SOLUTION TO THE CONGESTION OF URBAN PUBLIC PARKING IN ECUADOR

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Abstract: *An administrative approach is designed to solve the congestion of urban rotating public parking in Ecuadorian cities, mediating a case study that demonstrates its feasibility of implementation from the administrative, organizational, and financial aspects. The absence of designs, projects and proposals related to the problem of vehicular growth and congestion in Ecuadorian cities, together with the obsolescence of current ordinances at the national level, implies a critical problem. The current situation of the case study is described and detailed, proposing to incorporate computer tools associated with the geographic information system, as well as the adoption of information and communication technologies. The new approach to guidelines for a new ordinance and application that improves the interaction between users and workers is added. The research, of a non-experimental nature, declares exploratory, explanatory, documentary, case study and projective types. It is declared as a feasible project and scientific methods of analysis of information sources, experts, and deductive, inductive, empirical, mathematical statistics are appealed to. It is concluded that the proposal enjoys the relevance and feasibility to be applied in Ecuadorian cities that use the urban public parking system.*

Keywords: *public management efficiency, urban vehicle intervention, vehicle management, urban planning*

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1. Introduction

Problematization in this research

Since its implementation, Muñoz, and approved by the direction of justice, police and surveillance of the municipality of Riobamba (2009), the system of organized rotating parking fee, and henceforth SEROT, achieved a certain level of order in the management of vehicular parking. The excessive increase of the current vehicle fleet, implies the obsolescence of the ordinances and actions designed according to the SEROT. This reality implies the design and implementation of feasible solutions from the administrative, organizational and financial aspects.

The disadvantages in the human mobility of the city of Riobamba, with study, are seen in the excessive increase of the vehicle fleet, where the priority in streets and intersections falls on the vehicle and not on the pedestrian; peakhours, become vehicular bottlenecks that hinder the passage of pedestrians to thework and study entities , located in the center and historic center of the city; public and private parking lots, these do not assimilate the current demand, and is reflected in the loss of time and resources of citizens pressed to enter the historic center of the city, regardless of the activities they intend to carry out.

In this way, the problem detected is the absence of a feasible proposal for vehicle reorganization of SEROT. Of the specific problems, to delimit, describe the current situation of the SEROT of the city of Riobamba; design the geographic information system of SEROT, mediating the ArcGis computer tool; elaborate guidelines for the vehicular ordering of SEROT in the city of Riobamba, and propose application that allows to visualize the information generated by the proposal of vehicular ordering.

The delimitation of the problem in the location, is the area comprised by the SEROT of the city of Riobamba; the object of research results in the use of georeferencing tools to achieve the systematization of SEROT, and the field of action is traffic management.

Objectives, assumptions and rationale

The objective of this research is to design a feasible proposal for the reorganization of SEROT vehicles. Of the specific objectives, to delimit and describe the current situation of the SEROT of the city of Riobamba; to propose a geographic information system to support the management of SEROT, mediating the computer tool of ArcGis 10.2; to elaborate and suggest guidelines for the vehicular ordering of SEROT in the city of Riobamba, and finally, to propose application that allows to visualize the information generated by the proposal of vehicular ordering.

The hypothesis is that, by designing a feasible proposal for the reorganization of SEROT vehicles, it is possible to intervene effectively in the urban management of vehicular reorganization.

The research is justified, from the budgets of (Hernández, Fernández and Baptista, 2014), from the convenience, and in this case of the SEROT in the city of Riobamba, and generalizable to other Ecuadorian cities.

Referring to social relevance, avoiding traffic congestion, wasting time, resources and optimizing the value of public service. From the economic point of view, the possible increase in the rate benefits the public institution, in addition to impacting on savings for different concepts in the user, including fuel and payment of fines for delays in their work. Of the environmental benefits, the reduction of emission of gases from cars in the searches of parking places, the reduction of paper consumption in the current tickets, replaced by the computer application installed in each mobile.

In addition, the coding of the parking lots is added, where the user knows the place or space of his car, the available space, the relevant signage of each parking lot where today it is still incomplete. In this proposal, there is greater efficiency in the control of parking by the personnel who work today, not generating negative impact on unemployment; Training is conditioned to the administration, since there is a paradigm shift in work processes and the intensive use of information technologies, and, finally, the availability of the application, available to users and workers.

Relative to the theoretical value, it contributes to knowledge from technical proposals when designing, and demonstrating the proposal of vehicular reorganization of SEROT. The actors benefited are the citizen owner of the car and pedestrians, the public administration, the environment, and society as a whole.

From the structure of the article

In the introduction, the problematization is described, emphasizing the case study of the city of Riobamba, which is replicable in most Ecuadorian cities, as far as traffic congestion in parking lots is

concerned. The problem, objectives and hypotheses are stated, as well as the justification for this research.

The theoretical framework demonstrates the absence of methodological proposals of this nature, where previous research only characterizes the current local state, addresses and promotes rearrangements without adopting tools or technologies, nor how to execute interventions of this nature. It is added to this research proposal, the impact of geographic information systems, depending on the change of public management in SEROT, as well as brief description of the SEROT problem in Ecuador, and in the case study, of Riobamba city in Chimborazo province.

Already, the research methodology that supports this work, declares the design and types of research involved, the scientific methods adopted, the strategy and method of calculating the population and sample, the validation of the proposal and idea to defend, and the collection of data and instruments used.

In the section of the results, the methodological proposal of feasibility in each of its stages is described, enunciating actions and formulating intervention strategies. The emphasis on the assurance stage of the proposal, and the requirements prior to its implementation, is highlighted. In this way, the analysis of economic and financial feasibility is summarized, demonstrating the opportunity represented by this proposal.

As for the discussion, organizational cultural barriers, organizational change management in the face of a paradigm shift in perception, performance and social projection of SEROT are addressed. Those preventive actions contained in the proposal are added, which minimize these resistances and barriers in implementation. The role of managers as the object and subject of the process of change in SEROT management is addressed, as a way of effective implementation of this proposal.

State-of-the-art management of organized rotating parking rates Ecuadorian

Of the main antecedents in Ecuador, of SEROT, the absence of public and governmental sources that legislate from the macrosocial dimension, of the operation, the duties and obligations of users and administrations, rules of order. There are attempts to organize the phenomenon of vehicular parking from empirical visions in different cities, and not assuming administrative or business tools, supported by computerization and geographic information systems.

Regarding the bibliographic review, works are cited in Ecuador, in the style of Verdezoto, Cabrera and Soto (2020), associated with the analysis of vehicular congestion for the improvement of the main road in Guayaquil-Ecuador; of López (2013) and congestion in Ambato city and the organization of vehicular traffic; of the contributions of Padilla and Álvarez (2015), related to how to order the SEROT from administrative regulations in the city of Puyo, limited to planning, regulating and controlling the land vehicle parking system in the center of the city. Indicators of compliance with activities and user satisfaction are defined, such as ordering, cost of service, place of payment of fine

It is added, the study of SEROT for Municipal Decentralized Autonomous Government, Biblián canton, by the author Illescas (2016), and the rational use of public space in the absence of regulation in the use of parking. The study identifies public, private and commercial parking facilities, as well as their regulation and control policies.

In addition, the investigation of Mantilla and Granizo (2015), associated with the internal control and collections of SEROT, for the sale of parking cards of the vehicles of the city of Puyo. There are certain critical points that do not allow an adequate administrative management of resources, due to the lack of procedures regulated through administrative acts, emphasis is placed on the need for an ordinance that regulates the internal control system in income

The contributions of Salinas and Trova (2020) are highlighted, in the analysis of the level of service in seven downtown streets of Cantón, determining possible solutions to the increase in traffic, as well as economic feasibility study. this study only contemplates administrative reorganization and rules of action, but does not venture into tools to optimize SEROT. Criteria of the SEROT ordinance of Tulcán canton are assumed, and the balanced use of parking lots on public roads for the use of these; de Escobar and Tipantasig (2015) and the ordinance that establishes and regulates the SEROT of the city of Ambato, and vehicular traffic in the center of the city.

In short, from the sources consulted Ecuadorian, there is no proposal for feasibility, nor intervention approach, mediating tools to improve the efficiency in the management of SEROT, the rupture of the digital divide by adopting information and communications technologies.

Geographic Information Systems, GIS, according to SEROT

The criteria of Olaya (2014) are adopted in this study, such as the set of hardware and software created to analyze and interpret referenced data using "geographical or spatial coordinates with specific capabilities for georeferenced data" (Olaya, 2014: 6). However, for (Alegsa, 2019; Zamora, 2018), an information system is a set of interrelated components "to achieve an objective that will contribute to the decision-making of a company" (Zamora, 2018: 3), and in this case the public company in charge of SEROT and subordinated to the structure of local governance.

The researcher Rivera (2014) highlights the role of spatial consultations in urban planning, used to analyze boundaries between territories and adapt a structure, which will lead to a development that links these territories, "provide the location of vehicles that travel on a road that covers a route to make a delivery and avoid any setback in case of an unfavorable weather that causes a delay or accident" (Rivera, 2014: 8).

The GISis valued by the Confederation of Entrepreneurs of Andalusia (2010), with tactical functions when processing and visualizing geographic information for decision making. Its adoption in the case of Ecuadorian SEROT, outperforms any other traditional analysis method, by saving space and time in digital format work; recovers large amounts of data faster and at lower cost; of the capacity of analysis, manipulation when integrating data, whether or not spatial; of fast, simple, rational and intelligible results for the user. All this increases efficiency in the public service, and constitutes a change in the SEROT execution paradigm, which corresponds to the advancement of technologies and therefore facilitates the jumping of the digital divide in society.

This challenge of incorporating as a tool to the Information System in SEROT, is feasible through the ArcGIS computer application for georeferencing, which allows storing geographic information, performing data analysis, creating maps. The website (ArcGIS Resources, n.d.:.1), notes that, "the evolutionary process that technology has had today has allowed the development of programs of this type, the same ones that allow analyzing and identifying geographic information" (p.1).

Parking lots and SEROT

From the concept of parking, it is assumed (Perugachi, 2014: 12), "to the fact of leaving a car immobilized, for any indeterminate time, other than a stop or a stop" (p.12). The urban transport system is made up of three elements: the road network, vehicles and the terminal (parking). Its design and ordering influences the system, then, the problem of parking lots (terminals), is related to the problems of vehicular flow and the characteristics of vehicles.

The objectives or goals of SEROT management in public parking lots, according to the criteria of Abdó, (2017), result in compliance with the ordinances, regulations and provisions of the authorities of the municipality; improve vehicular flow while reducing travel times; encourage the reduction of private vehicles and choose to travel by public transport, and limit parking time. He points out (Perugachi, 2014: 13) that, the SEROTs arise from the "need to generate spaces to park vehicles in sectors of the city where there is a significant demand for them" (p.13)

In the case of the Riobamba city study, and referring to the advantages of SEROT, whether in favor of the user or the authority that regulates parking lots and streets, the revitalization of the economy in the area is cited, since there will be greater availability of free spaces to park the vehicle; contributes to saving time and resources; generates extra resources for the municipality by charging the parking fee; it is a source of income for a large number of families, through the management of control and regulation; It reduces pollution both the emission of gases, and in the excessive use of the vehicle's horn, given the traffic in the center of the city.

Moreover, visible disadvantages should be cited, such as the lack of control by the authorities in allowing some users to violate established rules; non-compliance with prepaid card sales hours; the lack of culture and awareness towards users.

Regarding the rotating parking systems charged in Ecuador, the researchers Valdivieso and Tania (2019), refer that it allows to establish parking schedules and determine specific areas, achieving the democratization of the use of space. SEROT, is presented as a solution to the problem of transport of people and goods within an area of high demand and that influences the entire economic, social and cultural life of the population.

Design and types of scientific research declared in this research.

The type of non-experimental research is declared, according to (Mata, 2019; Dzul, 2018; Arispe et al, 2020), by not drawing their definitive conclusions through reproducible actions and reactions in a controlled environment, and thus obtaining interpretable results through experiments. This does not imply the rigor, seriousness, level of documentation and application of its methods at the time of the proposal of the vehicular ordering of the rotating parking system ordered tariffed. It is assumed in this work the statistical measurements, consults the public opinion and the organization of available data, obtaining the desired relevant data

As regards the types of research, of the documented type, a t r a v é s de e n c ue stas, observacion and c onsulta e n dis t int a s fu entes document ales, re re cab a r los datos e información e xistente on the topic of the vehicular reordering of the parking system; type field research, by collecting data from primary sources, and thus reach the feasibility proposal of the vehicle reorganization. This field research is a qualitative method of data management, to understand, observe and interact in the environment of public vehicle planning.

It is also declared exploratory type research, (Zambrano, 2015), because the problem is not clearly defined, but it is required to understand it without reaching conclusive data. In this case, the proposal for the vehicular reorganization of the parking system, it is required to enact and update public ordinances capable of responding to the reality of the city and vehicular flow.

Descriptive research is added according to Barnet, Arbonés, Pérez and Guerra, (2017), by pointing out the characteristics and features of the population context studied, that is, of the vehicular phenomenon through diagnosis and definition of the analysis and processes involved; Explanatory type research contributing to the causal relationship, and in this way understand the phenomenon of traffic congestion and the proposal of reordering efficiently.

Finally, projective type research is declared, Hurtado, (2008), when developing a practical proposal based on the problem described, and from the diagnosis, needs and processes. The feasible project approach is declared (Dubs, 2002; Palella and Martins, 2012), as it develops and develops a viable operating model proposal, which solves the vehicular ordering of the rotating parking system ordered from the requirements or public needs in Ecuadorian cities.

Scientific methods

It appeals to the method of management, analysis and synthesis of informational sources, extracting the relevant contents for the purpose investigated; the method of experts when going to public specialists in charge of the vehicular phenomenon and congestion; inductive deductive methods in reaching the conclusions that allow this proposal to be drawn up; empirical methods, highlighting survey instrument or users, interviews public servants and specialists in the area of city vehicular traffic.

Population and sample calculation

It is the population, the average daily number of users, based on previous studies of the traffic direction, where a total of 8,260 users is determined. The sample is determined with NCA 95% and error of 5%, yields 184 users to apply data management instruments.

Validation of the research proposal or idea to defend

This SEROT reordering proposal is validated by applying the structured survey instrument, its analysis and interpretation of the responses, (Barrionuevo, 2019). It appeals to the recognition by users, of the need for intervention in the vehicular reorganization and parking system by minimizing parking search times, of the security generated by a virtual system to access parking lots.

Data collection and instruments

The information already digitized and belonging to public institutions, are studied and validated *in situ*, in terms of parking lots and their characteristics, territorial scope of each area, neighborhood composition and blocks. Each area has its own particularities according to the social economic environment, and the historical heritage variable, then, the treatments must be differentiated, as well as the reality of the data, current maps.

The computerization or translation of data and maps into digital language through ArcGIS, requires extreme rigor in each area included. This requires the accompaniment of workers in the areas and neighborhoods of study, where the measurement, exact location is teamwork. For these purposes, a GPS receiver and GeoPlaner web application are used.

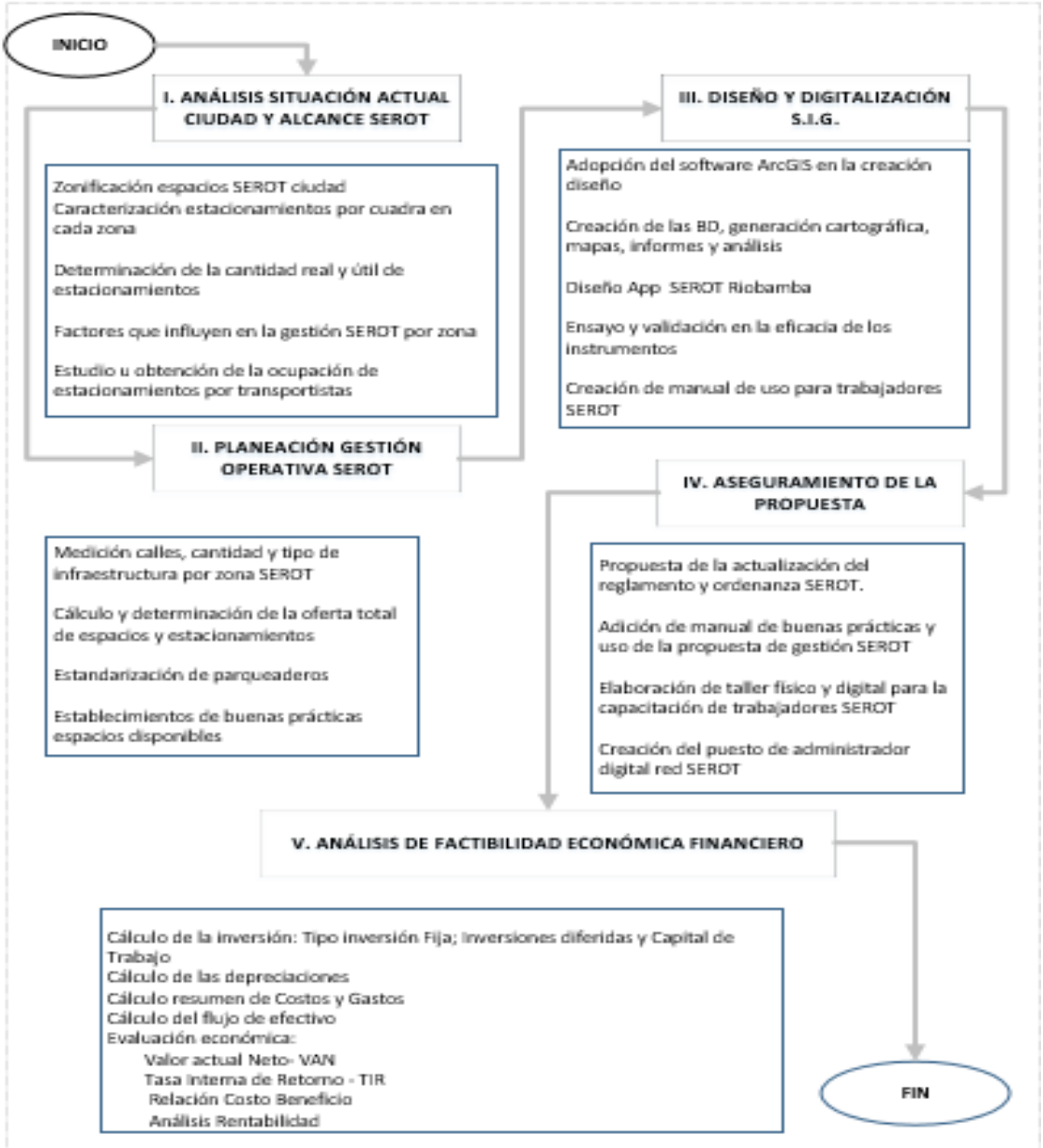
Instruments inherent to the empirical scientific method are added, such as interviews, surveys and scientific observation. The users themselves who, day by day, appeal to public parking lots, are sources when rethinking each action of the SEROT worker and the management of the service provided.

2. Content

This proposal for vehicular ordering on SEROT is shown in Figure 1 and developed in detail as a case study, according to Barrionuevo (2019). For each of the five stages designed, actions inherent to the local context are explained. This means that each Ecuadorian city willing to implement this proposal has to explore its local particularities, where this proposal enjoys the necessary flexibility.

Figure 1

Design of the SEROT feasibility proposal



Source: Authors.

Analisis of l a *situación* a *ctual city and scope SEROT*

This first stage requires first-hand and rigorous knowledge from the re g istros and map a s of the Direccion of Just i c ia, Pol icía and V i gil a n c i aof theMuni c c ipalidad, breakdown by zones,

blocks, streets and e stru c tur a s que conform a nactualmente el SEROT. It is necessary to specify that, of the e structur a s that make up SEROT, there are those e spacios d e stin a two a compañía s of taxis, the p a rada s of bu s es, those e spa c ios r e s e r v a dos p a ra entitye s públic a so priv a das y los e c otachos. The preliminary study, throws about 1943 e sta c ionamientos, according to e e l tipo de v e híc ulo q u e se estacione and of the form a d ecu a daofparking, this influences the economy of the spaces .

Thus, it is possible to know and validate the number of parking lots per block; the reserved spaces within the SEROT zone; factors influencing each Area; ocupacion destacion a mie ntos por p a rte de los transportistas. Figure 2 reflects zones 1 and 2 of the current map SEROT, Riobamba city, where its current spatial configuration is a problem for traffic congestion, parking and pedestrian circulation in the indicated areas

. Figure 1.

Map zone 1 SEROT, city Riobamba

Source: Authors.

Zone 2 and its delimitations, according to Figure 2, stand out from the study, where the zoning of city and hospital area, recreational park is reflected for the case study. For details of this stage, see (Barrionuevo, 2019).

Figure 2.

Map Zone 2 Parque Guayaquil–Hospital General Riobamba-IEES

Source: Authors.

For each zone, its inventory of available spaces has been updated. An example of this inventory and its updating is the number of parking lots per block in zone 1, where the total parking spaces has strong variation due to the diversity and type of vehicle fleet. TABLE 1 shows variation of spaces according to the nature of vehicles.

Tabla1

Number of parking spaces per block Zone 1

No.	Cadr as	Espacios de estacionamientos
1	Av. la Prensa entre rey Cacha y Av. Daniel León Borja	10-8
2	Rey Cacha entre Eplicachima y Av. la Prensa	11-7
3	Eplicachima entre av. Daniel León Borja y rey Cacha	50-46
4	Explanadadel parqueaderodel	24-20
TOTAL		95-81

Fuent e: Dir e cció n d e Justicia, Policía y V i gil a n cia d e la Municipali d ad d e Riobamba (2019)

These values of parking spaces are an indicator of the need to standardize and adapt these, according to the nature of the vehicle fleet. It is emphasized that, in public databases, there is no description of the factors that influence the zones, so it is not possible to determine the operational complexity SEROT in the specific area. Table 2 shows an example of these factors in zone 1 itself.

Table 2.

Factors influencing zone 1

Ca l les	Factore				
	P arada of ofxis	P arada de buses	E cotachos	Garajes Privtotw o	Espacios R eservaof
Eplicachima	2	0	1	8	0
Reand Cacha	0	0	0	1	1
P arqu e adero terminal	0	0	0	0	0
Total por zona	2	0	1	9	1

Source: Authors.

The existence of private garages, reserved spaces and ecotachos, limits the public parking space. The task is to measure, determine scope and sites to optimize parking sites. Hence the importance of this methodological proposal, prior to the computerization of the data.

SEROT operational management planning.

It includes the measurement diagnosis, designation of infrastructures, calculation of the offer, the standardization of the parking lots, the study of the current management and proposal of good practices under the prism of this proposal.

This stage requires care and attention, since the infrastructures of each SEROT Zone are counted and described, as well as the measurements of the streets, their parking lots and the importance of their standardization. A key aspect is the calculation of the number of parking spaces per block. Thus, Table 3 describes the number of parking lots per block in zone 1 without assuming the nature of the vehicle fleet, so congestion is critical.

Table 3

Number of parking lots per block in zone 1

No	Blocks	Available spaces	Unavailable spaces	Total spaces
1	Avenida LA PRENSA / Rey Cacha and Av. D. León Borja	13	0	13
2	Rey Cacha / Eplicachima and Av. LA PRENSA	12	0	12
3	Eplicachima / Av. D. León Borja y Rey Cacha	50	4	54
4	Esplanade of the parking lot Terminal Interprovincial Buses	24	0	24
Total		99	4	103

Source: Authors.

In this way, the standardization of car parks is designed and proposed, according to Figure 4 examples of the treatment provided to the case study are shown, its characteristics detailed in Barrionuevo (2019).

Figure 4

Standardization of car parks

Source: authors.

Design and digitalization S.I.G.

The entire study of the two preceding stages is systematized, ordered and translated into digital language. The computer tool for georeferences, ArcGIS, is appealed to, generating the cartography, maps, reports and relevant analysis from the precepts of (Ortega, 2018). Based on the final product, the application is designed for free download by users and workers of the company. As a requirement of the stage, is the creation of the manual of good practices for users and workers of SEROT.

Assurance of the proposal

Under the current regulations and ordinance, it is not possible to undertake SEROT's vehicular reorganization proposal. This implies another vision in work management, assimilating organizational changes and good work practices. This reality is assumed from the organizational culture in the public entity and how to manage the process of change and assimilate for each worker, the new ways of working.

It is then necessary to review and issue a new ordinance and management procedures; the creation of physical and virtual training workshops for workers, the creation of the position of administrator of the SEROT network with functions of support and guarantee to the proper functioning of digital tools, management control, and, finally, continuous training to the personnel involved.
The controlof the estac ionations by the a dm i nist r a dor e s actual e s tual e s is maintained, preventing no g e nerar impac tosocial and to employ more than100 persons responsible for the ingr e so of the vehículos and rot a r ar the cionamientos. These p e rson a s, after training, man e jan the pli c a c ion and s e enc a r g an of their daily activities in a more se e g ura way , eFI C A Z Y ECONÓMICA.

Feasibility analysis

Demonstrating the scope and meaning of this proposal, minimizing resistance to change on the part of responsible public officials, and involving investors is only possible through an economic and financial study. Thus, the total investment is described and calculated, from the fixed, deferred investment and need for working capital. Depreciation calculation is added and thus summarize the costs and expenses of the project and income, which allows a first approach to the cash flow, calculated.

Referring to the economic evaluation, the net present value or NPV is calculated, where in year 1, the update factor achieves the index of 1.10 and in the fifth year of implementing this proposal, net collection factor, exceeds $ 170.00 million USD with an update factor of 1.61. Regarding the internal

rate of return, IRR, net cash flows indicate that, already in year one, the initial investment is recovered, and surplus of 2.82%, and in the fifth year, the cash flow reaches six figures.

Finally, the profitability analysis, expressed in Table 4, when comparing NPV, IRR, investment payback period and the benefit-cost ratio, shows the financial opportunity and feasibility of the proposed vehicle reorganization in the city of Riobamba.

Table 4.

Profitability analysis

V a	Condition	Resouthtaof
Voftheir Actual Neto	>= 0	309.439,61
Tasa Interna de Retorno	>10%	2
P eriodo of Recup e racion of the Inveration	<= 5 years	3 m e sesy15 días
Relación Beneficio / Costo	>= 1	6

Source: authors.

3. Discussion

As a feasibility proposal to the problem of traffic congestion SEROT, it is a challenge to implement it by recognizing the prevailing organizational culture in public institutions, where old practices and resistance to change are visible features. It turns out to be a paradigm shift in the way of doing and managing, where the managers and directors of the public entity have to assimilate new approaches, analysis and perspectives of SEROT, otherwise it would not be viable to decide on this proposal.

The resistance to the adoption of innovative tools and information and communication technologies is due to the absence of programs for the training and training of personnel, in addition to the handling, maintenance and suitability of the necessary equipment. In this proposal, resistance to change is considered, but, only by demonstrating the opportunity and importance of this, the analysis of the feasibility and opportunity to implement it by public decision-makers, is the ideal way to undertake this challenge.

In this proposal, the investment of mobile phones appropriate to the demands and benefits is assumed, in addition to the rental and purchase of software. The figure of the specialist coordinator in the daily maintenance of the system is added, in addition to guaranteeing training to each employee, whose educational levelsare in the medium-low range. Then, SEROT, already takes on another social projection, where its work is inserted in the digital dimension, in addition to raising the effectiveness of its performance and digital monitoring.

As a perfectible project, new variables still have to be added, because with the expansion of other areas, neighborhoods and blocks to the SEROT system, the geographic information system, data and analysis relationships for making the relevant decisions are expanded. The performance and management suggestions that must be reflected in the methodological procedures and ordinances issued by the Decentralized Autonomous Government of Riobamba are added.

It can be said that there would be a qualitative leap in the performance of the public institution, where knowledge, labor skills, control and monitoring of each parking lot in neighborhood, block or area, enjoy high professionalism. And, each worker involved leaves the artisanal work of marking tickets and is trained in the use of the computer application that records times and indicates the decisions to be made for each specific case.

4. Conclusions

On the objectives stated in this research, it is concluded that:

The feasible proposal for theSEROT vehicle reorganization is designed. This proposal implies an organizational change in the ways of perceiving SEROT and the way of managing it.

The current situation of the SEROT of the city of Riobamba is successfully described, managing to identify by zones, neighborhoods and blocks the infrastructure, parking spaces inherent to this company.

It is possible to propose the design of SGI according to SEROT, mediating the ArcGis 10.2 computer tool, on the information collected, the expected outputs and relevant analysis.

Guidelines are elaborated and suggested for the vehicular ordering of SEROT in the city of Riobamba, and finally, propose application that allows to visualize the information generated by the proposal of vehicular ordering.

The justification of this work is demonstrated, from the convenience of SEROT and reproducible in other Ecuadorian cities.

It demonstrates the social, economic, environmental relevance, the reduction of car gas emissions in searches for parking places, the reduction of paper consumption in current tickets, replaced by the computer application installed on each mobile.

It is concluded that there is an effective contribution to knowledge from technical and scientifically based proposals when designing, implementing and demonstrating the proposal for vehicle reorganization of SEROT, from GIS and use of ICTs. The actors benefited are the citizen with cars and pedestrians, the public administration, the environment, and society as a whole.

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