Artículos científicos

La administración del transporte urbano: alternativa de uso sustentada en la educación sostenible

Management of Urban Transportation: Alternative of Use Based on Sustainable Education

A gestão do transporte urbano: alternativa de uso apoiada na educação sustentável

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Resumen

El objetivo de este trabajo fue determinar los motivos de la movilidad o desplazamiento de habitantes de la Ciudad de México y especificar el propósito del viaje y el tipo de transporte utilizado, así como observar de manera directa el involucramiento de la mujer en todo ello. Asimismo, con la información anterior, diseñar una propuesta de administración del transporte público y la movilidad de los usuarios para optimizar sus tiempos y movimientos. Para lo anterior, se tomaron datos de la *Encuesta Origen Destino en Hogares de la Zona Metropolitana del Valle de México (EOD) 2017* del Instituto Nacional de Estadística y Geografía [Inegi] (2017). La muestra fue de 160 095 personas. Se realizó la prueba del coeficiente de Pearson para determinar el grado de correlación entre las variables relacionadas con la movilidad. Los resultados reflejaron lo siguiente: el género (0.8865) se relaciona con el propósito de ir al hogar (0.9200), ir al trabajo (0.8967), al lugar de estudio (0.9971), para ir de compras (0.7898), al lugar de convivencia (0.9528), para llevar a alguien a un destino (0.7282), para realizar trámites (0.9808), para acudir a un recinto de salud (0.8944) y para acudir a un lugar religioso (0.8115). Se concluye que la correlación más alta es en el desplazamiento para ir a estudiar; enseguida, para acudir a lugares de convivencia, y un tercer motivo, dirigirse al hogar. Finalmente, se propone considerar la formación humana e incidir de manera directa desde la educación para formar agentes de transformación y lograr una administración eficiente del transporte público.

Palabras clave: gestión, motivos de desplazamientos, movilidad urbana, servicios de movilidad, sustentabilidad.

Abstract

The objective of this work was to determine the reasons for the mobility or displacement of the inhabitants of Mexico City and to specify the purpose of the trip and the type of transport used, as well as to directly observe the involvement of women in all this. Likewise, with the above information, design a proposal for the administration of public transport and the mobility of users to optimize their times and movements. For the above, data were taken from the *Encuesta Origen Destino en Hogares de la Zona Metropolitana del Valle de México (EOD) 2017* of the Instituto Nacional de Estadística y Geografía [Inegi] (2017). The sample was 160 095 people. The Pearson coefficient test was performed to determine the degree of

correlation between the variables related to mobility. The results reflected the following: gender (0.8865) is related to the purpose of going home (0.9200), going to work (0.8967), to the place of study (0.9971), to going shopping (0.7898), to the place of coexistence (0.9528), to take someone to a destination (0.7282), to carry out procedures (0.9808), to go to a health facility (0.8944) and to go to a religious place (0.8115). It is concluded that the highest correlation is in the displacement to go to study; immediately, to go to places of coexistence, and a third reason, to go home. Finally, it is proposed to consider human training and have a direct impact from education to train agents of transformation and achieve an efficient administration of public transport.

Keywords: management, reasons for travel, urban mobility, mobility services, sustainability.

Resumo

O objetivo deste trabalho foi determinar os motivos da mobilidade ou deslocamento dos habitantes da Cidade do México e especificar a finalidade da viagem e o tipo de transporte utilizado, bem como observar diretamente o envolvimento das mulheres em tudo isso. Da mesma forma, com as informações acima, elabore uma proposta de gestão do transporte público e da mobilidade dos usuários para otimizar seus tempos e deslocamentos. Para o exposto, os dados foram retirados da Pesquisa Origem Destino em Residências da Área Metropolitana do Vale do México (EOD) 2017 do Instituto Nacional de Estatística e Geografia [Inegi] (2017). A amostra foi de 160.095 pessoas. O teste do coeficiente de Pearson foi realizado para determinar o grau de correlação entre as variáveis relacionadas à mobilidade. Os resultados refletiram o seguinte: gênero (0,8865) está relacionado com a finalidade de ir para casa (0,9200), ir para o trabalho (0,8967), para o local de estudo (0,9971), para ir às compras (0,7898), para o local de convivência (0,9528), levar alguém a um destino (0,7282), realizar procedimentos (0,9808), ir a uma unidade de saúde (0,8944) e ir a um local religioso (0,8115). Conclui-se que a maior correlação está no deslocamento para ir estudar; imediatamente, para ir a lugares de convivência, e um terceiro motivo, ir para casa. Por fim, propõe-se considerar a formação humana e ter um impacto direto da educação para formar agentes de transformação e conseguir uma gestão eficiente do transporte público.

Palavras-chave: gestão, motivos de viagem, mobilidade urbana, serviços de mobilidade, sustentabilidade.

Introduction

For the United Nations Educational, Scientific and Cultural Organization (UNESCO) (Leicht, Heiss and Byun, 2018), education is a universal priority. It is a basic human right that facilitates the construction of a stage of peace, promotes sustainable development and responds to current challenges with a focus on gender equality.

In the National Development Plan 2018-2024, in its objective 3.6, it proposes to develop, in a transparent way, an accessible, safe, efficient, sustainable, inclusive and modern communication and transport network, with a vision of regional development and logistics networks that connects all people, facilitates the transfer of goods and services and contributes to safeguarding national security, according to the Center for Public Finance Studies [CEFP] (2019). Specifically, as a specific strategy, it indicates having a safe and efficient road network that connects population centers while preserving their heritage value (CEFP, 2019).

For the design of an assertive proposal, it is necessary to take the current regulations as a reference. In this case, the Mobility Law of Mexico City, in its article LV, defines mobility as follows:

> Set of movements of people and goods that are carried out through various modes of transport, which are carried out so that society can satisfy its needs and access the opportunities for work, education, health, recreation and others that the City offers (H. Congreso de la Ciudad de México I Legislatura, 23 de abril de 2020, p. 6).

Kaufmann and Widmer (2006) consider that the concept of motility is an excellent basis for analyzing people's motivations, the decision-making process and the constraints that dominate the use of space. Motility is defined as the way in which an individual or a group of people takes possession of the realm of mobility possibilities and makes use of them. Thus, urban mobility is also linked to the ability or potential to move within a locality. Although social and technological advances are continuously modifying said mobility possibilities of people, it is essential to move from one place to another to access different services, some basic, such as health and education, and others not so essential but also necessary, such as leisure (Montouto and Yustos, 2010).

The mobility and movement of human beings is a natural condition to see various needs satisfied. Mobility is a social action or practice of displacement in the territory. It is a concept that is not limited to transportation and contains a way of interpreting the act of displacement (Gutiérrez, 2012).

Another important concept for the purposes of this work is sustainable mobility. The set of actions aimed at achieving the rational use of means of transport by citizens could thus be defined. For this, it is necessary to achieve more livable and healthy spaces and to be able to move towards a social model where the community, people and their environment dominate daily mobility and its impact; Quality urban and interurban spaces, with conditions of accessibility and optimization of time, that have a positive impact on the social, work or personal environment (Montouto and Yustos, 2010).

The main aim of this research was to identify the main purposes of the trips made by the inhabitants of the metropolitan area of the Valley of Mexico (ZMVM) and the type of transport used. In other words, analyze the mobility or displacement of the individual and specify the purpose of the trip, the type of transport used and directly observe the involvement of women in all of this, with a view to designing an effective administration and planning proposal for transport. audience capable of optimizing times and movements. In short, to propose an alternative solution to the saturation of transport, mainly public transport.

The starting point is the following research question: will the identification of the purposes of the trips made by individuals in daily urban mobility in the ZMVM, the analysis of these motives and their correlation with gender, facilitate the process of transport administration?

A null hypothesis was proposed that indicates that there is no correlation of the reasons for displacement with the daily urban mobility of the citizens of the ZMVM.

The analysis method is presented below. Immediately afterwards, the results are shown and related to the theoretical foundations. Later, a planning proposal is outlined. And finally, the conclusions are reached.

Urban mobility and its main reasons

Urban mobility

According to the Royal Spanish Academy [RAE] (2020), mobility is the quality, ability or possibility of moving or moving around. Taking into account the above, urban mobility could be considered as the ability to move or move within an urban space. Regarding smart urban mobility, it is that affordable, effective, attractive and sustainable connectivity between towns and cities that links the smart and the sustainable (Lyons, 2018).

One of the consequences of urban growth has been a greater human displacement to be able to carry out activities considered necessary to survive. However, we must not lose sight of the fact that the individual characteristics of people are closely related to their ability to move. And that the infrastructure and the adequacy of transport are not enough to speak of more mobile individuals; other factors have to be considered (Aparicio, 2018).

Mobility by gender

It is very important to know the reasons that generate the daily movements of women because sometimes mobility strategies manifest gender inequalities (Riquelme, 2016).

Women's movements around the city are not uniform. The heterogeneity of mobility is a function of the immediate environment, the life experience and the link with the services offered (Riquelme, 2016). It is necessary to highlight that gender mobility inequalities in the ZMVM are more accentuated in contrast to those detected in Europe (Pérez y Capron, 2018).

Mobility to go home

The location of the residence is very important in deciding the mobility planning. Wherever territorial socialization takes place, there is a relationship with social mobility because it is where families live and is associated with lifestyles, which constitutes a differentiating element between people to decide how to move, how much budget to allocate and time suitable; that is, the necessary and varied resources to carry out the required displacement.

Mobility is a key condition of access to the labor market, to a home, to education, to culture and leisure, to the family (Boniolo and Estévez, 2017). The right to work, to have a home, to receive training implies the right to mobility. In a sense, this right to mobility is a precondition for other rights.

Mobility to go to work

The daily mobility of the population is generated and motivated by various purposes: work, study, consume, live together, to name a few (Galindo, Pérez and Suárez, 2020). A direct effect of the increase in the number of jobs in central Mexico, specifically in the ZMVM, was the redirection of daily mobility (labor flows) (Galindo *et al*., 2020).

Mobility to go to the place of study

A study carried out in Spain shows and highlights the importance of educating for sustainability. Thus, considering the social and administrative context, mobility has acquired a growing role that directly involves members of society as agents of change. Moving to the educational area occupies a very considerable place (Montouto y Yustos, 2010).

Mobility to places to shop

In a study carried out in five provinces of Spain, it was found that commuting to work directly influences the rest of the reasons for their mobility; going to spaces to make purchases was ranked third (Montouto y Yustos, 2010).

Mobility to take others

Women as generators of life are more dedicated than men to childcare activities and also, in Latin America, to the elderly (Pérez and Capron, 2018). This implies that, in general, they are the ones who carry out the activities to accompany the children to school and to their regular activities (Pérez y Caprón, 2018).

Mobility to go to a religious site

The displacement to go to religious sites usually occurs in a more crowded way on weekends. It is a sociocultural custom and of course a family one; despite everything, it is a destination hardly mentioned by those surveyed.

Mobility to go to a place to attend to health

In a study carried out in the city of La Plata, travel for health reasons corresponds to one of the three main reasons for mobility, along with travel for work and study (Aón, López, Freaza, Cola y Giglio, 2017).

Alternatives for the use of transport and its link with sustainable education

Education for sustainable development fosters changes, skills, values and attitudes to enable a more sustainable and just society for all, and aims to empower and equip current and future generations to meet their needs using a balanced and integrated approach: takes into account the economic, social and environmental dimensions of sustainable development (Leicht et al., 2018).

Urban mobility is also a primary need of individuals that requires immediate and priority attention, and it must be so in such a way that the effort required by human displacements to access goods and services does not have a negative impact on the quality of life, in obtaining economic, cultural, educational development, among other aspects necessary for individuals. Likewise, it must be recognized as a fundamental right, guaranteed under equal conditions to the entire population, without differentiating by economic level, physical or mental condition, gender, age or any other cause (Montouto and Yustos, 2010).

Another important aspect to consider regarding the fundamental services of the current socioeconomic model is transportation. One of the current contributions is the use of information and communication technologies (ICT), as well as technological innovation, to facilitate the management of material and human resources (expressed in motorized modes of transport), adding smart investment of public financial resources in transportation infrastructure (Montouto y Yustos, 2010).

The information provided by ICT is important. There are studies, such as the one carried out in Beijing (Long and Thill, 2015), that combine the information obtained in travel surveys with that obtained from smart cards used in transportation systems. With the help of land use maps and geographic information systems (GIS), they identify the patterns of pendulum travel routes, the forms of "compulsory" mobility that occur between home and the place of study or work (Gouëset, Demoraes , Le Roux, Figueroa and Zioni, 2015). Similar work has been carried out in Seoul, Korea (Kim, Kim, and Sohn, 2018) and in Shenzhen, China (Tang, Wang, Zong, and Hu, 2020).

In this research, it is proposed that an enterprise resource planning system (ERP) be included as a management system that facilitates the management of transport route control. An avant-garde example is the one currently used by the Basque Country. Thanks to an ERP for transport, the risk has been reduced in the operations of regular urban passenger transport companies (TURP) (Grupo IGN, 2020).

Effective urban transport management

In Mexico City there is a public transport system proposed since 2015, which was carried out to control the concessioned public transport service. For this program, a diagnosis, a management model, a cost analysis were carried out, and various implementation scenarios were even considered. At that time, the public transport situation registers the following figures: 56% minibuses, 8.84% metrobus, 1.49% trolleybus, 4.92% taxis, 24.35% Collective Transport System-Metro (STCM) and the mexibus 4.21%. The implementation proposal was given by delegation, today mayors, through the punctual administration of modal transfer centers (Cetram), by leadership, specifying route 100 modules and by metro lines, according to CTS Embarq México (2015)

Undoubtedly, one of the main tasks of the CDMX government is to promote the use of public transport in terms of efficiency and effectiveness, and that it does not have a negative impact on the environment. In a study carried out in 2018 to identify the areas of opportunity they have and to improve the service and encourage its use, users stated that the transports analyzed (metro, minibus and metrobús) do not meet their expectations of quality, personalization and reliability (Paredes and Palmer, 2018).

It is paradoxical that there are current regulations, avant-garde studies and proposals, but it is still an insufficient, ineffective and, of course, inefficient system.

Methods and materials

First, we proceeded with a quantitative approach and deductive process. The research was exploratory, descriptive and correlational (Hernández, Fernández & Baptista, 2014). In order to know the daily spatial mobility, the direction of the flows and the mode of transport divided by gender of the ZMVM, the Survey Origin Destination in Households of the Metropolitan Area of the Valley of Mexico (EOD) 2017 of the National Institute was taken as a direct source of Statistics and Geography [Inegi] (2017). Both the population and the sample were defined by Inegi Unam. For this study, data were only taken from the population that carried out mobility in a first section, considering 160,095 people. Mobility was considered as a dependent variable and the following as independent variables: gender, home, work, place of study, place of coexistence, taking someone, other means, car, does not know, other reason, going to a religious place, going to place of health and to carry out procedures (figure 1). Table 1 describes the variables used in the model.

Figura 1. Variables de estudio del modelo
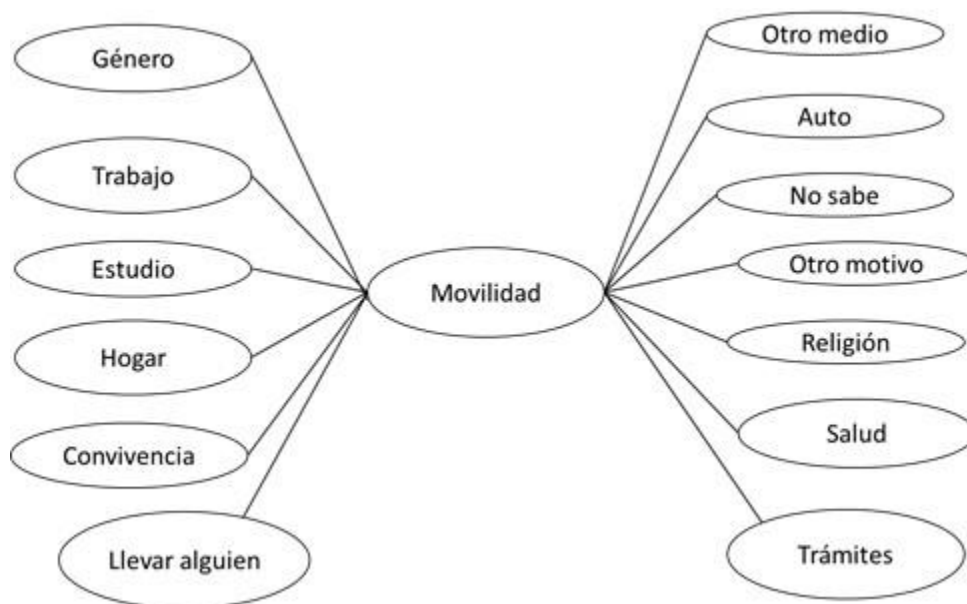
Fuente: Elaboración propia

Model

Taking as a reference the variables considered and linked to mobility as the purpose of the trip made by the users, the Pearson correlational analysis was carried out, using the gretl software version 2016c.

The model was established considering the multiple correlation coefficients and using observations from one to three with a critical value of 5% (two-tailed), that is, equal to 0.9969 for n = 3. If r = 0 there is no correlation, if r = 1 there is a positive correlation. Similarly, the following formula was followed:

$$rXY = \frac{\Sigma XY - \frac{\Sigma X \Sigma Y}{n}}{\sqrt{\left(\Sigma x^2 - \left(\frac{\Sigma X}{n}\right)^2\right)} \sqrt{\left(\Sigma y^2 - \left(\frac{\Sigma y}{n}\right)^2\right)}}$$

Tabla 1. Variables de estudio de movilidad

Variable	Descripción	Tipo de variable
Movilidad	Propósito del viaje-considerado el motivo de la movilidad o desplazamiento hacia el lugar de destino.	Dependiente: es el motivo para conocer el propósito del desplazamiento del individuo.
Género	En este caso se refiere a los usuarios hombres y mujeres que realizaron viajes por diferentes propósitos (variable cualitativa-dicotómica).	Independiente: se relaciona con la movilidad para determinarla por tipo de persona que se desplaza (hombre-mujer).
Hogar	Número de usuarios que su destino fue llegar a su domicilio (variable cuantitativa discreta).	Independientes: determinantes para proponer la administración de los movimientos o recorridos necesarios del usuario y optimizar tiempos y movimientos.
Trabajo	Número de usuarios que su destino fue llegar a su lugar de trabajo (variable cuantitativa discreta).	
Estudio	Número de usuarios que su destino fue llegar a su lugar de estudio (variable cuantitativa discreta).	
Compras	Número de usuarios que su destino fue llegar a un lugar para realizar compras (variable cuantitativa discreta).	
Convivencia	Número de usuarios que su destino fue llegar a un lugar de recreación (variable cuantitativa discreta).	
Llevar a alguien	Número de usuarios cuyo motivo de viaje fue para llevar a alguien a un lugar determinado (variable cuantitativa discreta).	
Trámites	Número de usuarios cuyo motivo de viaje fue para realizar un trámite (variable cuantitativa discreta).	
Salud	Número de usuarios cuyo motivo de viaje fue para buscar atención médica (variable cuantitativa discreta).	
Religión	Número de usuarios cuyo motivo de viaje fue acudir a un lugar religioso (variable cuantitativa discreta).	
Otro	Número de usuarios cuyo motivo de viaje fue otro diferente a los señalados con antelación (variable cuantitativa discreta).	
No sabe	Número de usuarios cuyo motivo de viaje no fue especificado.	
Auto	Número de usuarios que utilizaron su vehículo para transportarse (variable cualitativa discreta).	
Otro medio	Número de usuarios que utilizaron medios diferentes al auto para transportarse (variable cualitativa discreta).	

Fuente: Elaboración propia con base en Inegi (2017)

Instrument

A questionnaire made up of six sections was applied: 1) Residents and households, 2) Available vehicles, 3) Sociodemographic characteristics (in this case only gender was considered), 4) Identification of the people who traveled, 5) Trips made during the week (In this case, mobility was only considered in the first section of your journey once your trip started) and 6) Trips made on Saturday (not considered).

The recruitment method was through two interviews:

1) Informant aged 15 years or over, from whom housing and sociodemographic information was obtained. Two travel cards were issued to each member age six and older.

2) Identification of travelers; Each person aged six years and over was interviewed individually; With the support of the travel cards, the questions in the remaining sections of the questionnaire were answered.

Dependent variable

- Mobility of people.

Independent variables

- Type of vehicles used.
- Gender of the actors.
- Purpose of the trip.

Results

Regarding Pearson's correlational analysis, using gretl software version 2016c, the result obtained is shown in Table 2.

Tabla 2. Resultados obtenidos a partir del análisis correlacional de Pearson

| Género	Hogar	Trabajo	Estudio	Compras	
1.0000	0.6342	0.5901	0.8486	0.9840	Género
	1.0000	0.9984	0.9472	0.4862	Hogar
		1.0000	0.9279	0.4367	Trabajo
			1.0000	0.7406	Estudio
				1.0000	Compras
Convivencia	Llevar alguien	Trámites	Salud	Religión	
0.9851	0.9627	0.9598	0.9998	0.9898	Género
0.7576	0.4013	0.8258	0.6475	0.5175	Hogar
0.7201	0.3496	0.7931	0.6040	0.4690	Trabajo
0.9269	0.6738	0.9630	0.8576	0.7645	Estudio
0.9387	0.9955	0.8943	0.9807	0.9993	Compras
1.0000	0.9019	0.9937	0.9880	0.9506	Convivencia
	1.0000	0.8480	0.9579	0.9914	Llevar alguien
		1.0000	0.9645	0.9099	Trámites
			1.0000	0.9872	Salud
				1.0000	Religión
Otro	No sabe	Total lugar	Auto	Otro medio	
0.8651	0.7440	0.8865	0.6961	0.9186	Género
0.9365	0.9885	0.9200	0.9966	0.8881	Hogar
0.9155	0.9785	0.8967	0.9904	0.8611	Trabajo
0.9995	0.9849	0.9971	0.9705	0.9886	Estudio
0.7618	0.6130	0.7898	0.5570	0.8334	Compras
0.9384	0.8478	0.9528	0.8091	0.9729	Convivencia
0.6971	0.5355	0.7282	0.4759	0.7774	Llevar alguien
0.9711	0.9017	0.9808	0.8697	0.9926	Trámites
0.8737	0.7555	0.8944	0.7085	0.9253	Salud
0.7848	0.6412	0.8115	0.5867	0.8529	Religión
1.0000	0.9788	0.9990	0.9623	0.9929	Otro

	1.0000	0.9687	0.9976	0.9475	No sabe
		1.0000	0.9493	0.9972	Total lugar
			1.0000	0.9232	Auto
				1.0000	Otro medio
				Total medio	
				0.8865	Género
				0.9200	Hogar
				0.8967	Trabajo
				0.9971	Estudio
				0.7898	Compras
				0.9528	Convivencia
				0.7282	Llevar alguien
				0.9808	Trámites
				0.8944	Salud
				0.8115	Religión
				0.9990	Otro
				0.9687	No sabe
				1.0000	Total lugar
				0.9493	Auto
				0.9972	Otro medio
				1.0000	Total medio
Coeficientes de correlación usando las observaciones 1-3					
Valor crítico a 5 % (a dos colas) = 0.9969 para $n = 3$					

Fuente: Elaboración propia

Something very important that must be taken into account is the size of the sample when you want to appreciate the determination of the coefficient in unit and percentage terms, since this last value is very important, because the interpretation of the correlation between two variables It is done by means of the coefficient of determination as the common variance of both. The larger the sample, it will be enough for the variables to have a minimum percentage in common for there to be a statistically significant relationship, however, it could be that from a practical point of view this percentage is not very relevant, since it would imply having a high percentage of non-shared variability.

Figure 2 shows the results of mobility by purpose of the trip and it is perceived that work is the one that occupies the first place, it is followed by study and then shopping.
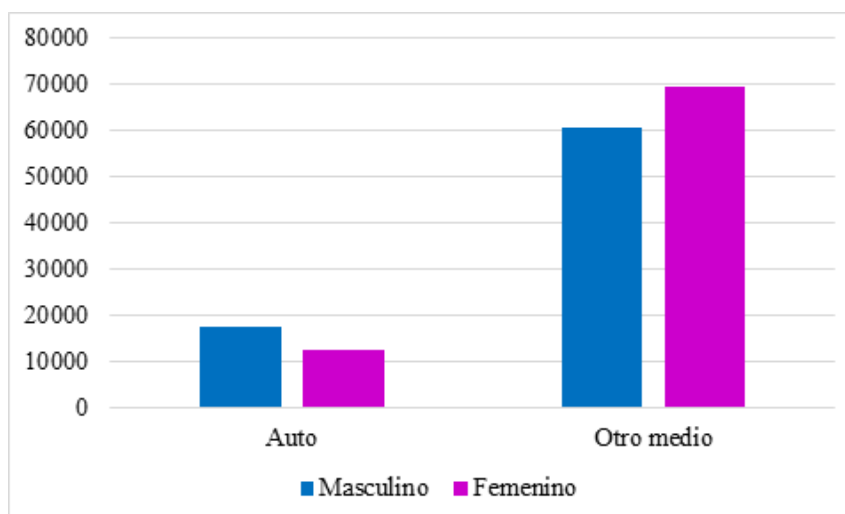
Figura 2. Movilidad por propósito de viaje por género
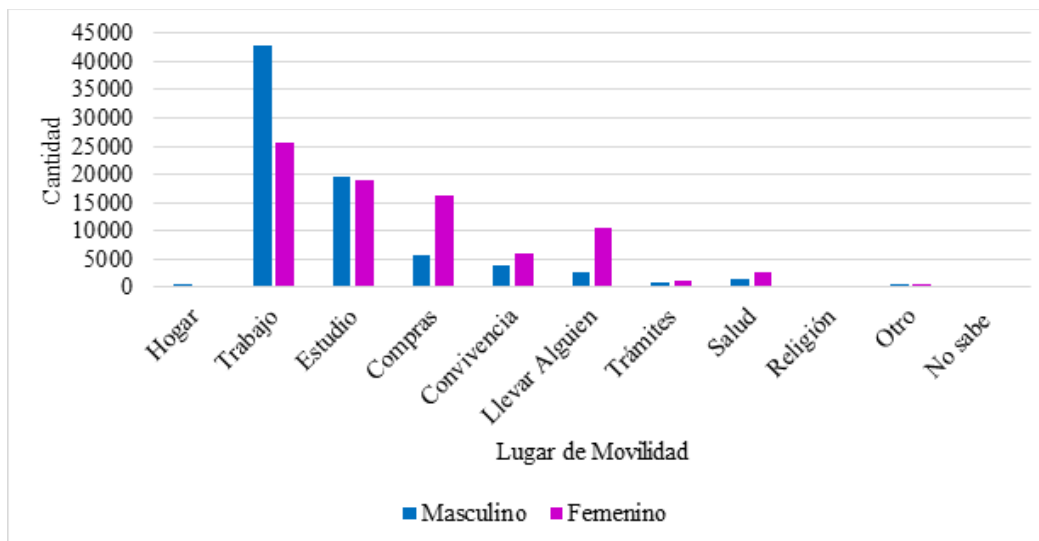
Fuente: Elaboración propia con base en Inegi (2017)

Figure 3 shows mobility by type of transport, and it is shown that most of the population does it by means other than the car.

Figura 3. Movilidad por tipo de transporte

Fuente: Elaboración propia con base en Inegi (2017)

Table 3 shows the interpretation of the correlation of the study variables, which show a different behavior in terms of descriptive presentation, as shown in figures 2 and 3.

Tabla 3. Correlación de Pearson de variables de movilidad

Variable	Por lugar de movilidad	Por medio de movilidad
Género	0.8865	0.8865
Hogar	0.9200	0.9200
Trabajo	0.8967	0.8967
Estudio	0.9971	0.9971
Compras	0.7898	0.7898
Convivencia	0.9528	0.9528
Llevar alguien	0.7282	0.7282
Trámites	0.9808	0.9808
Salud	0.8944	0.8944
Religión	0.8115	0.8115
Otro	0.9990	0.9990
No sabe	0.9687	0.9687
Total lugar	1.0000	1.0000
Auto		0.9493
Otro medio		0.9972
		1.0000

Fuente: Elaboración propia con base en Inegi (2017)

A Pearson coefficient analysis was performed to measure the degree of correlation between the variables in relation to mobility. The results reflected the following: gender (0.8865) in relation to the purpose of going home (0.9200), going to work (0.8967), to the place of study (0.9971), to shopping (0.7898), to the place of coexistence (0.9528), to take someone to a destination (0.7282), to carry out procedures (0.9808), to go to a health facility (0.8944) and to go to a religious place (0.8115).

It is concluded that the highest correlation is in the travel required to go to the study site; then, to go to places of coexistence, and the third reason, to go home. Visualizing the statistical behavior descriptively, it is the work that occupies the first place, follows the study and in third position goes shopping. Therefore, the use of public transport as a direct means of individual mobility must be managed in an effective way to improve conditions.

The female performance is very active; In the purpose of travel, it is present first in going to work, study place and shopping. As for the means used to move, it far exceeds the use of a means other than the private car. In the result, there is agreement in the two analyzes, the descriptive one and the Pearson coefficient, when using another means of transport different from the private car (0.9972). Thus, visualizing the very representative participation of women, it is proposed to consider human formation, to directly influence education as an agent of transformation towards direct respect for others, as well as efficient administration towards effective public transport.

The results of this research coincide with those of other similar studies where the guiding pattern is work and education and the displacement for various purchases are positioned next to this.

Based on the results, an administration design is proposed considering two active elements or agents, the public administrator and the service user. It starts from co-responsibility in the process seen from a systemic approach (see table 4 and figure 4).

Proposal

For this case, it is suggested, once having the specific statistics of daily population mobility and through strategic planning, select and propose efficiently and effectively the use of transport, specifically public transport. It is suggested that with the use of an ERP system (for its acronym in English, Enterprise Resource Planning) and the use of digital cards or some app makes the systemic process more efficient, with the co-responsible involvement of the service administrator and the user.

Next, in table 4 and figure 4, the form of the proposed process is briefly described, taking as a reference the diagnosis and the results obtained from the data analysis and considering the different participants and their roles.
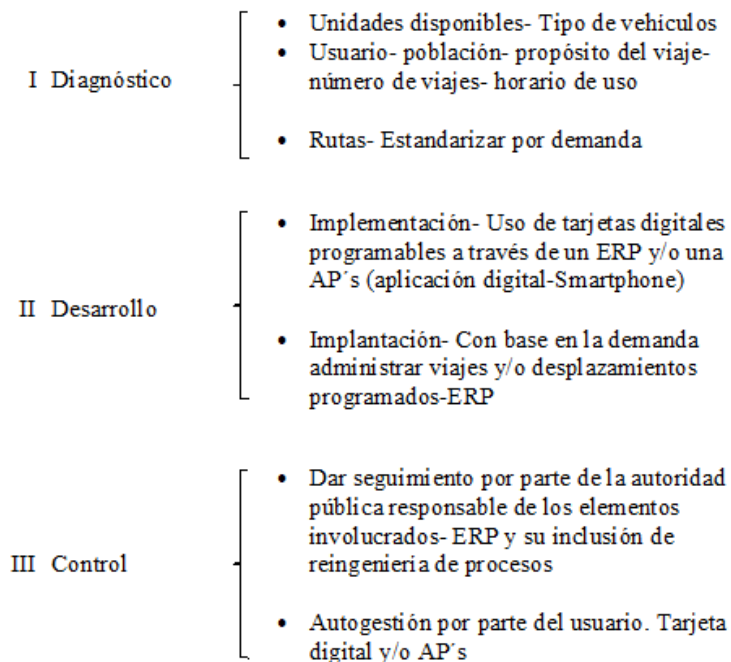
Tabla 4. Propuesta de administración corresponsable

Actores	Definición	Elementos-acciones
Administración de la autoridad	Proceso específico y oficial realizado por personal competente que represente a la autoridad pública oficial.	• Diagnóstico • Cadena de valor-privilegiando al sujeto-usuario • ERP. Con su respectiva reingeniería de procesos
Administración del Usuario	Proceso de autogestión de la persona para definir por prioridades su movilidad.	• Autogestión administrativa • Uso de ERP, como usuario-sugerido • Beneficios: uso de tarjetas digitales o *apps* (*smartphone*)

Fuente: Elaboración propia

Figura 4. Proceso de administración-corresponsable

Proceso administrador

I Diagnóstico
- Unidades disponibles- Tipo de vehiculos
- Usuario- población- propósito del viaje- número de viajes- horario de uso
- Rutas- Estandarizar por demanda

II Desarrollo
- Implementación- Uso de tarjetas digitales programables a través de un ERP y/o una AP´s (aplicación digital-Smartphone)
- Implantación- Con base en la demanda administrar viajes y/o desplazamientos programados-ERP

III Control
- Dar seguimiento por parte de la autoridad pública responsable de los elementos involucrados- ERP y su inclusión de reingeniería de procesos
- Autogestión por parte del usuario. Tarjeta digital y/o AP´s

Fuente: Elaboración propia

Discussion

Mobility, a pressing need of the individual in the face of the growth of cities that have exceeded their limits, requires a very specific administrative process. To do this, it is necessary to know the main reasons why people need or want to travel on a daily basis.

In Switzerland, for example, the trips that people make are marked by structural specificities linked to the labor market, institutional specificities associated with a federalist state and a specific context. The high spatial mobility related to work in the population aged 25 to 54 years (11%) stands out. The rate varies and amounts to 13% with partial occupancy and 15% with full-time occupancy. This last proportion is mainly due to the fact that the majority of the population working part-time is women (84%), since they must combine work and family (Viry, Kaufmann and Widmer, 2009). This last condition can be linked to the data obtained in this research: women actively participate in family mobility.

In general, individuals have the opportunity to choose between a wide range of modes of travel and an extensive transportation system, however, variables such as age, gender,

income level, or physical and intellectual abilities influence the moment. to move from one point to another (Montouto and Yustos, 2010). Mobility and poor collective transport affect social exclusion (García, 2014). It is worth mentioning that in a study carried out in Spain, transfers to work in private vehicles represented 40% of total mobility on a working day (Cremades and Gómez, 2019). This situation is also reflected in this work.

The most worrying thing here has been the planning of transport as an infrastructure unrelated to the growth of cities and the lack of improvement in supply in the low-density peripheries. It is worth highlighting the fact that users constantly complain about waiting times to take transport (19.63%) and, something closely related to the above, of the infrequency of public transport (17.47%) (Aón et al. , 2017). In this regard, García (2014) mentions that the reduction of this factor, the waiting time, can achieve that the travel times in public transport approach those of the private car and encourages the use of mass transport.

Conclusions

Mobility as a natural need of the human being is manifested in the routine movements that we carry out on a daily basis to satisfy our needs: reasons for work, school, health, recreation, among others.

The resulting data coincide with the information contained in similar studies, where the guiding axis is work as a primary need, and displacement for educational reasons continues and later mobility due to various purchases.

The proposed objective was fully achieved by identifying the main reasons for the daily mobility of individuals in a specific area, the causes of displacements based on the purposes for which their trips generate, and the precision of the type of transport used. A very important aspect was to point out and recognize the involvement of women in these actions and to highlight the remarkable role that they play in the axiological part, and thus be able to identify co-responsibility from the administrative process (self-management), behavior and respect for others, the care of the services and of course the impact that this has on our environment.

Another core aspect was being able to consider daily mobility (motives) to design a proposal for the administration of public transport that positively impacts the dynamics of users to optimize the times and movements of the community. This gave a guideline so that, based on the statistical analysis, the rejection of the null hypothesis could be emphasized and

the alternative hypothesis accepted, it was already confirmed that there is a correlation of the reasons for daily displacement with mobility.

It is considered pertinent to be very clear about the reasons that cause daily displacements, as well as their frequency; all this to have an objective and punctual diagnosis of the daily mobility of the population, to manage transport and of course emphasize the public.

For this case, it is suggested that, once having the specific statistics of daily population mobility and through strategic planning, select and propose efficiently and effectively the use of transport and specifically public transport. In this sense, the use of an ERP system, combined with the use of digital cards or apps, can be key to an effective systemic process, with the co-responsible involvement of the service administrator and the user.

Future lines of research

One of the main limitations was that the analysis only considered the trip of a first section; It would be convenient to do it considering greater distances or complete trips.

It is also pertinent to work on the administrative aspect of transport in the face of the pandemic, since the part of conscience of the users must be actuated in a volitional way.

It is also highly recommended to link mobility with costs, prices for transport used, and in relation to the distances that you must travel in your journeys and with the time that this daily mobility entails.

A very important recommendation is to work specifically on the important role that women have in determining the reasons for traveling, in managing time and resources within the home, and their role as a worker outside the home. Also highlight the direct link in the communication and transmission of values towards the children.

An urgent aspect that must continue to work, also linked to gender, is the collective overcrowding due to the pandemic. In this regard, the International Labor Organization (ILO) mentions that in regular times the work of women in the home was three times greater than that of men. In the context of the COVID-19 pandemic, the condition of women has worsened to such an extent that she has had to assume multiple simultaneous responsibilities (Comisión Económica para América Latina y el Caribe [Cepal]-Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [Unesco], 2020).

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