

## Analysis of the factors that impact the development of the auto parts industry in the state of Tlaxcala Mexico

Irais Hernández Martínez<sup>1</sup>, Crisanto Tenopala Hernández<sup>2</sup>, Miguel Ángel Rodríguez Lozada<sup>3</sup>

*Postgraduate studies Division, Apizaco Technological Institute, México<sup>1</sup>. Postgraduate studies Division, Apizaco Technological Institute, México<sup>2</sup>. Postgraduate studies Division, Apizaco Technological Institute, México.<sup>3</sup>*  
*Corresponding Author: Irais Hernández Martínez*

---

### ABSTRACT:

*The rapid growth of the auto parts industry in the state of Tlaxcala in Mexico, leads us to ask ourselves: what have this state that makes it so attractive for the industries of this sector during the last years? With the purpose of knowing what these factors are, a research is carried out directly with the industry to identify them and then analyze them, ending with the interpretation of the results obtained in such a way that the most important ones are identified, as well as the areas of opportunity for improve existing.*

**KEYWORDS:** *automotive growth, auto parts industry, Tlaxcala, automotive industry, automotive development, factor analysis.*

---

Date of Submission: 28-03-2019

Date of acceptance: 08-04-2019

---

### I. INTRODUCTION

In this article an analysis is made of the following factors which have been identified in a previous study: geographical location, railway infrastructure, road infrastructure, industrial corridors, workforce, demand / production, government, standard of living, culture and security. The objective of this analysis is to know which of these factors are the most important for auto parts companies, as well as to know which ones are better positioned and which represent an opportunity for improvement, this with the purpose of maintaining the growth of the auto parts industry within of the state, because it provokes a series of productive linkages with other industries which causes economic development, and thousands of jobs, which is beneficial for the tlaxcalteca society.

### II. LITERATURE SURVEY

The auto parts industry in Tlaxcala is moving ahead at a staggering speed in the last years. Kathya Elizabeth Torres Vázquez, Secretary of Tourism and Economic Development of the entity (Portal Automotivo, 2016) said that of the 48 companies in the sector located in the state, 23 have been installed in the last five years. These represent an investment of about 4,250 million pesos, as well as the creation of 3,683 new sources of employment. The border with Puebla has generated a very important inertia; we have grown from 2011 to date approximately 55% of the direct foreign investment that was registered at that time to which there is currently in the automotive field. "The growth of the automotive industry fosters the growth of the auto parts industry" (SEDECO, 2017). This industry has developed important productive chains with the industries of glass, steel, iron, rubber, plastic, aluminum and textiles, which has become a catalyst for manufacturing and economic activity in the municipalities and regions where they are located. (Carbajal, Almonte, Mejía, 2016: 41). The smallest federal entity in the country, Tlaxcala, has a total of 48 suppliers of the automotive industry, of which 28 are first level, also called "Tier1 level", 18 "Tier2 level", and two "level" Tier3 ", and together generate around 10 thousand direct jobs currently in the state (Pérez, L. 2017).

### III. RESERCH

Formerly, a measurement instrument was created with 47 items in total, of which 11 are open-ended questions whose objective is that the respondent can express their opinions on the subject and thus complement the survey and the remaining 36 should be evaluated on a Likert scale that ranges from 1 to 5, being 1 equivalent to totally disagree and 5 to totally agree. The variables to be evaluated are geographic location, railway and highway infrastructure, industrial corridors, workforce, demand/production, government, standard of living, culture and security. This measurement instrument was validated by Cronbach alpha in the application of a pilot test, later applied to the entire participating population. Now continuing the previous investigation, in order to understand why the companies decide to establish themselves in the state, an analysis is made of the

previously identified factors (independent variables that affect the growth of auto parts in the state, the dependent variable) to define the existing correlation, and identify areas of improvement opportunity to attract more companies. Likewise, to identify the most important variables or factors for the industries of the auto parts sector in the state.

**IV. RESULTS AND DISCUSSION**

Proceeding with the investigation, the analysis of the results obtained by factor (geographical location, railway infrastructure, highway infrastructure, industrial corridors, workforce, demand, government, standard of living, culture and security) is done. The table 1 shows the factors in the column on the left side, while the other four columns represent the incidence of answers in totally disagree (TD), disagree (D), neither agree nor disagree (NA-ND), agree (A) and totally agreement (TA).

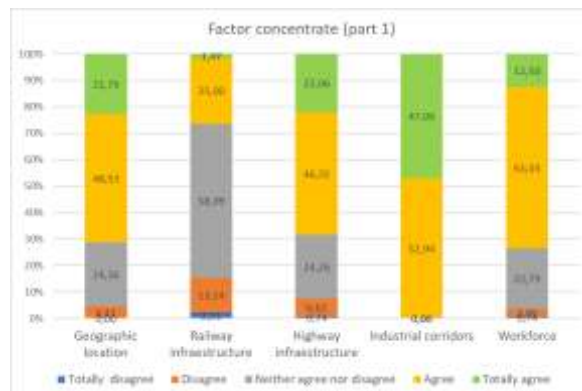
Concentrated results

	TD	D	NA-ND	A	TA
<b>Geographiclocation</b>	0	6	33	66	31
<b>Railwayinfrastructur e</b>	3	18	79	34	2
<b>Highwayinfrastructu re</b>	1	9	33	63	30
<b>Industrial corridors</b>	0	0	0	18	16
<b>Workforce</b>	1	4	31	83	17
<b>Demand</b>	0	12	37	39	14
<b>Government</b>	36	26	0	0	3
<b>Standard ofliving</b>	2	3	90	103	6
<b>Culture</b>	19	21	68	62	0
<b>Security</b>	1	14	39	14	0

**Table 1.** Concentrated results. Own creation. 2019.

In the same way in graphic 1 "factor concentrate (part 1) and in graphic 2" factor concentrate (part 2) "we have the visual representation of the results shown in table number 1.

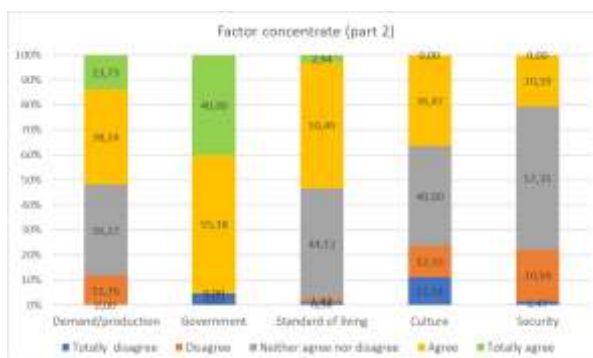
Graphic 1 shows the geographic location, railway infrastructure, highway infrastructure, industrial corridors and workforce. The blue color corresponds to totally disagree, the orange to disagreement, gray neither agree nor disagree, yellow agree and green totally agree. Factor concentrate (part 1)



**Graphic 1.** Factor concentrate (part 1). Own creation. 2019

Graphic 2 shows demand/production, government, standard of living, culture and security. The blue color corresponds to totally disagree, the orange to disagreement, gray neither agree nor disagree, yellow agree and green totally agree.

Factor concentrate (part 2)



Graphic 2. Factor concentrate (part 2). Own creation. 2019

Then two analysis of reliability, the Cronbach’s Alpha and the method of the two halves of Guttman are applied in order to verify the reliability of the results with the measuring instrument. All results presented below in the tables 2 “Reliability statistics” and the table 3 “Coefficient of two halves of Guttman” were obtained with the software SPSS test version.

Reliability statistics	
Cronbach's Alpha	N of elements
.880	10

Table 2. Reliability statistics. SPSS test version, with own data. 2019

Coefficient of two halves of Guttman

Coefficient of two halves of Guttman	0,900
--------------------------------------	-------

Table 3. Coefficient of two halves of Guttman. SPSS test version with own data. 2019

The obtained alpha of Cronbach is of .880, whereas the coefficient of the two halves is of .900, therefore both coefficients indicate that the analysis of said factors is reliable.

Later, in order to determine the maximum, the minimum and the average of each factor, a descriptive analysis is made.

As we can see in the table 4 “Descriptive statistics“ the average in most of the factors is between 3 and 3.9. The average indicates the score obtained in each factor, according to the scale of liker that goes from 1 to 5. The closer to 5 the average, the better qualified this factor, the closer to 1, the lower the score. Therefore, we have that the best positioned factors are industrial and government corridors with scores of 4.4706 and 4.4154 respectively. Subsequently we have geographical location, highway infrastructure, workforce, demand / production, standard of living, railway infrastructure, culture and ultimately security, this being the factor with the lowest score.

Descriptivestatics

	N	Rank	Min	Max	Aver
G. Location	136	3,00	2,00	5,00	3,8971
Railway infra.	136	4,00	1,00	5,00	3,1029
Highway infra.	136	4,00	1,00	5,00	3,8235
Industrial corridors	34	1,00	4,00	5,00	4,4706
Workforce	136	4,00	1,00	5,00	3,8162
Demand	102	3,00	2,00	5,00	3,5392
Government	65	4,00	1,00	5,00	4,4154
Standard of living	of204	4,00	1,00	5,00	3,5294
Culture	170	3,00	1,00	4,00	3,0176
Security	68	3,00	1,00	4,00	2,9706

**Table 4.** Descriptive statistics. SPSS test version with own data. 2019

## V. CONCLUSIONS

As the results show, the most important factors are first of all "industrial corridors". The state has 11 industrial and / or technological parks: Industrial City Xicohtécatl I Tetla, Industrial City Xicohtécatl III Huamantla, Industrial City Xicohtécatl III Tlaxco, Malinche Industrial Corridor, Apizaco Industrial Corridor - Xalostoc – Huamantla, Panzacola Industrial Corridor, Xiloxotla industrial park, Ixtacuixtla Industrial Park, Calpulalpan Industrial Park, Atlangatepec Industrial Zone, Velazco Industrial Zone. Having 11 industrial corridors in the state is beneficial for industries since in a short distance zone you can have more than one supplier of raw material or semi-finished product, which translates into reduction of time and costs. Therefore, it is vital to be aware of this factor, to manage the level and not have a decline that could greatly harm.

Another important factor is the government, explain the companies in the sector, that there are various supports that benefit them if they are installed in the state, such as support for SMEs, land forgiveness, and other programs. Maintaining the level of this factor is vital.

The next factor in the list is geographic location, which we can not modify because we are where we are, but definitely this factor is important, the state of Tlaxcala has a privileged location in the country, since it is located in the downtown area, in the megalopolis, and when it is related to the Tlaxcala highway infrastructure, it stands out because it is a state of connection to different regions of the country. In addition to that being a small state the distances and costs when traveling the state are low. Here the important thing is to maintain the highway infrastructure in optimal conditions.

Consecutively is the workforce factor, the affordable cost in the region attracts the production industries, because producing is more profitable than in other areas.

In the demand factor, we depend on the requirements of the automotive assembly, the important thing is to be a reliable supplier and be competent in the market. Other factors related to this, are highway and railway infrastructure and industrial corridors.

Regarding the standard of living in Tlaxcala, we can say that we have an acceptable standard of living, but it can improve, considering different topics such as the school level and the quality of the health sector.

In the factor of railway infrastructure, there is opportunity for improvement, rail transport is economic, however it is necessary to give more attention, more diffusion, most companies in the sector do not use this transport.

About the culture factor, most of the companies within the industry are not so affected by this factor, although we have acceptable social attitudes, companies are open about the beliefs and preferences of society in general and its employees.

To finish we have the security factor, which is the lowest in terms of evaluation. The industries consider this factor relevant, however they express that in recent years insecurity has grown within the state, their employees have been victims of assault outside the company, road safety has also fallen, their fleets have suffered losses when stolen on route. It is necessary to be aware of this factor and take the necessary measures to increase the level of security in the state, since it affects in a considerable and negative way, the good perception in general that the state has.

## REFERENCES

- [1]. Carbajal, Y., Almonte, J., y Mejía, P. (2016). La manufactura y la industria automotriz en cuatro regiones de México. Un análisis de su dinámica de crecimiento, 1980-2014. *Economía: Teoría y práctica*, núm. 45, julio-diciembre, 2016, pp. 39-66 Universidad Autónoma Metropolitana Unidad Iztapalapa Distrito Federal, México.
- [2]. Pérez, L. (2017). Tlaxcala cuenta con 48 proveedoras automotrices de alto nivel. *El financiero*. Recuperado de <http://www.elfinanciero.com.mx/empresas/tlaxcala-cuenta-con-48-proveedoras-automotrices-de-alto-nivel.html>
- [3]. Portal Automotriz. (2016). Tlaxcala, núcleo importante de la industria automotriz: ProMéxico. Recuperado de <https://www.portalautomotriz.com/noticias/gobierno/tlaxcala-nucleo-importante-de-la-industria-automotriz-promexico>
- [4]. SEDECO. (2017). Directorio industrial del estado de Tlaxcala. Abril.

Irais Hernández Martínez" Analysis of the factors that impact the development of the auto parts industry in the state of Tlaxcala Mexico" *The International Journal of Engineering and Science (IJES)*, 8.3 (2019): 39-42