organize the management and operation of a public service that allows improving the quality and opportunity for users; and b) make transparent the level of income and its distribution - in an equitable manner - among the providers of this service (Torres, 2013).

In Ecuador, the experience of implementing a Common Cash system is framed in the sector of public land transport services for passengers. This system is presented as a management model by which an operator centrally manages the resources from the collection of a rate, through a contribution made by all members of the organization to a single fund, from which an equitable distribution is made among all members



Merger of the Common Fund

According to Sanchez, (2012, p. 28) the common fund "in the case of the transport sector, all the income collected by the mobilization of passengers from one place to another is taken to the same account, and then the total income is distributed among the entrepreneurs according to previously established conditions."

The common fund is a mechanism to manage the collection of fares and the operation of the public transport service in a centralized manner, that is, the cooperatives will work based on the fulfillment of operational plans and tasks assigned to each unit. It is intended to move from individual management to centralized management, both of money and of the provision of the service.

Features of an ordinary box

In general, the common box allows greater efficiency in the provision of the service, which generates a large number of advantages, among which are the following:

- The total revenue of a complete route can be distributed, for example, among the vehicles that make it up. This can be done by averaging the mobilization of the entire fleet according to the number of trips, the total kilometers traveled, or according to the conditions that the entrepreneurs establish.
- It allows to eliminate the competition for arriving before the others towards a point, since the income collected will be credited to the same account. In the single box, the route at rush hour is the same as at another time, improving the provision and coverage of the service.
- This, in turn, allows promoting a culture of zero accidents by reducing competitive driving.
- It reduces traffic congestion and thus reduces travel time.
- Improves the driver's quality of life, as the stress load is reduced when
- Losing sense of competition with the partner.
- It improves road culture in cities, due to the decrease in the number of vehicles transiting; Better use is made of public roads without promoting illegal stops, without looking for passengers in off-road places or violating traffic rules.
- It offers the user greater comfort, adequate speed and safety.
- Improves the profitability and productivity of the group included in the single box.
- Decreases the operating costs of entrepreneurs.
- It allows users to regain their confidence in public transport.

Disadvantage of the common box

- Resistance to change.
- Distrust of economic management.
- Ignorance of the model and its application.

For the application of the common fund to work, it is important that the income funds given are handled properly and with the respective transparency, in this way distrust is avoided, with the implementation of this system.

What are the benefits for the transport user?

With the common box the user benefits because there will be a more agile and orderly system, with established stops to get on or off the buses with greater security, paying at the stops before boarding, receiving the complete return and avoiding the running and competitions of the operators to win a jero on the given route.

How does this system help the integral safety of transport?

The common box inserted to the new operators that have already implemented it in the city of Quito, allows a comprehensive planning with new technology aimed at counting passengers and determining the frequency with which buses must circulate. There are flat hours and peak hours that buses must optimize their fleets at certain times of the day, so a good reengineering will allow the proper use of routes such as departure and return frequencies. The logic of distribution of the box will depend on the shifts and the mileage traveled that each unit fulfills. It is not possible that, at flat hours, when there are not enough passengers, buses circulate half-empty occupying the public road and congesting the traffic of the city unnecessarily.

OBJECTIVES

Improve the level of public transport service (with the extension of coverage, compliance with established schedules, road safety, etc.).

- Strengthen the business organization of operators (with a corporate structure of resource and operational management).
- Increase the demand for travel on public transport, by improving the quality of service.
- Start the implementation of the new public transport management system of Quito, with its three defined subsystems.
- Improve the revenues of public transport operators (through the equitable distribution of revenues, effective distribution of kilometers operated, the use of economies of scale, etc.).

GLOBAL COLLECTION PROCESS

Identify the authorized Units in the Enabling Title, order of departure and work schedules.

Identify the established routes and frequencies and the kilometers traveled by each authorized transport unit

INPUT SUPPLY PROCESS

Identify the mechanisms to grant the documentary and instrumental inputs necessary for the operation of the common box (Identifications, Uniforms, registration sheets, tickets or tickets)

MONITORING AND CONTROL PROCESS

- Supervise the management carried out by the field controllers, verifying that passenger and fare records are kept on each route and frequency.
- If you have a technological registration, the technological information issued must be contrasted with the information provided by the controller.

Registration and Reconciliation Process

- Receipt of the money received by each of the controllers, to be able to validate with the information of number of passengers previously registered manually or electronically.

Liquidation

- Payment or money transfer process, once the registration or reconciliation is finished.
- The operator must previously cover the expenses generated within the benefits of the service (corporate, labor and operational).

DISCUSSION OF RESULTS

Inferential research was applied that refers to measurement and analysis, therefore, it is very easy to round or take it from the environment of inferential statistics, which arises from the mental evaluation between different expressions.

Inferential research is used in the present work, because it is responsible for the mediation and analysis of the results of the sample to obtain valid and significant statistical conclusions through the application of techniques, in order to obtain and adequately verify the hypothesis generated.

The study information can be seen in the following statistical table.

Table N° 2: Population and Sample

Strata	Frequency	%
Legal representatives of the Cooperative of Passenger Transport	14	0,3
Recurring Bus Users	5056	99.7
TOTAL	5070	100

Source: Research

Prepared by: The authors

From the surveys established to the universe of study, in relation to the application of the BIG DATA system within the model of the common box in the cooperatives of passenger transport, the following results are determined.

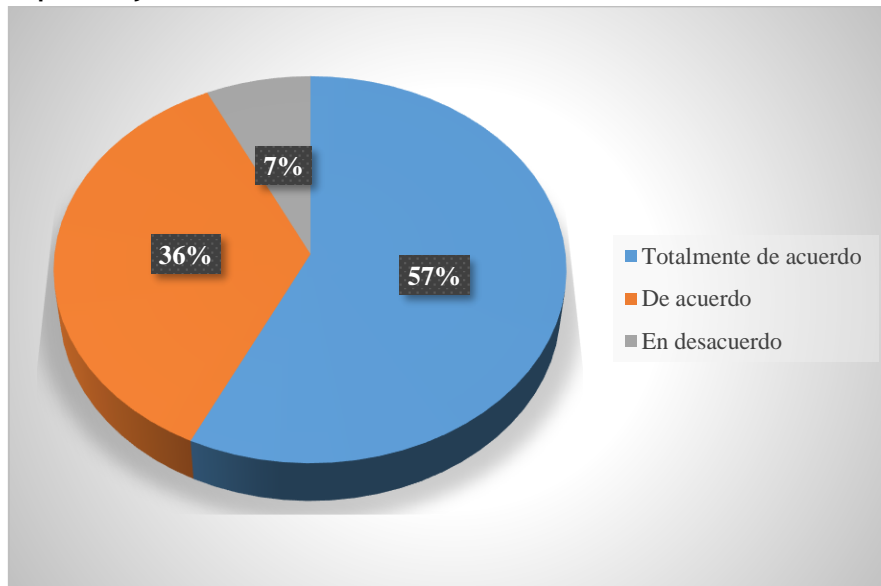
Question N° 1: Do you agree with the current situation of transport operators?

Table N° 3: Current situation of transport operators

DEFINITION	FREQUENCY	PERCENTAGE
Totally agree	8	57%
I agree	5	36%
Disagree	1	7%
Total	14	100%

Source: The established survey

Prepared by: The Authors

**Graph N° 1:** Current situation of transport operators

Source: The established survey

Analysis and Interpretation.

Through the survey established to the members of the s Cooperatives it is determined that 57% if they fully agree with the current situation of the transport operators, instead 36 agree and the missing 7% disagree.

That is to say that most of the members of the cooperative agree with the current situation of the transport operators, so they agree that the changes are very important, to improve the profitability of it.

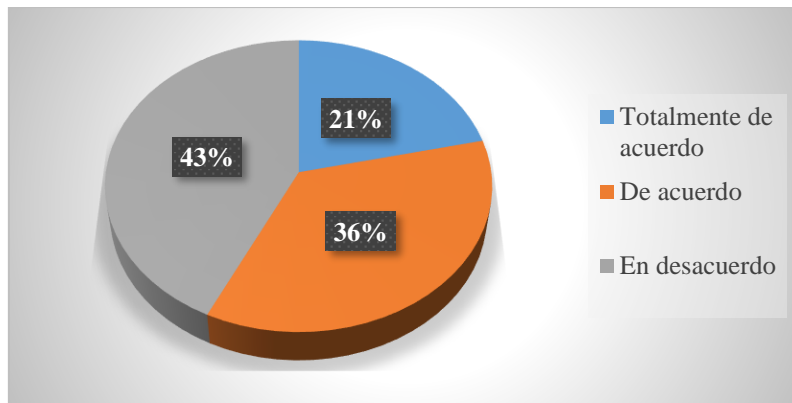
Question N° 2: Does the administrative management in the cooperative currently allow you to work correctly?

Table N° 4: Administrative management allows you to work correctly

DEFINITION	FREQUENCY	PERCENTAGE
Totally agree	3	21%
I agree	5	36%
Disagree	6	43%
Total	14	100%

Source: The established survey

Prepared by: The Authors



Graph N° 2: Administrative management allows you to work correctly

Source: The established survey

Prepared by: The Authors

Analysis and Interpretation.

Of the 14 members of the cooperative, 21% strongly agree, 36% agree and the remaining 43% disagree that the administrative management used by the cooperative does not allow it to work correctly.

That is to say that half of the members of the Cooperative are in disagreement because they do not have an adequate administrative management that allows them to carry out their work correctly.

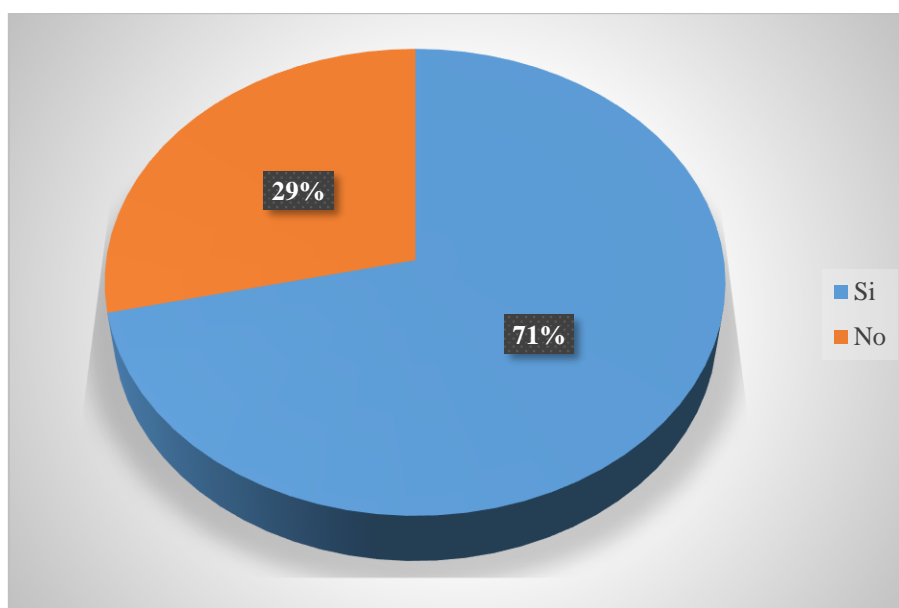
Question No. 6: Do you know the sanctions you could have if you do not have a management model?

Table N° 5: Penalties for not having a management model

DEFINITION	FREQUENCY	PERCENTAGE
Yes	10	71%
No	4	29%
Total	14	100%

Source: The established survey

Prepared by: The Authors



Graph N° 3: Penalties for not having a management model

Source: The survey established to the members of the Cooperative

Prepared by: The Authors

Analysis and Interpretation

Through the established survey it is determined that of the 14 members 71% do know the sanctions they could have if they do not comply, and instead 29% do not know the sanctions they could have by not having the respective management model in the cooperative.

That is to say that most of the members if they know the respective sanctions that they could have in the cooperative for not having a management model, for this reason they are interested in the elaboration of the common box, which helps to comply with the provisions of the law.

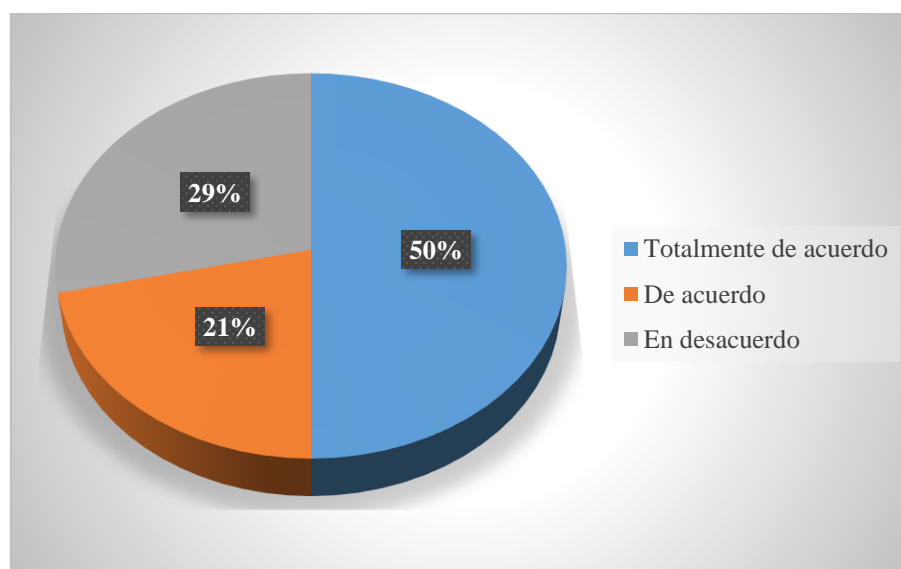
Question N° 7: Do you consider that the implementation of the common fund is important to obtain adequate control in the cooperative?

Table N° 6: Implementation of the common box

DEFINITION	FREQUENCY	PERCENTAGE
Totally agree	7	50%
I agree	3	21%
Disagree	4	29%
Total	14	100%

Source: The established survey

Prepared by: The Authors



Graph 74: Implementation of the common fund

Source: The established survey

Prepared by: The Authors

Analysis and Interpretation

With the survey established to the members of the Cooperative s it is determined that 50% if they fully agree with the implementation of the common box, instead 21% agree and the missing 29% are in disagreement.

That is to say that most of the members of the cooperative agree with the implementation of common cash, since you measure this model you can obtain an adequate control and therefore improve the administrative management which will be reflected in the profitability of the same.

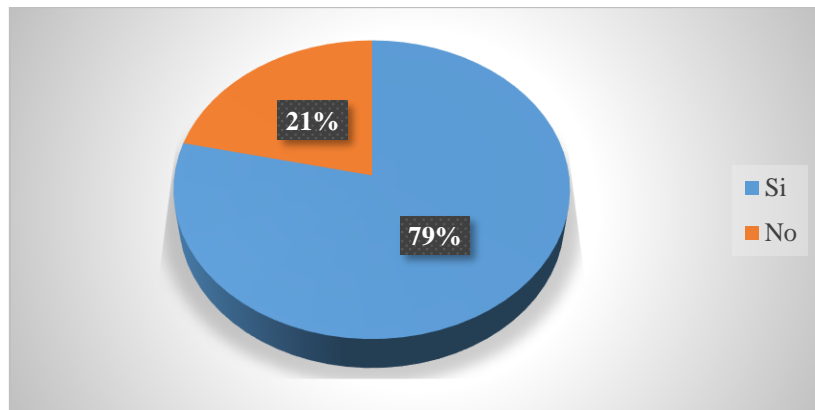
Question N° 8: Do you think you should design an administrative model called a common fund, which allows you to meet the objectives set by the transport operators?

Table N° 7: Model of the common box

DEFINITION	FREQUENCY	PERCENTAGE
Yes	11	79%
No	3	21%
Total	14	100%

Source: The established survey

Prepared by: The Authors



Graph 85: Model of the common box

Source: The established survey

Prepared by: The Authors

Analysis and Interpretation

Through the survey established to the 14 partners, it is determined that 79% do believe that they should design an administrative model called a common box, and 21% do not agree that the respective model should be designed.

That is to say that most of the partners do agree that an administrative model called common box is designed, which allows it to meet the objectives set by the transport operators.

In the development of the research the method used for the verification of the idea to defend is the statistical method of Chi-Square X^2 , where the importance of the research variables is compared, through the observed and expected values, so that in the end we obtain if we accept the alternative hypothesis.

For the respective verification of the hypothesis, the survey of the members of the transport cooperativewas used, for which it is done by crossing variables of two questions, which are related to the independent variable and dependent on the research.

Independent variable: common box

Question N° 7: Do you consider that the implementation of the common box through the BIG DATA system is important to obtain adequate control in the cooperative?

DEFINITION	FREQUENCY	PERCENTAGE
Totally agree	7	50%
I agree	3	21%
Disagree	4	29%
Total	14	100%

Dependent variable: Administrative management

Question N° 2: Does the administrative management in the cooperative currently allow you to work correctly?

DEFINITION	FREQUENCY	PERCENTAGE
Totally agree	3	21%
I agree	5	36%
Disagree	6	43%
Total	14	100%

The implementation of a common Fund model through the BIG DATA system affects the improvement of administrative management in passenger transport operators.

Next, the two hypotheses are determined:

Null hypothesis (Ho) = The implementation of a common Fund model does not affect the improvement of administrative management in public transport operators.

Alternative Hypothesis (Hi) = The implementation of a common Fund model affects the improvement of administrative management in public transport operators.

Observed frequencies

Table N° 8: Observed frequencies

FREQUENCIES	VD: Administrative Management			
V.I: Common Box	Totally agree	I agree	Disagree	TOTAL
Totally agree	1	1	5	7
I agree	0	3	0	3
Disagree	2	1	1	4
TOTAL	3	5	6	14

Source: Field Research

Prepared by: The Authors

Expected frequencies

Table N° 9: Expected frequencies

FREQUENCIES	VD: Administrative Management			
V.I: Common Box	Totally agree	I agree	Disagree	TOTAL
Totally agree	1,50	2,50	3,00	7
I agree	0,64	1,07	1,29	3
Disagree	0,86	1,43	1,71	4
TOTAL	3	5	6	14

Source: Field Research

Prepared by: The Authors

Calculation of Chi Square X^2

Table N° 10: Calculation of Chi Square χ^2

VI: Common box	VD: Administrative Management	FO	FE	FO - FE	(F-O-FE) ²	(F-O-FE) ² /FE
Totally agree	Totally agree	1	1,50	-0,50	0,25	0,17
	I agree	0	0,64	-0,64	0,41	0,64
	Disagree	2	0,86	1,14	1,31	1,52
I agree	Totally agree	1	2,50	-1,50	2,25	0,90
	I agree	3	1,07	1,93	3,72	3,47
	Disagree	1	1,43	-0,43	0,18	0,13
Disagree	Totally agree	5	3,00	2,00	4,00	1,33
	I agree	0	1,29	-1,29	1,65	1,29
	Disagree	1	1,71	-0,71	0,51	0,30
$\chi^2 = \sum (O-E)^2/E$						9,75

Source: Field Research

Prepared by: The Author

In order to determine whether the research hypothesis is accepted or rejected, the comparison is made with the Chi tabulated, in relation to the degrees of freedom, which is obtained by the respective calculation:

Degrees of freedom

$$\text{Grados de libertad} = (\text{Filas} - 1) * (\text{columnas} - 1)$$

GL = Degrees of Freedom

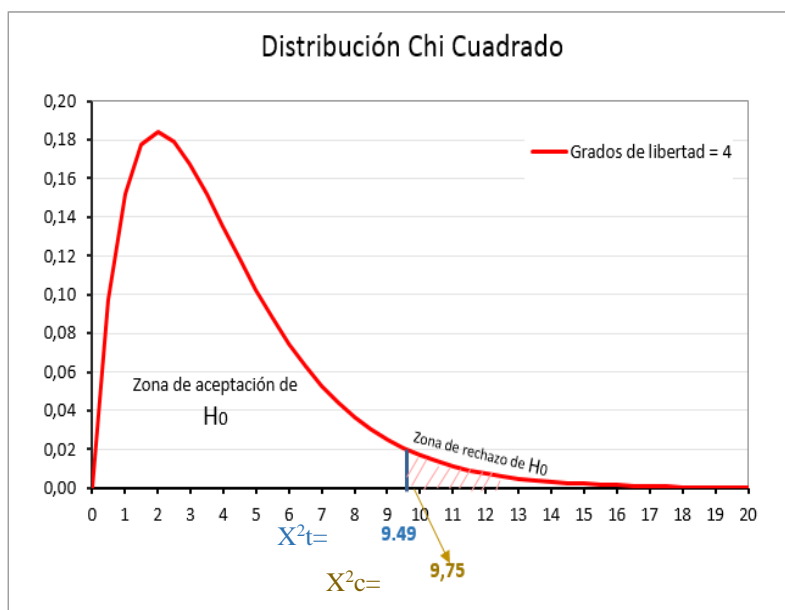
$$GL = (3-1) (3-1)$$

$$GL = 2*2$$

$$GL = 4$$

With the high degrees of freedom of 4 and the confidence level of 95%, the value of the Tabulated Chi Square χ^2 is established , which is equal to 9.49

Next, we proceed to the realization of the graph of the Chi square χ^2 where the rejection of the null hypothesis and the acceptance of the alternative hypothesis or also called the investigative hypothesis is determined.



Graph N° 6: Gauss's bell

Source: Chi Square Calculation

Prepared by: The Authors

Definition of the idea to defend

With the statistical method Chi Square X^2 , it is established that the calculated Chi-Square ($X^2 C = 9.75$) is greater than the Tabulated Chi Square X^2 ($X^2 t = 9.49$), the null hypothesis is rejected and the alternative or investigative hypothesis is accepted "The implementation of a model of the Common Fund affects the improvement of administrative management through the BIG DATA system, in public transport operators".

Within the Common Fund, the functions that would be carried out with its implementation are:

- Means of payment.
- Validation and Access Control.
- Sales network.
- Central System.
- Securities management.

The means of payment through this model will be made as follows:

Table N° 11: Means of Payment

Payment Method	
Effective	TISC (Scaled System)
<ul style="list-style-type: none"> • A hopper will be implemented on the buses, exclusively exact payments in coins. • With the payment the passenger will be able to enter the transport unit. • The respective driver will change the bills into coins, for which he must have a coin dispenser. 	<ul style="list-style-type: none"> • There will be a validator for smart cards. • The respective validation will allow the passenger to enter. • Smart cards will allow you to store contacts of transport units. • Customers who have this card can make exchanges in the services that are automated.

Source: Field Research

Prepared by: The Authors

Fasis for the implementation of the Common Fund model



Graph7: Phases of the common fund model.

Prepared by: The Authors

Phase: Implementation of the BIG DATA System in the Collectionss

Within the centralized collection, the financial and accounting management is established, which allows to know the resources obtained through an adequate control of the resources issuance of tickets and / or tickets, tonnage and others of a financial, accounting and treasury nature that may be required.

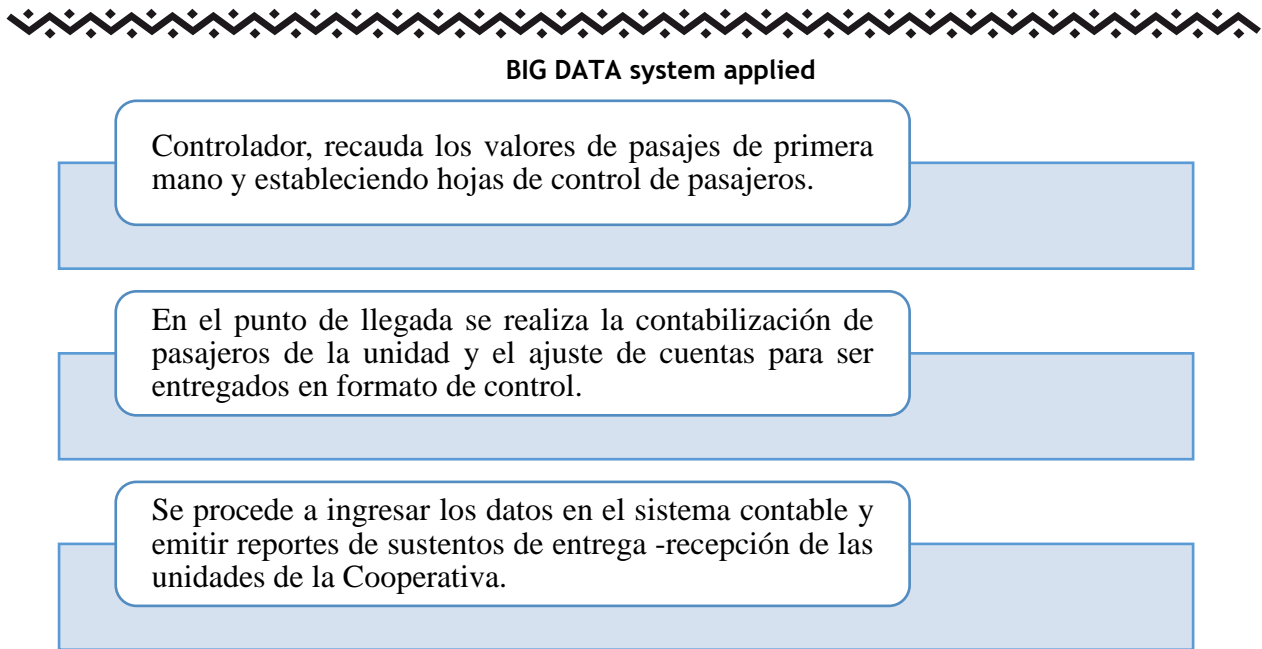
The centralized collection is a mechanism by which all the persons who are involved in the provision of services are provided with the respective inputs which include:

- Identification
- Uniforms
- Record sheets
- Tickets or tickets.

The technological systems of massive data BIG DATA for the common box are compatible, which will be complemented with the verification and internal security in the transport units, which offer the following benefits:

- Automated information to the user.
- It has the ability to review the videos in case of theft, or claims that exist for suspicions of misuse of the collection.
- It is responsible for the immediate sending of the message to drivers through a console.
- Sent message to partners and drivers by LED displays.
- Reliable supervision of online operations is maintained.
- Have centralized information within operations.

The BIG DATA system in the short term can be as follows:

**Graph No.8:** Manual collection system

Prepared by: The Authors

Phase: Operation, supervision and control plan

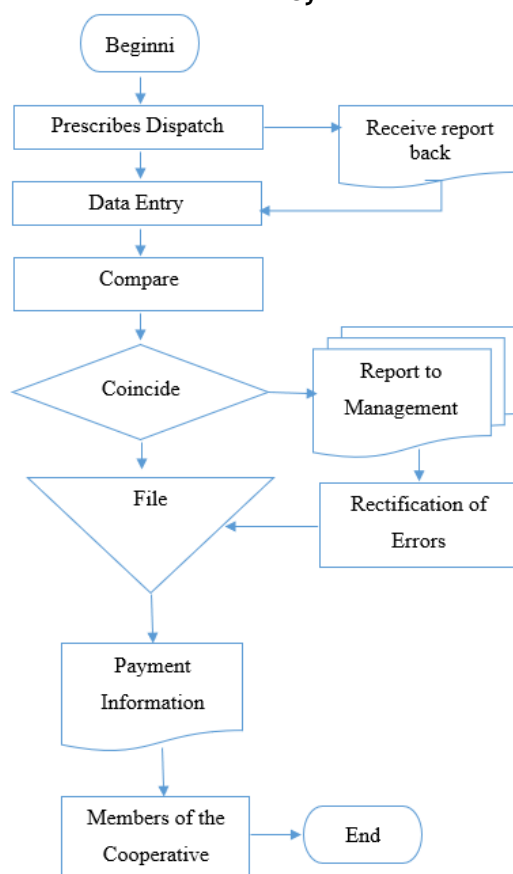
This process is of vital importance when it comes to efficiently operating the transport units, in the control of maintenance, routes and routes, supervision of attention and provision of services, and the most important allows a validation of the information obtained in the collection system. This type of control may be carried out by the respective authorities of the Cooperative on the actions of the respective drivers at the time of providing the transport service.

The plan is intended to supervise the management, according to the information provided from the passenger records and the respective fares collected. In the same way, it is responsible for receiving total money for the fare of each of the routes and frequency, validating the information issued by the control deposits.

Before the implementation of the system, some important measurements must be obtained from the statistical unit that require a permanent adjustment of the system.

- Reduction in operating hours based on study of times measured en route
- Operational improvements on routes based on data related to demand behavior
- Reduction in evasion calculated on the basis of historical versus current collection data
- Increase in security determined by the number of events prevented through the use of CCTV cameras
- Determination of the points of origin and destination of the integrated transport system according to recorded input/output
- Waiting time at stops to enter the system and level of user satisfaction through field surveys.
- Reduction of operating costs based on historical operating data

Validation flowchart of data in the System of information BIG DATA



Graph N°9: Flow chart for validation of payment information.

Prepared by: The Authors

CONCLUSIONS

It is determined that at the national level the government implements the new policies and laws that adapt to the competition, this type of event will allow the transport cooperative to know that the management and operations of the transport services are not carried out properly with the elements of the common box, which helps to achieve the efficient management of the Cooperative.

Through the established research it is concluded that there are totally different opinions in relation to the Administration and the partners, which is based mainly on the information obtained by the survey, in relation to the income and expenses that are generated during all the months.

In the research work technically vasados in the data obtained from the tabulation, the need arises to adopt a new model of common box based on competition, since it must be remembered that within every Organization the changes are good, since, if continuing with the same system will be reflected with the disagreement of the partners in relation to the competition, Deteriorating the respective corporate image.

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