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Cost Study For The Micro-Location Of A Sauces Plant

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Abstract

Through the proposed design and plant layout of the new factory to be located in the Department of Norte de Santander and which is proposed with the aim of contributing to the creation of business and the participation of entrepreneurs to encourage the growth of the economy of the region, three alternatives for the location will be analyzed through the geographical areas of the region, which are Cucuta, Los Patios and Villa del Rosario, these being the capital and municipalities of the metropolitan area. In the arc of the research was based on the description of the factors so the methodology was framed in a descriptive quantitative way, since all the analysis was done in an evaluative way to determine the points referents for the micro location of the plant. According to the interpretation of the researchers selected the municipality of Los Patios as the relevant city to advance the process of micro-location, of which 3 alternative lots were selected for their location, after interpreting the evaluations we found that lot 1 is the most suitable for the conditions of the plant.

Keywords: Micro-localization, macro-localization, localization factors.

1. Introduction

Through the proposed design and plant layout of the new factory to be located in the Department of Norte de Santander and which is proposed with the aim of contributing to the creation of business and the participation of entrepreneurs to encourage the growth of the economy of the region, three alternatives will be analyzed for the location through the geographical areas of the region, which are Cucuta, Los Patios and Villa del Rosario, these being the capital and municipalities of the metropolitan area.

The macro location was accompanied by the determination of the most important location factors, which can directly or indirectly influence the choice of the appropriate sector to develop the economic activity.

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In this case, a weight of interest was used, which was valued as a percentage of one to one hundred, multiplied by a consideration factor of one to ten. When adding the factors of interest, these gave as a result which will be the most suitable municipality or area for the needs of the plant, all this according to the subjective assessment of the analysts, who, in this case, are the authors of the project.

1.1. Classification of factors into essential and trivial.

For the development of these processes, the following factors were taken into account.

1.1.1. Marketplace

Proximity to customers: Knowing the delivery time and the distances to customers is one of the most important factors when you want to locate a new plant.

It is from this that creates the need to study very well the location of the new plant, which ensures an approach to people and that these in turn can know what is offered. In this case, having location options between a capital city and municipalities in its metropolitan area, it is expected that the product offered enters in a faster way to the knowledge of the people who will become the next customers. Once located, it will be decided to start looking for these potential customers and generate a large volume of market. A factor that is essential because it is intended through this to have more contact with customers.

1.1.2. Manpower.

It is one of the factors that will be given more attention in the creation of the company, since it is intended in a way to reduce the negative indicators of unemployment in the region, in addition to promoting economic development in the region.

Also with the choice of resident staff from the region, the aim is to generate a good competence and development of the practical components of the professionals in the region.

1.1.3. Suppliers.

The plant must have a constant supply, it is for that the factor of suppliers is essential for the development of the idea, to have a self-sufficient process, ie greenhouses own cultivation of raw materials, in addition to this are essential inputs such as ingredients for the extract of the sauce, packaging, boxes and others. We will look for nearby suppliers in order to have an efficiency in delivery times and that these arrive with times that benefit the production of tomato sauce.

1.1.4. Electric energy.

The resource can be considered as an essential factor, since it requires machinery that needs the supply of electricity, contact with the company in charge of public service CENS to have a good performance and availability of service.

1.1.5. Water.

Water is an indispensable resource for our activities and is of vital importance because during the whole stage from the cultivation of tomatoes to the preparation and mixing of the paste. It is an essential factor for the functioning of the plant.

This factor seeks to be optimized in the best way, achieving that water is reused and if possible treated to offer other alternatives in the region.

1.1.6. Sewerage.

Being a food industry should be handled very well waste obtained during the process, forms of supply and drainage are needed to proceed to perform the activities well within the plant, although it is important can be considered trivial since it is not affecting as such the production of the sauce, although it should be noted that thanks to the sewerage water is supplied to us.

1.1.7. Toilet.

The process does not frame so much waste, and the resources that are available are used to the maximum, a waste plan should be managed to avoid contamination even if it is organic waste, it should be considered an important factor, but as something trivial.

1.1.8. Transport.

Time is an important resource in companies, thanks to the transport can benefit many stakeholders is why for the raw material arrives on time and there are dispatches for the demand in the times required to have available a good transport scheme that benefits the company and its environment, for this reason it is considered an essential factor.

1.1.9. Communications.

In this case two types of communication could be considered , one is that the company must maintain with the environment to acquire resources at any time either through access routes and proximity to its suppliers. Another type of communication is the way the plant would establish contact with its customers where factors such as advertising, social networks and others come into consideration. Although this second type of communication would be more in line with the proximity to customers. In the communication of either type, there is something in common and is how the plant maintains contact with any external factor, this is important and is considered a trivial factor because it is not of great relevance to the implementation of the proposed design and layout of the plant.

1.1.10. Quality of community livelihoods.

The activity that elaborates the plant is the manufacture and distribution of tomato sauces, it is a product of second necessity in the family basket and mainly would be consumed by any social stratum, regardless of the economic level or quality of life of the community.

In Cúcuta and the metropolitan area people mostly survive on trade and self-employment, it is for this reason that the final product will be offered more economically and affordably, since as creators of the project and next industrial engineers what is sought is to meet the needs of the population and create

solutions that serve for the industrial development of the region. Therefore, it is considered a trivial factor, because its weight in the development of the project is low.

1.1.11. Environmental regulations.

All manufacturing companies regardless of its raison d'être, must have strengthening in their systems and the environmental issue is one of these, it is important to have the necessary regulations to work for the company and the environment so it is considered an essential factor.

Being this factor the central axis of the production policies of the company, since these will revolve around the preservation of resources and decrease the use of chemicals or products that pollute the water.

1.1.12. Free trade zones.

Currently thanks to globalization have been opened many doors to market products, in this case thanks to the fact that the region is a good producer of tomato generates interest in the region to be marketed and can be reached with products from the region to other cities and countries around the world.
For this reason it is considered a trivial factor since, thanks to this great openness, there are no limitations in marketing.

1.1.13. Business climate.

Currently there are not many business offers in Norte de Santander and the region is lagging behind, which is why thanks to the ideas and proposals made by students, businessmen and entrepreneurs are looking for solutions and openings that work for the development of the region and creating a broader business climate in which a greater interest in contributions from people outside the region is generated, it is considered an essential factor since it is important for the plant to have opportunities and support from other people interested in the project.

1.1.14. Fiscal aspects.

When acquiring an industrial plant must take into account taxes and regulations that help the legal operation of this, it is important to consider these factors. You should also take all the rules of food handling and packaging of the same, since in the country there are rules that show all these.

Not taking them into account, makes it impossible to perform the process in the most appropriate way, for all these arguments it is considered that this factor is essential, because it directly affects the production of the company.

The above factors are located in a more organized way in a table to make their understanding and identification easier.

Table 1. Essential and Trivial Factors

Factors	**Essentials**	**Trivia**	**Motif**
Market-Proximity to customers	**x**		Location and proximity to customers.
Workmanship	**x**		Personnel required.

Suppliers	**x**		Supply of inputs.
Electrical energy		**x**	Necessary for machinery.
Water	**x**		Necessary for production.
Sewage		**x**	It does not directly affect production.
Toilet		**x**	It is indispensable but does not generate as much harmful waste.
Transport	**x**		It is favorable in the production and dispatch of products.
Communications		**x**	It allows to know external information.
Quality in the means of community life		**x**	It does not affect the family basket of basic necessities.
Environmental regulations	**x**		Required to work for the environment.
Free Trade Zones		**x**	The market is very open.
Business climate	**x**		A great business climate needs to be created.
Fiscal aspects		**x**	They are needed to maintain the project.

Note: Table 1 shows the different types of factors that are involved in the production process Salsa del oriente, this table was made by the authors of the project, which identified and classified each of these in trivial or essential.

2. Method

The methodology to be used in the development of the project was practical - descriptive. "Descriptive research includes the description, registration, analysis and interpretation of the actual nature and composition of the phenomena; descriptive research works on factual realities, and its fundamental characteristic is to present us with a correct interpretation". (tamayo, 2004).

In this same sequence of ideas, a series of practical activities are proposed, which seek to obtain first-hand information, i.e. that obtained by direct observation and information from people knowledgeable about the subject (teachers, graduates). This is why much of the information for the analysis and direction of the project was obtained through field work.
However, bibliographic information will also be extracted which will facilitate the retention of certain theoretical concepts.

3. Results

3.1. Classification and evaluation of macro location factors. These factors

They were essential for the location of the facilities, since the most optimal location was sought among the 3 alternatives (Cúcuta, Los Patios and Villa del Rosario), the one that best suits the needs of the organization, facilitating decision making.
A detailed analysis was made to each of the locations, giving a numerical value to each selected factor, being the optimal location the one that obtained the best final score.

The data table format, was taken from the book by (Muther, 1990) and the selection of essential and trivial factors was at the authors' own discretion.

3.2. Evaluation Analyst 1. As evidenced below.

Analyst Name	**Marvin Davila**					**Date: March 20th**	
FACTORS	**WEIGHT**	**ALTERNATIVE LOCATION**					
	%	CUCUTA		THE PATIOS		VILLA DEL ROSARIO	
Market - proximity to customers			0.9		1,05	5	0,75
Workmanship			1,35		1,35		1,05
Suppliers			0,54		0,63	5	0,45
Electric power			0,56		0,72		0,48
Water			1,2		1,35	5	0,75
Sewage			0,24		0,24	5	0,15
Toilet			0,24		0,24		0,18
Transport	5		0,35		0,4	5	0,25
Communications			0,16		0,16		0,08
Quality of community livelihoods			0,8		0,8		0,6
Environmental regulations			0,21		0,21		0,21
Free Trade Zones	5	5	0,25		0,45		0,40
Business climate	5		0,4		0,4		0,4
Fiscal Aspects		5	0,1		0,12	5	0,1
TOTAL			7,3		8,12		5,85

3.3. Evaluation Analyst 2. As evidenced below.

Analyst Name	**Marlon Andres Fuentes**					**Date: March 20th**	
FACTORS	**WEIGHT**	**ALTERNATIVE LOCATION**					
	%	CUCUTA		THE PATIOS		VILLA DEL ROSARIO	
Market - proximity to customers			0,9		0,9		0,6
Workmanship			0,9		1,05	5	0,75
Suppliers			0,54		0,54		0,54
Electrical energy			0,48		0,56		0,48
Water			1,05		1,2		0,9
Sewage		5	0,15		0,24	5	0,15
Toilet		5	0,15		0,21		0,18
Transport	5		0,3		0,35		0,3
Communications		5	0,1		0,12		0,12

Quality of community livelihoods			0,6		0,7		0,6
Environmental regulations			0,18		0,18		0,21
Free Trade Zones	5	5	0,25		0,35		0,4
Business climate	5		0,35		0,35	5	0,25
Fiscal Aspects			0,16		0,12		0,12
TOTAL			6.11		6,87		5

Once the formats have been filled out and the different total values obtained, they are grouped in a table to identify the most viable option.

Table 2. Weighting of results

	Cúcuta	The courtyards	Villa rosario
Analyst 1	7,3	8,12	5,85
Analyst 2	6.11	6,87	5
Average	6,705	7,495	5,425

Note. Table 2 shows the total results obtained in each evaluation carried out by the analysts, these values are subjected to a simple weighting to make the choice.

3.4. Evaluation by plant micro location factors.

This evaluation was carried out by scoring factors of each lot, because after locating and knowing each lot with their respective advantages and disadvantages, it is not enough to make a decision.

This evaluation was carried out through the use of Word format, and was performed by each of the analysts, these formats are evidenced below.

3.5. Evaluation micro location analyst 1 .

Analyst Name	**Marvin Davila**						**Date: March 24th**
FACTORS	**WEIGHT**	**ALTERNATIVE LOCATION**					
	%	**LOT 1 XXX**		**LOT 2 XXX**		**LOT 3 XXX**	
TRANSPORT			**0,91**	**5**	**0,65**		**0,91**
STORE SIZE			**0,84**		**0,96**		**0,84**
PROXIMITY TO THE COMMERCIAL SECTOR			**1,2**		**0,9**		**1,05**
SOCIOECONOMIC STRATUM	**5%**		**0,3**	**5**	**0,25**		**0,3**

PROXIMITY TO THE CITY CENTRE			**1,6**		**1,2**		**1,4**
COST OF SERVICES			**1,4**		**1,4**		**1,4**
LOT COST			**1,05**		**1,05**		**1,05**
TOTAL			**7,31**		**6,41**		**6,96**

3.6. Evaluation micro location analyst 2

Analyst Name	**Marlon Andres Fuentes**				**Date: March 24th**	
FACTORS	**WEIGHT**	**ALTERNATIVE LOCATION**				
	%	**LOT 1 XXX**		**LOT 2 XXX**		**LOT 3 XXX**
TRANSPORT			**1,17**		**0,78**		**0,91**
STORE SIZE			**0,96**		**0,96**		**0,84**
PROXIMITY TO THE COMMERCIAL SECTOR			**1,2**		**0,9**		**1,05**
SOCIOECONOMIC STRATUM	**5%**		**0,35**	**5**	**0,25**		**0,3**
PROXIMITY TO THE CITY CENTRE			**1,6**		**1,2**		**1,4**
COST OF SERVICES			**1,4**		**1,4**		**1,4**
LOT COST			**1,05**		**1,05**		**1,05**
TOTAL			**7,73**		**6,54**		**6,95**

Once the formats have been filled out and the different total values obtained, they are grouped in a table to identify the most viable option.

Table 3. Analysis of micro-location results

	Lot 1	Lot 2	Lot 3
Analyst 1	7,31	6,41	6,96
Analyst 2	7,73	6,54	6,95
Average	7,52	6,475	6.955

Note. Table 3 shows the total results obtained in each evaluation carried out by the analysts, these values are subjected to a simple weighting to make the election.

4. Discussion and conclusion

After observing the data obtained, it was determined that the new production plant of Salsa del Oriente should be located in the municipality of Los Patios.

Since it is the most favorable location for both the marketing of the product and the municipal development that presents, a priori will be one of the most industrialized municipalities in the region, also opted for this location because it is the best business climate offers, since competition is scarce.

Another factor that had a significant impact on the choice of this area is the proximity of the municipality to other cities and easy access to national and intermunicipal roads which is a variable that guarantees the delivery and sale of the product, as well as easy access to inputs and raw materials. Without further ado, we proceed to conduct the study of micro location to identify possible lots for the location of the production plant in the municipality.
Because in the study of micro location was determined that the lot 1, located in the sector of San Pedro is the one that has greater acceptance for analysts, it is recommended that this lot is the place where the plant comes into activity and on which the distribution of the same is made.

One of the factors that most influenced the choice of this lot, was not so much the cost of the land, if not the proximity of the lot with an intermunicipal and national road connection, in addition to this of all the lots, was the one that needed less machinery, as it had a very good terrestrial characteristics such as its fullness and shape. However, a factor that caused a stir was the transportation because for this area there is only one bus route, so it is suggested that the company's workers live nearby or have their own means of transportation.

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