

Logistics in the Field of Motor Carriers with a Focus on the Theory of the Firm Case Study: Transportes Cara

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Abstract: - The aim of this paper is to analyze the strategic decision focus on the theory of the firm. The problem tractate is transport logistics, which for a family SME, is a work technique difficult to accept by employees, trying to answer how do the owners act to problems related routines? And if, is the use of logistics in the transportation sector provides maximizing company profits, based on the theory of the firm? Using descriptive and explanatory method, the main problems that an SME of trucking faces every day and it concludes with recommendations for changes that must be performed for his growth, focused on a restructuring of management since the use of logistics represents an additional annual profit of \$361,341.60 Mexican pesos for Transportes CARA.

Keywords: Transportation analysis, corporate culture, firm theory.

JEL: O18, M14

Resumen:- El objetivo de este trabajo es analizar la toma de decisiones estratégicas enfocándonos en la teoría de la firma. El problema tratado es la logística de transportes, la cual para una Pyme familiar, es una técnica de trabajo difícil de aceptar por los empleados, tratando de responder ¿Cómo actúan los dueños ante los problemas relacionados con las rutinas? Y si ¿La utilización de la logística en el sector de autotransportes de carga, proporciona la maximización de beneficios de la empresa, con base en la teoría de la firma? Haciendo uso del método descriptivo y explicativo, se discuten los principales problemas que una Pyme de autotransporte de carga afronta día con día y se concluye con las recomendaciones de los cambios que debe realizar para su crecimiento, enfocado a una restructuración de gestión ya que el uso de logística representa una ganancia anual extra de \$361,341.60 pesos M.N para Transportes CARA.

Palabras clave: Análisis de transporte, cultura corporativa, teoría de la firma.

I. INTRODUCTION

Logistics is all movement activities and storage, facilitating the flow of goods from the loading of the goods, until delivery of the same, as well as information flows that put the

merchandise in motion, with the purpose of providing adequate service levels to customers at minimal cost.

For the sector of trucking freight, trips made by the company and especially its optimization is very important, because with adequate logistics, it could maximize company profits and lower costs (Gonzalez Araya, 2012). This logistics is recognized by specialists, who create companies dedicated to logistics motor carrier, which charge a generous amount for their services. In small and medium enterprises (SME) sector, there is a cost problem, not knowing how to use the travel logistics so that each of the elements of the fleet is working and thus generating maximum benefits for business.

According to the National Institute of Statistics and Geography (INEGI), 87 percent of goods that move in the country, are by land transport, since the products of low value and high volume are moved to a large percentage by road, which provides an advantage for the sector load trucking. This shows that transport demand is high and although there is much competition, only this sector provides 6.3 percent of gross domestic product (GDP), ranking fifth in the seventy-three economic sectors in which indicator is broken down, promoting economic and social development of the nation, by generating 2 million direct jobs, with an annual income of 394.170 billion Mexican pesos, amount that year after year is on the rise (INEGI, 2015) sector.

According to Islas Rivera, Rivera Trujillo and Torres Vargas (2002), regularly, the service price is reciprocally related to the quantity demanded of travel. That is, at a lower price, most users will demand shuttle service offered. Mutually, an increased level of price of transport which is also called freight, reduce the number of users demanding the service, since there is a maximum payment level that each user is willing to make. In the case study, Transportes CARA has a set of companies with a fixed demand that regularly hire its services demand, although it is not possible to provide the service to all movements that are seeking the customers, so

the company will take the routes and trips safely the customers are requested to find a solution that allows us to optimize the logistics of the trips.

II. BACKGROUND

There are several problems associated with the sector motor carrier, factors that have caused huge losses and even closure of companies. Among them are the costs of delays burden on businesses, empty returns or low payment by businesses. Associated with these problems, there are the costs resulting from fines of weights and dimensions. When overburden transport and cause damage to roads (Moreno Quintero, 2004), the high cost of diesel fuel so that it can optimize consumption through aerodynamic design of the unit, (Velazquez de Leon Collins, 2008), low application of technology innovation, and high time it takes a trip. In the case of fuel efficiency is taken into account low productivity of staff, Islas Rivera (2000), transport logistics, (Salazar López, 2013) and finally the renewal of the vehicle fleet (Secretariat of Communications and Transportation (SCT) 2013).

Most problems cannot be fixed the company, but the government's development plans as indicated by the SCT (2013) in the 2013-2018 development plans. Therefore one of the main problems for SMEs transport, and the issue to be addressed in this study, is the selection of the trips that are to be made (logistics). So that will provide maximum utility to the owner. This problem is caused by empty returns or by selecting trips that will not have return. Normally the trips to be carried out in SMEs by transport agents, they are selected by chance, or simply opting for freight that at first glance are the most profitable.

The main objective of a business is to maximize profits. In the transport sector, this is achieved by meeting market demand with a comprehensive cost reduction, and this is where the problem occurs. Payment for transportation is a depending function on the chartered amount and time it takes to make the trip, although not considered any loss or damage that may arise. It can be also added the costs for the errors of the human factor, which can lead to large losses for the company.

The process of decision-making in the company, is a very important part of management, but has great influence the behavior of workers, either by motivation, attitude that they have, or simply the rationality of behavior human. Based on this information, it is realized the influence of the theory of the firm in business, especially when it comes to logistics in the transport sector because each aspect of the theory is considered in this problem.

III. RATIONALE

The importance of this work lies in the pursuit of profit maximization in business. Transportes CARA is a family SME, which has had a sustained growth that has allowed their

workers to perform tasks that should be shared among more employees. Its workforce is somewhat reduced. This is because the employees are not sufficiently trained to do their job or simply do not have the information that leads them to meet their goals, adding to, that scheduling travel is under the assumption of a problem in transport logistics.

It is imperative to locate trips that provide greater profitability, as the selection of these without any support, making almost random selection, creates a decrease in the profits of the company, which is reflected in increased costs. If achieved positive results, the company will have better control of trips made and will be maximizing their profits.

IV. RESEARCH QUESTION

Does the use of logistics in the field of cargo motor carrier provide maximizing company profits, based on the theory of the firm?

V. HYPOTHESIS

It aims to create a culture of strategic decision making, addressed to the benefit of the company by motivating workers through training that provide information flow, reducing as far as possible the uncertainty and risk.

VI. OBJECTIVES

The overall objective of this work is to find a solution to the problems of routines that generate costs to the company by coordinating activities in the organization, leading to achieve a reduction in transaction costs, allowing workers to adapt to new working methods. Also to formulate a model to optimize the logistics network travel company, which show that a change must be made.

VII. THEORETICAL AND EMPIRICAL REVIEW

This chapter provides a theoretical and empirical analysis of the leading exponents of the theory of the firm from the classics to the main exponents today and its application in the company Transportes CARA, reviewing its main influence on the problem of logistics applied in a family business. Based on this analysis may be determined the implications of the use of this theory in the company, and its reach could have if the relevant changes are made.

A. *The nature of the firm and the theory of the firm*

At the beginning of the theory of the firm, Coase (1937) makes an analysis on why firms exist and mentioned that the firm exists because of its ability to economize on certain costs of using the market. Therefore, the organization carrying out an economic activity, held within the company, as long as the costs of coordinating production within it are less than the costs that would be if it is purchased the input through market.

If it is not performed in this manner, an increase in uncertainty about prices that would have to close the wage

would be created, which would generate a lot of time and resources, hence the idea to Coase on costs derivative from transactions in the market, which were subsequently called transaction costs. Therefore, Coase argued that firms were born to economize the use of information, which would replace decision-making by consensus and would be governed by the hierarchical decision-making. Based on the information provided by Coase (1937), the search for lower costs of coordination to organize activities within the firm and transaction costs going through the market, indicate that the company seeks to obtain maximum information at a lower cost.

For a transport company having accurate information can give it great benefits when carrying out the logistics of travel, this may occur when you know that travel will occur in the future, but of course. This information is somewhat complex to obtain, as regularly businesses that hire the services of freight forwarding do not provide this information and report it at the last minute, or one day in advance, leaving little time to carry out an effective logistics. The most practical way to get the necessary information is through contracts, which would lead to the generation of transaction costs; same that can be reduced, but not eliminated.

B. The routines and transaction costs.

The ability of individuals and organizations to perform complex tasks, same as several years ago might not make today are viable. According to Nelson and Winter (2002) it is when it can be born the question how an organization can perform such complex activities and at the same time have limited rationality? From the evolutionary point of view, the key lies in the demands of the different situations that come to present.

Focusing this information in motor carrier freight logistics is a reality the logistics that is normally used with a mathematical method was quite complex to perform in ancient times, but thanks to advances and innovations in technology, this field can be addressed more easily, although there is still bounded rationality, this can be addressed by business owners in search of information.

Routines are what characterize the behavior of continuity in evolutionary theory according to Nelson and Winter (1982). They commented that firms behave in the future according to the routines that have been used in the past. Routines continue to be influenced by a large number of reasons, including the fact that people refuse to make a change. Although there are two reasons that are rational and meaningful, which are to store and access to knowledge; and that all the techniques under production are available today, regardless of whether they have been practiced or not. These routines that are embodied in the minds of the workers of a company should be modified, allowing employees who have experience in the area; they are motivated to learn to do their work in an efficient manner.

The fact of learning or relearning the routines of the organization generates costs, which can be raised. It is on this issue that people adhere to the prevailing routines. Although each organization has its routines that include ways of dealing with conflicts that arise, usually the conflict is more intense if the output of the routine causes anxiety. The challenge however, is the construction of a theoretical structure that is able to make effective use of that vision, exploiting this aspect of the continuity of behavior for purposes of explanation and prediction in specific cases.

Although the cost of relearning routines can be raised, it can be reduced transaction costs by not having to outsource other companies which have the logistics and also reduce company costs, and that investing in employee training will be an only cost, rather than performing ongoing costs.

C. Factors that generate transaction costs

According to Williamson (1979) factors that generate transaction costs are brought about mainly by opportunism, which generates selfish behavior in people, which seek personal interest for private advantage; and another factor is the limited rationality, which is a limitation of the human mind to solve problems that are presented as the information they receive can be deciphered in different ways by different people. These two factors, lead to transaction costs on businesses, as these behaviors that occur daily in business, is a matter that can hardly disappear, although get measures to eliminate them, at some point, will be presented.

When taking a decision on the company, it can become more complex than necessary, since it must ensure that these situations do not arise. Opportunism is an issue that is clearly presented in a transport company, because at the time to take a trip to its destination, whether the truck operator, as those who receive the merchandise, they can take advantage of the owners of the company transport who are not present, to underreport merchandise. This is just one example of the many that might present.

If we consider bounded rationality, this comes to harm the company since it was understood differently the delivery or load instructions either by the area of logistics, by the owners of the company, by the unit operator or directly by the company that requested the service cannot explain or released the information correctly.

VIII. USE OF LOGISTICS IN THE TRANSPORT SECTOR

According to Collins (2006), the transport sector is directly related to logistics, because the procedures performed to make the movements of goods, should lead planning that goes from the costs that generated the trip, the locating of the best route, driving times, places where the truck should stop, and so on. There are many issues that lead to create a logistics for a delivery charge. Usually, enterprises often hire specialized companies to schedule their travel logistics. For an SME motor carrier, this becomes complex, as companies often do

not inform in advance the journeys undertaken. That is why it is important to have a logistics area in the company, which allows companies to make adjustments to last moment.

On several occasions it has been shown that logistics provides increases in profits for the companies. But how to achieve those agents can change their old routines work to provide this gains? This resistance to change will only be diminished when this represents an evolution in the company, although this resistance is caused by mistakes made by companies in the past, once not been received timely, creating obstacles to its development. Resistance to change by employees cannot be generated by the change itself, but by the strategies used or the lack of them at the time of implementation.

A. Problematic logistics at Transportes CARA

Transportes CARA performs local travel in the state of Baja California. Its freight is directed to the municipalities of Tijuana, Tecate, Ensenada and San Luis Rio Colorado, which is located in Sonora, but colloquially for Mexicali carriers, San Luis is so close that they take it as a local trip.

The logistics of trips of the company has problems by failing to increase the profits. Usually its way of working is to take the price of freight, reduce its costs and get the profit per trip. Once the company gets it, it takes most trips that provide most profits and selected as the best option to load. This method is somewhat ambiguous, because although a trip to provide more useful, do not take into account the trips that could be made for not doing that. This is why it has requested a way to locate the trips that are due to performing and can increase the usefulness.

B. Detailed description of the problem

Table 3 details the revenues per trip made by the company and shows the information of kilometers that are traveled one way and return journeys. The company has a performance diesel fuel on one-way trips in flotilla 2 kilometers per liter (km / l) with box loaded, and returns a yield of 2.5 km / l with box loaded and 3 km / l with the empty box, with the current price of diesel \$ 13.77 pesos per liter by supplying fuel (Dagal, 2016). The difference in yields is because when the truck leaves Mexicali to any of the municipalities around, the truck will rise as the altitude of the city is just 8 meters above sea level, unlike its surroundings, which reach a height of up to 1278 meters above sea level according to Cuéntame INEGI (2016). Therefore, this causes extra fuel consumption.

Table 3 Destinations of trips made, returns and payments for travel.

Journeys	Payment per freight	Km to travel	Return	Payment per freight	Km to travel
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Mexicali – Tijuana	\$4,100	180 km	Tijuana – Mexicali	\$2,100	180 km
Mexicali – Mexicali	\$1,200	40 km	N/A	N/A	40 km
Mexicali – Ensenada	\$6,100	270 km	Ensenada – Mexicali	\$2,800	270 km
Mexicali - San Luis	\$2,100	80 km	San Luis – Mexicali	\$1,600	80 km

Source: Own elaboration from data provided by the company Transportes CARA.

In Tables 4 and 5 are broken down the costs generated by one way and return journeys respectively. The cost generated by the payment to drivers is fixed per trip, as well as the cost generated by the toll booths. The trucks have a satellite tracking unit which allows review and lock speed limit, so the trucks are tested to spend that amount on fuel efficiency.

According to company policy, if a truck exceeds that amount of fuel costs, it is deducted from the driver, which does not generate a cost to the company, so that the cost breakdowns remain constant, unless there is a change in the price of diesel or booths, which usually does not change.

Table 4 Costs generated by one-way trips.

One way trip	Cost of payment of driver	Cost of charged diesel	Cost of tollbooths
Mexicali – Tijuana	\$500	\$1,239.30	\$310
Mexicali – Mexicali	\$200	\$275.40	0
Mexicali – Ensenada	\$600	\$1,858.95	\$451
Mexicali - San Luis	\$300	\$550.80	\$53

Source: Own elaboration from data provided by the company Transportes CARA

Table 5 Costs generated when the return trip.

Return trip	Cost of payment driver	Cost if charged diésel	Cost of empty diésel	Cost of tollbooths
Tijuana – Mexicali	\$250	\$991.44	\$826.20	\$310
Mexicali – Mexicali	n/a	n/a	n/a	n/a
Ensenada – Mexicali	\$300	\$1,487.16	\$1,239.30	\$451
San Luis – Mexicali	\$150	\$440.64	\$367.20	\$53

Source: Own elaboration from data provided by Transportes CARA.

The company has 9 trucks and 13 boxes with a weekly requirement specified in Table 6. The one-way trips have greater demand than return trips. In fact, return trips are minimal compared to one-way trips. The company believes that it can take all or most trips with their respective return could reduce costs and increase revenues. On the other hand,

it has also come to consider that if fewer local trips are made this could also increase gains as local trips give them fewer profits than other freight.

Each one of the trucks with that the company accounts is limited to one trip per day to Tijuana and San Luis, 2 trips per day for 1 truck in Mexicali, and the trip to Ensenada lasts 2 days to go and come back, because the businesses put enough time to load and unload the boxes, which is a problem for the carrier, which is why it has extra boxes to leave the freight yard while the other trips are delivered, this mainly in Mexicali.

Table 6. Demand of journeys per week.

One way trip	Demand of journeys	Return trip	Demand of journeys
Mexicali – Tijuana	28	Tijuana – Mexicali	5
Mexicali – Mexicali	30	Mexicali – Mexicali	n/a
Mexicali – Ensenada	9	Ensenada – Mexicali	2
Mexicali – San Luis	4	San Luis – Mexicali	4

Source: Own elaboration from data provided by Transportes CARA.

IX. MATHEMATICAL MODEL FOR LOGISTICS

By studying mathematical models according Budnick (2007), concerning the optimal allocation of limited resources of activities carried out by the company, with the use of linear programming, used a F.O., which is defined by the benefits to the company for payment of freight, simplifying it so that we get the total revenue per trip, which is as shown in Table 1. It should be taken into account that each trip to San Luis Rio Colorado has return, this because the plant where the journey is discharged, is the same load as the return to Mexicali, since it must return the wooden pallets that were given, along with the pallets accumulated in the plant.

Table 1 Total income per trip.

One way trip	Income with one way trip	Round trip	Income with round trip
Mexicali – Tijuana	\$914.50	Tijuana – Mexicali	\$2,599.26
Mexicali – Mexicali	\$724.60	Mexicali – Mexicali	n/a
Mexicali – Ensenada	\$1,499.75	Ensenada – Mexicali	\$3,751.89
Mexicali – San Luis	\$776	San Luis – Mexicali	\$2,152.76

Source: Own elaboration with data provided by enterprise Transportes CARA.

Table 2 Comparison of results

Celda objetivo (Máx)		
Nombre	Valor original	Valor final
Pago por flete Max Utilidad	\$ 66,438.87	\$ 73,966.82

Celdas de variables		
Nombre	Valor original	Valor final
Viajes a realizar Tijuana sin Retorno	23	22
Viajes a realizar Tijuana con retorno	5	5
Viajes a realizar Mexicali local	8	30
Viajes a realizar Ensenada sin retorno	7	2
Viajes a realizar Ensenada con retorno	2	2
Viajes a realizar San Luis con retorno	4	4

Source: Own elaboration prepared by using Solver.

To explain Table 2, it should be taken into account that the column of original value is the amount of profits and made trips that the company has now. The column end value refers to optimizing the use of linear programming (LP). With the information obtained, it can be observed a change in the results currently obtained by the company and the results shown by the mathematical model.

The data displayed here is not real; it is only used as an example to how the structure and the dynamics of the problem in this specific case.

Table 2 shows the changes that must be made in trips, checking that the method used by the company today fail to give its freight optimization, especially considering that the trips to the naked eye are considered most profitable were the most were reduced, since taking 7 trips to Ensenada, it was decreased to 2, thus increasing local trips, which they were considered of minor benefits given to the company, taking the maximum of local trips. If it is compared the profits of company, it can be seen an increase of just over 10 percentage points in income, resulting in an increase of \$ 7,527.95 pesos MN weekly, which raised a year, leads to an extra \$ 361,341.60 pesos utility MN

X. FORMULATION PROBLEM PLE

Once the problem affecting the administration was realized, which want to maximize the utility of the company, it can be proceeded to formulate the problem of LP. It has been determined that the F.O. Maximization of travel is defined by the formula:

$$Z = \sum_{i=1}^{i=n} \sum_{j=1}^{j=m} \pi_{ij} x_{ij}$$

Where:

x_{ij} = Number of trips by destination and how the trip is done.

π_{ij} = Earnings per trip depending on the destination and the way in which the journey is made.

i = Destinations

- j = Travel forms
- n = Total possible destinations
- m = Total possible forms of travel

Substituting the values in the F.O., this is posed as follows:

$$Z (\text{Max}) = 914.5x_{11} + 2599.26x_{12} + 724.6x_{21} + 1499.75x_{31} + 3751.89x_{32} + 2152.56x_{42}$$

Where the decision variables are:

- x_{11} = Profit travel from Mexicali to Tijuana.
- x_{12} = Profit travel from Mexicali to Tijuana to return.
- x_{21} = Benefit Local Mexicali travel.
- x_{31} = Profit travel from Mexicali to Ensenada.
- x_{32} = Profit travel from Mexicali to Ensenada to return.
- x_{42} = Profit travel from Mexicali to San Luis Rio Colorado to return.

Once the F.O. is calculated it proceeds to take into account the restrictions that the company has, same as they have explained above, and at this time is presented by a formula.

Constraint 1: Restriction trucks available a week.

$$\sum_{i=1}^n \sum_{j=1}^m a_{ij} x_{ij} \leq k$$

Where:

- a = Number of trucks needed per trip.
- k = Number of possible trips.

Restriction 2: Restriction demand for weekly trips.

$$[[x_{ij} \leq D]_{i=0}^n]_{j=0}^m$$

Where:

D = Demand travel

Constraint 3: minimum travel restrictions that must be provided to customers.

$$x_{ij} + x_{ij} \geq m$$

Restriction 4: non-negativity restriction.

$$x_{ij} \geq 0$$

Restriction 5: Restriction of whole numbers

$$x_{ij} \in \mathbb{Z}$$

XI. PRESENTATION OF RESULTS

In this section the results obtained through the development of problem LP held in the previous section are explained. the model in Excel is run by using Solver and announces the results, explaining each one in detail, showing images of the

results obtained, as well as the steps taken to arrive at an optimal solution, comparing amounts and presenting the main finding based on profit maximization and differences regarding how current work and the new form of work that must have the company.

Once raised the problem, the data to an Excel spreadsheet, where the variables are delimited, the coefficients and relevant restrictions are entered, the sums product to provide with the final results are formulated in order to make a comparison with the logistics used by the company and the proposed logistics that concerns in this work. Travel data used by the company are entered, to obtain the information of profits that the company gets for the trips made in the week with their current working model (Figure 1).

	911	912	921	931	932	942		
	Tijuna sin retorno	Tijuna con retorno	Mexicali local	Ensenada sin retorno	Ensenada con retorno	San Luis con retorno		
Viajes a realizar	23	5	8	7	2	4		Max Utilidad
Pago por flete	\$ 914.50	\$ 2,399.26	\$ 724.60	\$ 1,499.75	\$ 3,751.89	\$ 2,152.56		\$ 66,438.87
Restricción 1: Camiones disponibles por viaje	1	1	0.5	2	2	1	54	≤ 54
Restricción 2: Demanda de viajes a Tijuana sin retorno	1	0	0	0	0	0	23	≤ 23
Demanda de viajes a Tijuana con retorno	0	1	0	0	0	0	5	≤ 5
Demanda de viajes Mexicali local	0	0	1	0	0	0	8	≤ 30
Demanda de viajes a Ensenada sin retorno	0	0	0	1	0	0	7	≤ 7
Demanda de viajes a Ensenada con retorno	0	0	0	0	1	0	2	≤ 2
Demanda de viajes a San Luis con retorno	0	0	0	0	0	1	4	≤ 4
Restricción 3: Mínimo de viajes por semana a Tijuana	1	1	0	0	0	0	28	≥ 10
Mínimo de viajes por semana a Ensenada	0	0	0	1	1	0	9	≥ 2
Mínimo de viajes por semana a San Luis	0	0	0	0	0	1	4	≥ 2

Figure 1 Gain on trips made by the company normally

Source: Own elaboration, compiled from data provided by the company Transportes CARA

XII. USING THE MATHEMATICAL MODEL

To solve the problem of LP, using Solver, which gives the results to the optimization of travel to be performed, and shows maximizing profits that would result from the use of this program (Figure 2) is used.

By formulating a product sum in Excel boxes the Solver software searches using additions and multiplications in question of seconds, which gives the best results for each trip. Although it would become more complex, this method allows entering a lot of variables and constraints, allowing flexibility when framing an LP problem.

The mathematical analysis that has been raised in this research can be applied to different areas of the transport sector. These models are very important for the evolution and growth of SMEs. To determine the analytical data, it was preceded to the use of linear programming, by presenting the

different variables and constraints used by SMEs Transportes CARA, which provided the data for the logistics problem.

	X11	X12	X21	X31	X32	X42		
	Tijuana sin Retorno	Tijuana con retorno	Mexicali local	Ensenada sin retorno	Ensenada con retorno	San Luis con retorno		
Viajes a realizar	22	5	30	2	2	4	Max Utilidad	
Pago por flete	\$ 954.50	\$ 2,599.26	\$ 724.60	\$ 1,496.75	\$ 1,751.89	\$ 2,152.56		\$ 73,966.82
Restricción 1: Camiones disponibles por viaje	1	1	0.5	2	2	1	54	≤ 54
Restricción 2: Demanda de viajes a Tijuana sin retorno	1	0	0	0	0	0	22	≤ 23
Demanda de viajes a Tijuana con retorno	0	1	0	0	0	0	5	≤ 5
Demanda de viajes a Mexicali local	0	0	1	0	0	0	30	≤ 30
Demanda de viajes a Ensenada sin retorno	0	0	0	1	0	0	2	≤ 7
Demanda de viajes a Ensenada con retorno	0	0	0	0	1	0	2	≤ 2
Demanda de viajes a San Luis con retorno	0	0	0	0	0	1	4	≤ 4
Restricción 3: Mínimo de viajes por semana Tijuana	1	1	0	0	0	0	27	≥ 10
Mínimo de viajes por semana a Ensenada	0	0	0	1	1	0	4	≥ 2
Mínimo de viajes por semana a San Luis	0	0	0	0	0	1	4	≥ 2

Figure 2 LP solution using Solver in Excel.

Source: Own elaboration from data provided by the company Transportes CARA

This was done in order to schedule trips to different destinations demanded by companies to whom are providing the service of freight, so that could maximize the benefits of the carrier. In order to do research the different criteria that provide a more complex use of LP in transport logistics, but even so, the results were defined, positive changes for the company in question were achieved.

XIII. CONCLUSIONS AND RECOMMENDATIONS

Logistics is the most important industry in the field of motor carrier cargo area, as through it is provided sustained growth due to developing efficient strategies. Transportes CARA has seen the need to optimize its logistics for the increase in profits. Once achieve this, it can manage and distribute travel to be performed in an efficient manner.

It is extremely important innovation in the methods that are commonly used in an SME. It could choose to outsource companies that specialize in this type of logistics, but this would increase their costs. So that the best option would be to train its employees and that they can carry out this work, because eventually the company needs to have a logistics officer toiling in it, so do not waste time when making decisions.

Using linear programming (LP), an increase in company profits is observed, and is a feasible option to use for Transportes CARA and also for other companies with similar situations. Entrenched routines in the agents, they select

strategies, which are not optimal for the company, resulting in costs and misuse of information. These routines may change through appropriate explanation of the importance of change and comprehensive training and feedback from owners and experts in the field. Although it is clear that logistics is an area to exploit in the company, the change will not be easy. The stigma of old routines prevail for a while until adaptation is achieved.

The agency theory provides the why? To the main problems suffered when making a change in organizations. It indicates the main factors which are given pro and allows analyzing business problems from a humanitarian perspective. Understanding that employees refuse to comply with the changes, allows owners or managers to find a method to reach the evolution of the company. Here lies the importance of having employees who are interested in the welfare of the organization, because if the company grows, they will get more benefits.

With this change in the model of logistics management, not only Transportes CARA, but different SME sectors can obtain benefits, which would positively influence the national GDP. These findings allow to ask What if SMEs in the trucking industry they had support from the government in the logistics of their businesses by LP?

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