



Methodological proposal of a feasibility study for the creation of an MSME of Maintenance, Automation, and Control Services for the Automotive Industry in the State of Tlaxcala

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Abstract. The company seeks to satisfy the demand of the market to which it belongs through the production of goods or services, having to effectively coordinate its technical, human, and financial resources. The following article shows the proposal of how to develop a feasibility study for the creation of MSMEs for maintenance, automation, and control services in the automotive industry within the state of Tlaxcala. So that it can be determined whether or not it is feasible to establish it and can compete with the companies that are providing this type of service in the local market.

To cite this article

[Rojas, V. S., Lozada, M. A. R. & Rivera, J. L. M. (2020). Methodological proposal of a feasibility study for the creation of an MSME of Maintenance, Automation, and Control Services for the Automotive Industry in the State of Tlaxcala. *The Journal of Middle East and North Africa Sciences*, 6(09), 14-18]. (P-ISSN 2412- 9763) - (e-ISSN 2412-8937). www.jomenas.org. 3

Keywords: Feasibility Study, MSMEs, Maintenance, Automation, and control.

1. Introduction:

Micro, Small and Medium-sized Enterprises (MSMEs) began to gain importance within the economy in the 1950s and 1960s during the validity of the import substitution model, as much criticized as admired by the different specialized authors. According to Esquivel, (2002) the role of MSMEs becomes an increasingly important issue in globalization, however, these types of companies represent around 90% of existing companies globally, employing 50% of the labor force and participate in the creation of 50% of the world Gross Domestic Product (GDP), that is, MSMEs are a fundamental basis for the economies of nations to grow and become competitive, both internally and externally, since into the extent that MSMEs grow, to the same extent they influence the development of your country. Despite this, in no country, these companies have favorable conditions and, especially now, with the competition that has been generated in this globalized world.

2. Theoretical Framework:

At this stage, the documentary information will be collected to carry out the methodological design of the investigation, that is, the how and what information is required, in addition to how it will be analyzed and the time it will take all this process, when having the information required the verification or obtaining of the knowledge that was needed and for which the project arose will be generated.

2.1. Feasibility study

It is the most complete pre-investment study, in which an in-depth analysis of the alternatives that were seen in the pre-feasibility study is carried out. The background information to be used at this stage must be accurate and obtained mostly from primary sources of information (Sapag Puelma, 2007).

Market Study: Market is understood as the area in which the forces of supply and demand conclude to carry out the transactions of goods and services at determined prices. The general objective of this research is to verify the real possibility of service penetration in a given market (Urbina, 2006).

Voice of Customer (VOC): The Voice of the Customer tool, also called Customer Satisfaction Studies, is collected using tracking studies and serves to inquire about the factors that are the source of satisfaction or dissatisfaction for its consumers (Kotler & Armstrong, 2008).

Technical study: The optimal size of a project is its installed capacity, and it is expressed in production units per year. It will be considered optimal when it operates with the lowest total costs or maximum economic profitability (Urbina, 2006).

Economic - Financial Study: The economic study is in which the monetary information appears in a systematic and ordered manner, as a result of the research and analysis carried out in the previous stage (technical study), which



will be very useful in evaluating the economic profitability of the project (Urbina, 2006).

Administrative Study: This study has to do with the definition of the organizational structure that will be responsible for the project both in the execution phase and in the operation phase (Jimenez Boulanger & Espinoza Gutierrez, 2007).

Legal Study: It serves to determine all legal regulations that could affect its development, especially about its location and operation. The location is affected by the regulatory plans of the local municipalities or by what is established by the national entities responsible for urban development (Jimenez Boulanger & Espinoza Gutierrez, 2007).

2.2. MSMEs

The company is the entity where wealth is created, it allows organizational resources (human, material, financial, technical) to be put into operation to transform inputs into finished goods or services, based on the objectives set by the general management - it intervenes in different degrees and the economic, social and service motives (de León Vázquez, Cruz Lugo, Laffit Anaya, Sosa Serrano, & Vega Hernández, 2014). An element to be defined is the small size of the company, known as its size or magnitude, in Mexico as of June 30, 2009, the size is determined based on the total number of personnel in the organization and the level of annual sales (de León, & del Refugio, 2012).

Table 1: Classification of MSMEs by Size

Size	Sector	Range of number of workers	Annual sales amount range millions of pesos)
Microenterprise	All	Up to 10	Up to \$4
Small Company	Commerce	From 11 to 30	From \$4.01 to \$100
	Industry and Services	From 11 to 50	
Medium Business	Commerce	From 31 to 100	From \$100.01 to \$250
	Services	From 51 to 100	
	Industry	From 51 to 250	

Source: Official Journal of the Federation (2013). Own elaboration

2.2.1. MSMEs in Mexico:

Efforts to encourage them have been reflected with the creation of various support and promotion programs, but to date, these programs have not yielded the expected results, since the problems they face to survive against large companies, as well as the Economic imbalances, while becoming more productive and efficient are some of the most notorious problems that can be observed.

MSMEs are found in all areas of economic development in the country, such is the case of the automotive industry, it is a sector that in recent years has become the most important for economic growth since it is taking vital relevance considering the importance and multiplicity of trade agreements that Mexico has signed (national and foreign) (Miranda, 2007), which benefits the country by obtaining higher economic income and generating more jobs throughout the republic, by the various companies that belong to this bouquet.

But there is a problem with the Mexican industrial MSMEs since it has been observed that the specialization index is negative, which probably indicates that the diffusion of scientific and technological knowledge in the manufacturing sector where MSMEs are located does not have a favorable effect on the job (Acolt & Flores, 2010), and this causes that much of the workforce is foreign, thus reducing national job opportunities.

2.3. The Automotive Industry in Mexico

The automotive industry in Mexico is made up of the manufacture and assembly of motor vehicles and is made up of two sectors: terminal and auto parts. In the international terminal industry, it generally divides the production of motor vehicles into two segments: light vehicles and heavy vehicles (Macías Morales, 2019).

Within these sectors is the classification of transnational companies that are original equipment manufacturers and automotive equipment manufacturers (OEM), and their suppliers of first (Tier 1), second (Tier 2) and third level (Tier 3) are of utmost importance. for the integration of a value chain in this sector. According to a study prepared by ProMéxico (2014), the automotive sector can be classified as follows:

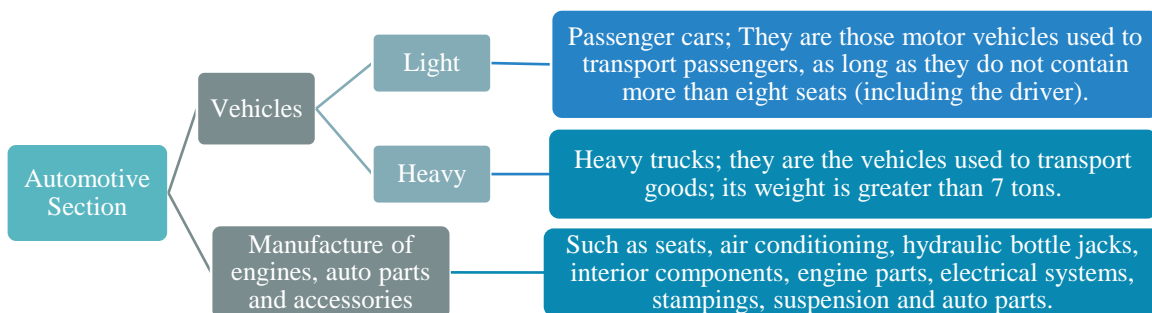


Figure 1. Classification of the Automotive sector.

Source: Automotive and Auto parts Industry of the State of San Luis Potosí. Elaboration: Creus, 1988.

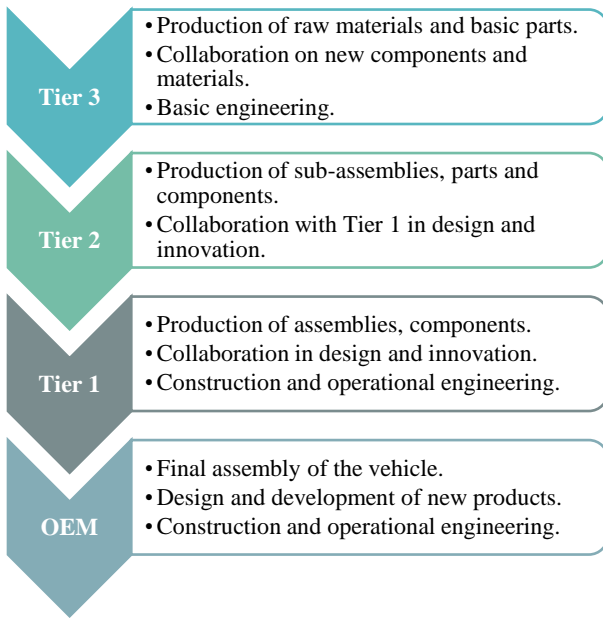


Figure 2. Automotive Industry value chain. Source: ProMexico (2014). Own elaboration.

2.4. Services

Employment and activities in the tertiary sector are frequently defined in a general way or according to the characteristics that supposedly distinguish them from the secondary sector: low labor productivity, low capital intensity, a higher proportion of female labor, a higher concentration of part-time jobs, etc. (González et al., 1989).

2.4.1. Control

Automatic control of the manufacture of a product through several stages with the free use of machinery to save manual labor and mental effort (Oxford English Dictionary).

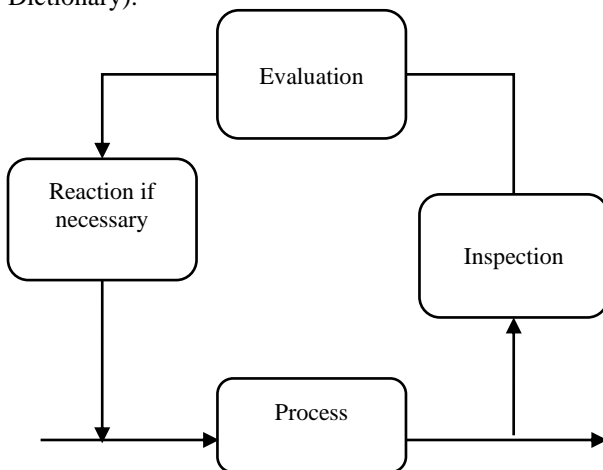


Figure 3. Feedback control loop considering the concept of global factory automation. Elaboration: Creus, (1988).

2.4.2. Automation

Automation is the discipline that deals with methods and procedures whose purpose is the substitution of the human operator for an artificial operator in the execution of a previously programmed physical or mental task (Piedrafita Moreno, 2004).

2.4.3. Maintenance

Maintenance can be understood very simply as “what needs to be done to make things work correctly or failing so that breakdowns last as little as possible” (de Bona, 1999).

3. Proposed Methodology

The following diagram shows the sequence in which each element that makes up the feasibility study would be developed. The purpose that is developed in this way is so that each one, individually is feasible and with it, the study that carries the greatest weight for this research is the financial one and with this, it is defined in its entirety if there is feasibility for the creation of an MSME of maintenance, automation and control services in the Automotive industry within the state of Tlaxcala.

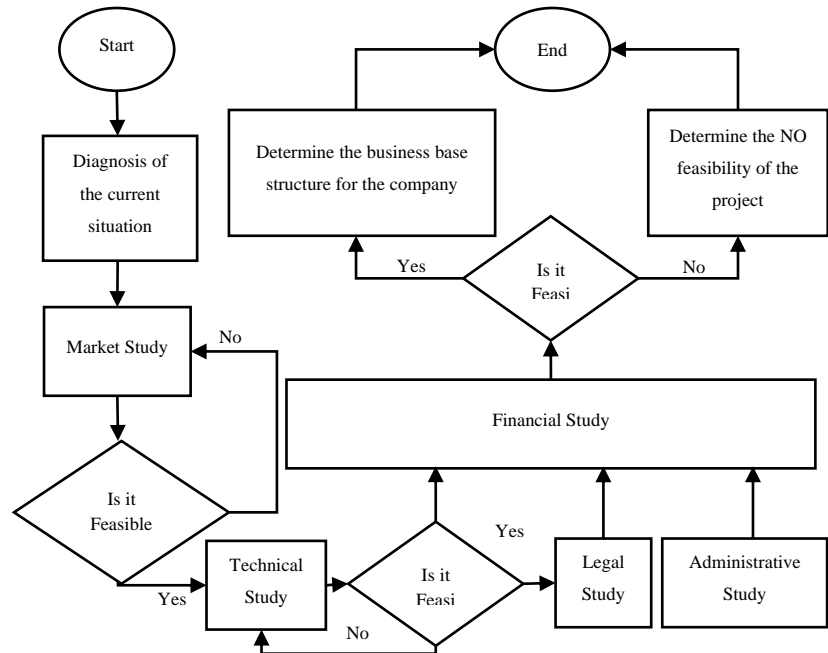


Figure 4. Flow diagram of the methodology. Own elaboration.

The present investigation will begin with the diagnosis of the current situation, which will establish the impact that the automotive industry currently has at the national level at the state level to know the area in which you want to venture when obtaining said information, we will continue with the market study, which gives the starting point for the feasibility study.



For this research, the market study aims to determine if there is a demand for the services that MSMEs intend to offer in addition to knowing the offer that already exists, for this, figure 5 shows the steps to follow to reach these objectives:

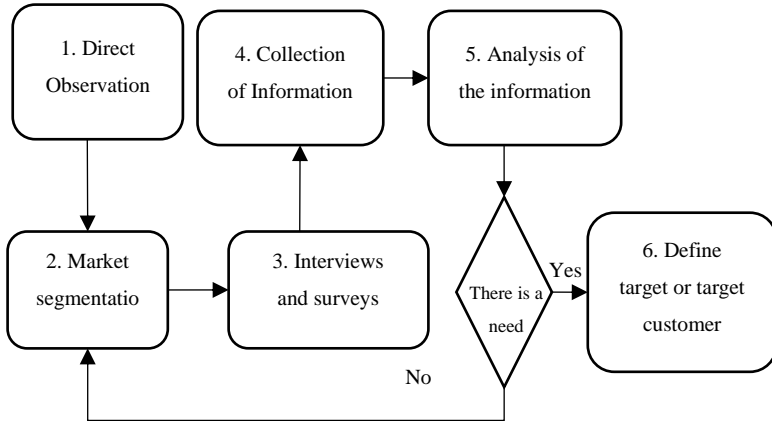


Figure 5. Steps of the Market Study. Own elaboration.

As a second study we have the technician, in which the appropriate location of the project will be established, in addition to defining the machinery and equipment that are needed for the start-up of the MSMEs, in figure 6 the steps to follow to complete said study:

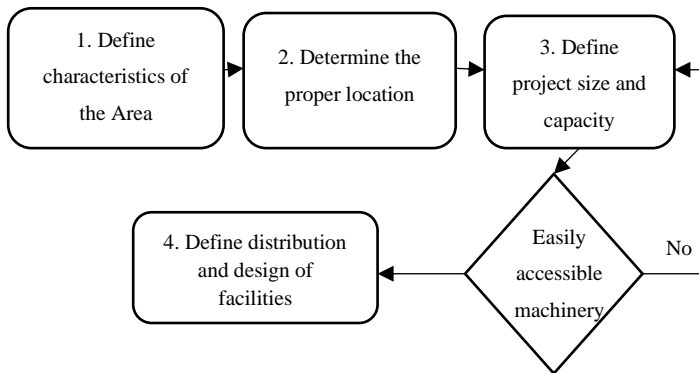


Figure 6. Technical Study Steps. Own elaboration.

The third study to be carried out will be the legal one, whose main objective is to determine the regime in which the company will be administered, and which has its points to establish as observed in figure 7.

Following the administrative study, which aims to design the organizational structure of MSMEs, in figure 8 it can be seen which points this structure encompasses:

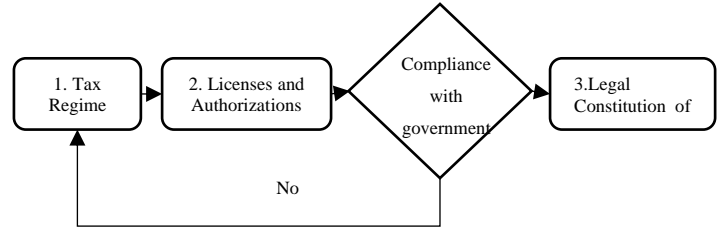


Figure 7. Points of the Legal Study. Own elaboration.

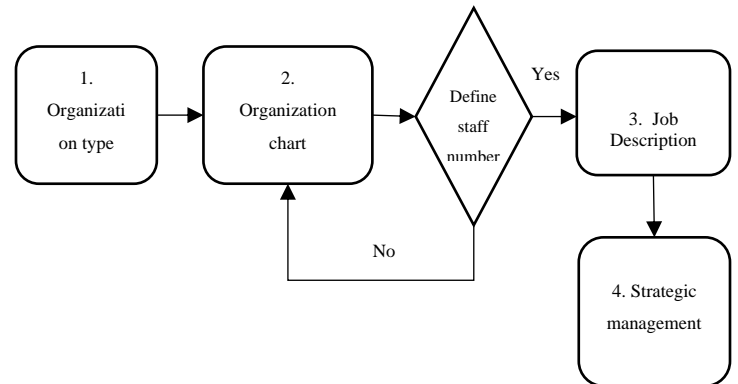


Figure 8. Administrative Study Points. Own elaboration.

To conclude, the financial study will be carried out. For this project, this study is the one with the greatest impact since it will primarily determine the initial investment that MSMEs will require to implement it. In figure 9 you can see the points that will determine this:

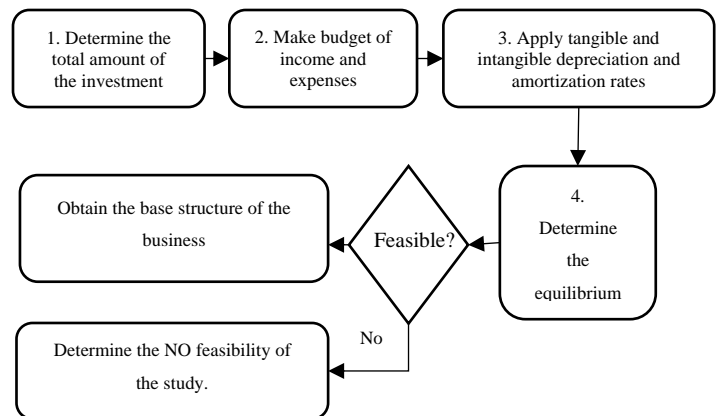


Figure 9. Points of the Financial Study. Own elaboration.

At the end of these studies, the most important decision-making can be carried out, determine whether it is feasible and, as a result, the base structure of the business or not feasible, and terminate the investigation.



4. Conclusions:

After determining the main objective of the project and proposing the methodology to be developed, it can be concluded that:

Deciding to start a project is a very big responsibility since the bases are needed to defend that the project is going to be feasible, that there is a need, and that it is not just another project.

The methodology proposed here is a feasible option for anyone who wants to start a business since during the development of the project the entrepreneur will be able to analyze how viable the idea is or, failing that, modify it so that in the end it can be seen whether there is truly a successful future or just a passing project.

Starting a business from scratch is a very difficult decision, given that there are changes in the market that can be very aggressive and if there is no support study for the company, the investment may only be an economic loss.

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References:

1. Acolt, R. G., & Flores, M. D. (2010). Desempeño regional de la Micro, Pequeña y Mediana Empresa del sector manufacturero. *Investigación y ciencia*, 18(47), 31-38.
2. Creus Solé, A. (1988). Control de procesos industriales. *Dialnet*. Obtenido de <https://dialnet.unirioja.es/servlet/libro?codigo=105289>
3. de Bona, J. (1999). La gestión del mantenimiento. Madrid: Fundación Confemetal.
4. de León Vázquez, I., Cruz Lugo, A., Laffit Anaya, A., Sosa Serrano, N., & Vega Hernández, M. (SN de Enero de 2014). Microempresas del sector abarrotero. Tlahuelilpan, Hidalgo, México.
5. de León, N., & del Refugio, P. (2012). Administración de pequeñas empresas (1a.
6. Esquivel, C. (2002). *Micro, Pequeñas Y Medianas Empresas en México*. Instituto de Investigaciones legislativas del senado de la república.
7. González, M., Del Río Gómez, C., & Domínguez, J. M. (1989). Los servicios: concepto, clasificación y problemas de medición. *Ekonomiaz: Revista vasca de economía*, (13), 10-19.
8. Jimenez Boulanger, F., & Espinoza Gutierrez, C. L. (2007). Costos industriales.
9. Kotler, P., & Armstrong, G. (2008). Fundamentos de marketing Octava edición PEARSON EDUCACIÓN.
10. Macías Morales, F. (23 de Abril de 2019). *Industria Automotriz y de Autopartes del Estado de San Luis Potosí*. Obtenido de Secretaria de Desarrollo Económico: http://mim.promexico.gob.mx/work/models/mim/doc/gobestatales/San_Luis_Potosi_Automotriz.pdf
11. Miranda, A. V. (2007). La industria automotriz en México: Antecedentes, situación actual y perspectivas. *Contaduría y administración*, (221), 209-246.
12. Piedrafita Moreno, R. (2004). Ingeniería de la Automatización Industrial. Segunda Edición. RA-MA S.A. Editorial y Publicaciones.
13. ProMéxico. (2014). Sector automotriz . México: Secretaria de Economía.
14. Sapag Puelma, J. M. (2007). Evaluación de proyectos: guía de ejercicios. Problemas y soluciones.
15. Urbina, G. B., & Castellanos, M. Á. T. (2006). Evaluación de proyectos (Vol. 3). McGraw-Hill.

Received July 20, 2020; reviewed July 28, 2020; accepted July 29, 2020; published online September 01, 2020