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Mejores pequeñas y medianas empresas de acuerdo con sus prácticas logísticas

Best small and medium enterprises according to logistics practices

Melhores pequenas e médias empresas de acordo com suas práticas logísticas

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Resumen

En la última década, los autores han puesto énfasis en la importancia de las pequeñas y medianas empresas en la economía de los países, así como en el poco tiempo que estas siguen funcionando, situación que, obviamente, afecta a la economía mundial. Por la importancia de este tema, este artículo muestra un estudio sobre las características de las mejores pequeñas y medianas empresas en función de las actividades de logística que realizan. El objetivo de este trabajo fue conocer las características de las empresas que tienen un mejor nivel de sofisticación en las prácticas de logística, así como los costos logísticos más bajos. El estudio se realizó en Querétaro, México, con 99 empresas. Los resultados mostraron que las mejores empresas son las que tienen una fuente de capital extranjero y las que exportan.

Palabras clave: logística, pequeñas y medianas empresas.

Abstract

In the last decade, authors had emphasized the importance of small and medium enterprises in economics of countries, as well as in the short time that these keep working, situation that obviously affects the world economy. Because of the importance of this topic, this article shows a study of the characteristics of best small and medium enterprises, depending of logistics activities that they perform. The objective of this work was to know the characteristics of enterprises that have a better level of sophistication in logistics practices as well as lower costs. The study was made in Querétaro, Mexico, with 99 enterprises. The results showed that the best companies are those with a source of foreign capital and exportation.

Keywords: logistics, small and medium enterprises.

Resumo

Na última década, os autores enfatizaram a importância das pequenas e médias empresas na economia dos países, bem como no pouco tempo que ainda estão trabalhando, situação que obviamente afeta a economia mundial. Devido à importância deste tema, este artigo apresenta um estudo sobre as características das melhores pequenas e médias empresas de acordo com as atividades logísticas que realizam. O objetivo deste trabalho foi conhecer as características

das empresas que apresentam melhor nível de sofisticação nas práticas logísticas, além de menores custos logísticos. O estudo foi realizado em Querétaro, no México, com 99 empresas. Os resultados mostraram que as melhores empresas são aquelas que possuem fonte de capital estrangeiro e aquelas que exportam.

Palavras-chave: logística, pequenas e médias empresas.

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Introduction

In many environments, small and medium-sized enterprises (SMEs) are considered to be young companies in the growth process until they reach the optimum scale. Understanding conventional economic thinking, "small and medium enterprises represent around 90% of the world economy" (INEGI, 2009, p.11). In this way, SMEs can be valued as a fundamental link in national economies, not only for their contributions to the production and distribution of goods and services, but also for the flexibility to adapt to technological and environmental changes, thus having a growing potential for innovation and for gross and net generation of jobs (Van Aucken, Madrid-Guijarro and García, 2008).

SMEs are in the vast majority of productive, commercialization and services, as they tend to perform autonomous activities related to larger companies, thus generating interdependence between them, in most cases. Therefore, it is evident that SMEs play a fundamental role in almost all the economies of the world, due to their intervention in aspects such as the generation of employment, exports, tax revenues, innovation, competitiveness, equitable distribution of income, stability social, use of national resources and regional development, so that they are the main source of economic growth (Dasanayaka, 2008).

An important distinction regarding the role that SMEs play in different countries is that they have significantly higher sales growth compared to large companies in middle-income countries. However, this is different in low and high income countries, because the differences in the sales of SMEs and large companies is minimal. Likewise, SMEs have significantly lower productivity growth than that of large companies in all income groups.

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The process of globalization has intensified in the different economic environments that affect the activities of companies, regardless of size. Due to this process, in Mexico, SMEs face multiple difficulties regarding the operational efficiency necessary to remain in the market (Almeida, 2010). According to statistical studies of the Ministry of Economy (SE, September 25, 2015), businesses of this type in Mexico employ 78% of the economically active population and provide 68% of the country's gross domestic product (GDP). While globalization poses challenges and opportunities for the development of companies, Mexican SMEs have not found a way to take advantage of these options, which prevents them from being sufficiently competitive according to the new demands of the market (Almeida, 2010).

It is important to highlight that Mexican SMEs are the backbone of the national economy, because of the trade agreements that Mexico has had in recent years, and because of its high impact on job creation and national production (SE, 2015). According to data from the National Institute of Statistics and Geography (INEGI, 2015), in Mexico, there are approximately 4 million 15 thousand business units, of which 99.8% are SMEs that generate 52% of GDP and 72% of employment in the country .

There are several obstacles that prevent SMEs from developing optimally in Mexico, among which we can mention the lack of financing, creation of new policies, little-known support programs, lack of use of technology in the processes and products they develop. , as well as the lack of trained personnel in a specialized way, which allows us to suppose that a limiting factor in the strengthening or disappearance of SMEs is the logistic processes.

The importance of logistics processes in companies has grown over the years. The importance of the approach based on business processes and dynamic management is triggered by market expectations, such as the reduction of delivery times, pressure to cut costs and the importance of good customer service. An efficient management process requires measurement and evaluation skills. In order to meet these market expectations, it is necessary to dynamically change the structure of the company, not only in terms of how it is organized, but also in how it works, that is, opting for a dynamic rather than a static and structural management (Stock, Greis and Kasarda, 2000).

In logistics, qualitative parameters frequently appear, measured from the limits that are granted to each variable (maximum and minimum accepted). Each of these simpler terms revolves on the basis of one or more variables, this in order to control and ensure the corresponding quality (Machado, Glistau and Illes, 2015).

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One of the significant differences between SMEs and large companies lies in the delegation of responsibilities, since - while in large organizations the tasks are distributed specifically to those who are prepared to carry them out - in small companies many responsibilities are delegated to a small number of employees with little or no training, which generates an impoverished response capacity (Murphy, Daley and Knemeyer, 1999).

Two factors associated with the logistics of SMEs of great importance are: 1) the role of owner-manager participation; and, 2) the dependence of the company on other companies (Stock et al., 2000). The authors, based on their research, affirm that there are no statistically significant differences between SMEs, so that the size of the businesses is not an obstacle to internationalization nor is it a restriction in the selection of a country to do business.

There are three basic strategies that should be considered when observing logistics processes in companies (Stock *et al.*, 2000):

1.- Strategy process, whose main objective is to manage the cost flows.
2.- Market strategy, whose purpose is to reduce complexity when interacting with customers.
3.- Information strategy, which consists of coordinating information flows along the distribution channel in order to facilitate cooperation and coordination among member channels.

This is how logistics operations in the supply chain are a fundamental tool to identify opportunities and formulate solutions for companies to follow sustainable operations. To be competitive, there must be a commitment from top management. Companies must also be able to visualize and trace their supply chains and compare their sustainability with other companies in their industry.

In addition, companies have a great social responsibility, especially with respect to the use of energy sources, non-renewable materials and the way in which their products are used and managed once they reach the end of their life cycle. It is important to take care of unsustainable practices, since they can give a bad image to the company and damage its business processes. Sustainability must be taken care of from various angles, taking into account the facets of the business process, including logistics, strategic planning, information services, marketing, sales and finance (Dey, LaGuardia and Srinivasan, 2011).

For supply chain managers, it is important to understand that day-to-day decisions have the potential to affect millions of stakeholders, either positively or negatively. Although the

addition of sustainability throughout the organization leads to creativity, many companies have learned to use it to differentiate themselves from their competitors, reduce costs and improve services to their customers. This is important because it helps to strengthen the value of the brand, minimize the misuse of resources, avoid government intervention, as well as being adjusted to international norms and regulations, among others.

One of the problems that logistics professionals have faced in recent years is that this has simply been seen as a cost that must be reduced. For this reason, it is essential to deepen the knowledge of the logistics processes within organizations.

Due to the importance of this type of companies and the logistics they carry out, the objective of this research was to know the degree of sophistication of the logistic practices that are carried out in the SMEs of the state of Querétaro, Mexico, as well as the costs that represent In addition, it was analyzed which companies have a greater degree of sophistication and what are their distinctive characteristics.

Materials and methods

The objective of this research was to determine the specific characteristics of SMEs that perform the best logistics practices with lower costs. In order to fulfill the objective of the study, the following steps were carried out.

Development of the survey

A survey was developed on logistics practices that take place in SMEs in the state of Querétaro. The first stage of processing the survey was to do a documentary research, which allowed us to know what are the logistical practices considered by different authors as the most important. Once the most sophisticated logistical practices were detected, the survey format was developed in which the basic practices were taken into account. The questionnaire consisted of 37 questions, four for purchases, seven for sales, seven for production, nine for warehouses and ten for transport.

Table 1 shows the variables used and the dimensions of each one. The people who responded to the survey were responsible for the logistics in each of the companies and, in some cases, were responsible for more additional areas of logistics. Therefore, special care was taken in choosing the person who answered the survey, to ensure that it was the most appropriate. Sometimes the same company had to be visited several times to find the right person. For each

question, five response options were offered, in which the number one is considered the simplest way the activity can be carried out and the five the most sophisticated form.

Tabla 1. Variables utilizadas para conocer las prácticas logísticas

Variable	Factor	Variable	Factor
Compras		Almacenes	
P1	Planeación de entregas a clientes	ST1	Área de almacenamiento
P2	Información a clientes	ST2	Capacidad/espacio de almacenamiento
P3	Calidad	ST3	Procedimiento y normas de almacenamiento
P4	Previsión de ventas	ST4	Localización de materiales
Ventas		ST5	Área de carga y descarga
SA1	Costo de materiales	ST6	Costo de material almacenado
SA2	Especificaciones de materiales	ST7	Niveles de Stock
SA3	Tiempos de entrega	ST8	Reducción de inventario
SA4	Recibo de órdenes	ST9	Materiales obsoletos
SA5	Selección de proveedores	Transporte	
SA6	Seguimiento de pedidos	T1	Costo de transporte
SA7	Intercambio de datos	T2	Uso de la capacidad del transporte
Producción		T3	Deterioro de la mercancía transportada
P1	Costo de producción	T4	Seguridad del transporte
P2	Tamaño del lote	T5	Sistema de intercambio de datos de proveedor de servicios logísticos
P3	Distribución de planta	T6	Transporte propio
P4	Técnicas de mejora	T7	Planificación de rutas
P5	Programas de entrega y producción	T8	Capacidad de distribución de cualquier tamaño de lote
P6	Capacidad de producción	T9	Flota de vehículos
P7	Programa preliminar de producción	T10	Logística inversa

Fuente: Elaboración propia

In addition to questioning logistics business practices, we asked about the percentage of monthly logistics costs to analyze the correlation between these two variables and test the hypothesis of this thesis.

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Population and sample

The research was conducted in the state of Querétaro, Mexico. As a universe of study, the SMEs of Querétaro were considered. The database provided by the Secretariat of Sustainable Development (SEDESU) was used to know the total of SMEs; the total of those registered in said database was 571.

A probabilistic sampling was carried out using the following formula for the calculation of sample size:

$$n = \frac{0.25 * N}{\left(\frac{\alpha}{Z}\right)^2 * (N-1) * 0.25} \qquad (1)$$

N represents the size of the population; α is the error value of type 1; z is the value of the number of units of standard deviation for a two-tailed test with rejection region equal to a; 0.25 is the value of p2 that produces the maximum standard error value, that is, p = 0.5, n is the size of the sample. Finally, a random sample of 99 companies with a 92% confidence level and a margin of 8% error was obtained.

Application

The survey was applied to the 99 companies, visiting each one and interviewing the people in charge of logistics. This stage of the investigation was the most difficult, due to the indifference on the part of the businessmen to answer the questions asked, although, finally, and after visiting some companies on several occasions, it was possible to survey the total of the selected companies for sample.

To know the characteristics of the companies with better logistics practices and lower costs, a graph was made in which these values are crossed. Then it was identified which companies were above the average in terms of the level of sophistication of their logistics practices and, at the same time, they were below the average of the logistics costs. This, to detect and analyze the common aspects they have.

Results

The first analysis that was carried out was the reliability of the variables, which is nothing more than a correlation between the different factors that make up a variable. When a questionnaire is prepared, it is necessary to do this type of tests to confirm that it is effectively measuring what is desired. Table 2 shows the results obtained from this analysis:

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Tabla 2. Validación de los constructos

Variable	Factor	Alfa de Cronbach	Variable	Factor	Alfa De Cronbach
Ventas			Almacenes		
P1	Planeación de entregas a clientes	.624	ST1	Área de almacenamiento	.939
P2	Información a clientes		ST2	Capacidad/espacio de almacenamiento	
P3	Calidad		ST3	Procedimiento y normas de almacenamiento	
P4	Previsión de ventas		ST4	Localización de materiales	
Compras		.563	ST5	Área de carga y descarga	
SA1	Costo de materiales		ST6	Costo de material almacenado	
SA2	Especificaciones de materiales		ST7	Niveles de Stock	
SA3	Tiempos de entrega		ST8	Reducción de inventario	
SA4	Recibo de órdenes		ST9	Materiales obsoletos	
SA5	Selección de proveedores		Transporte		.889
SA6	Seguimiento de pedidos		T1	Costo de transporte	
SA7	Intercambio de datos		T2	Uso de la capacidad del transporte	
Producción		.726	T3	Deterioro de la mercancía transportada	
PO1	Costo de producción		T4	Seguridad del transporte	
PO2	Tamaño del lote		T5	Sistema de intercambio de datos de proveedor de servicios logísticos	
PO3	Distribución de planta		T6	Transporte propio	
PO4	Técnicas de mejora		T7	Planificación de rutas	
PO5	Programas de entrega y producción		T8	Capacidad de distribución de cualquier tamaño de lote	
PO6	Capacidad de producción		T9	Flota de vehículos	
PO7	Programa preliminar de producción		T10	Logística inversa	

Fuente: Elaboración propia

A graph was also created showing the average level of sophistication of all logistics practices and the percentage of logistics costs of the 99 companies analyzed (figure 1).

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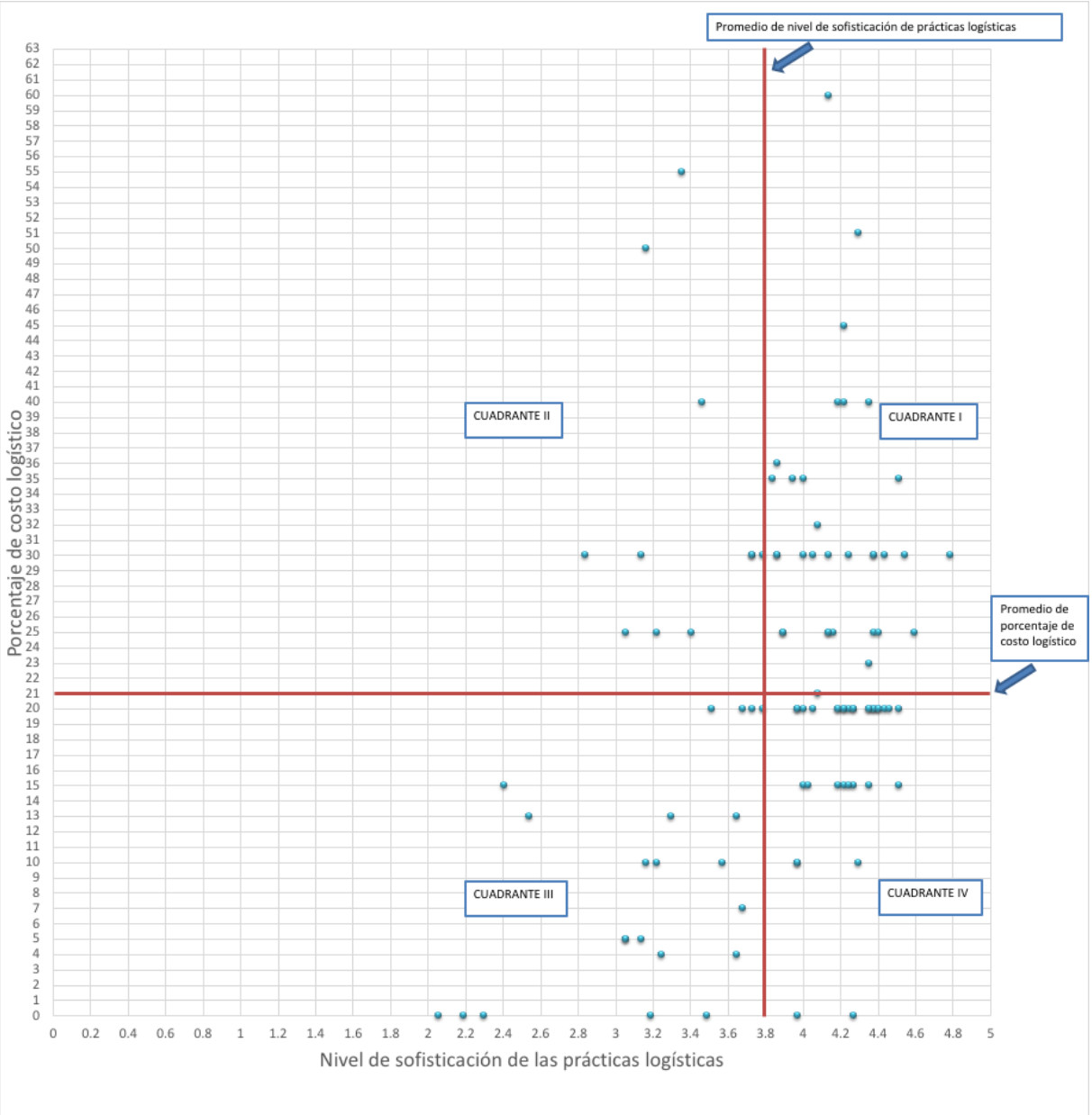
Figura 1. Nivel de sofisticación de la logística y porcentaje de costo logístico en PyMEs



Fuente. Elaboración propia con base en encuesta original

Figure 1 shows that in quadrant I companies with logistics practices and logistical costs are above average, that is, they perform best practices, but they cost a lot. In quadrant II, there are the companies with the level of sophistication of logistic practices below the average and the logistics cost above the average. These companies are those that require more attention, since their practices are not adequate and their costs are the highest. In quadrant III are those that have a level of sophistication of logistic practices below the average, with an average of costs below the average, that is, their practices are not the best, but their costs are not that high.

Finally, in quadrant IV, there are the points referring to the companies with the best level of sophistication of logistics practices, that is, they are above the average (3.8) and with a logistical cost lower than the average, which It is 21%. It can be said that these are the best companies in the field of logistics, since they carry out the best practices with the lowest costs.

Followed by a more detailed description of the companies within each of the quadrants.

Quadrant I

The companies that are in quadrant I have the following characteristics:

Tabla 3. Frecuencias por criterio exporta

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	SÍ	5	15.6	15.6	15.6
	NO	27	84.4	84.4	100.0
	Total	32	100.0	100.0	

Fuente: Elaboración propia

Tabla 4. Frecuencias por criterio origen de capital

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	NACIONAL	30	93.8	93.8	93.8
	EXTRANJERO	2	6.3	6.3	100.0
	Total	32	100.0	100.0	

Fuente: Elaboración propia

As shown in Tables 3 and 4, companies within the first quadrant are, for the most part, non-exporters. Nine of them belong to the basic metal sector: 50% are small and 50% medium, their origin of capital is mostly national.

Quadrant II

Regarding sector two, companies have the characteristics mentioned in tables 5 and 6 below:

Tabla 5. Frecuencias por criterio exporta

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	NO	11	100.0	100.0	100.0

Fuente: Elaboración propia

Tabla 6. Frecuencias por criterio origen de capital

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	NACIONAL	11	100.0	100.0	100.0

Fuente: Elaboración propia

In this quadrant is the smallest number of companies, only 11, of which none exports. Eight are small and only three medium, all are of national capital origin.

Quadrant III

Tabla 7. Frecuencias por criterio exporta

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	NO	22	100.0	100.0	100.0

Fuente: Elaboración propia

Tabla 8. Frecuencias por criterio origen de capital

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	NACIONAL	22	100.0	100.0	100.0

Fuente: Elaboración propia

As shown in tables 7 and 8, the companies in this quadrant are all of national capital and not exporters.

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Quadrant IV

Tabla 9. Frecuencias por criterio exporta

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	SÍ	3	8.8	8.8	8.8
	NO	31	91.2	91.2	100.0
	Total	34	100.0	100.0	

Fuente: Elaboración propia

Tabla 10. Frecuencias por criterio origen de capital

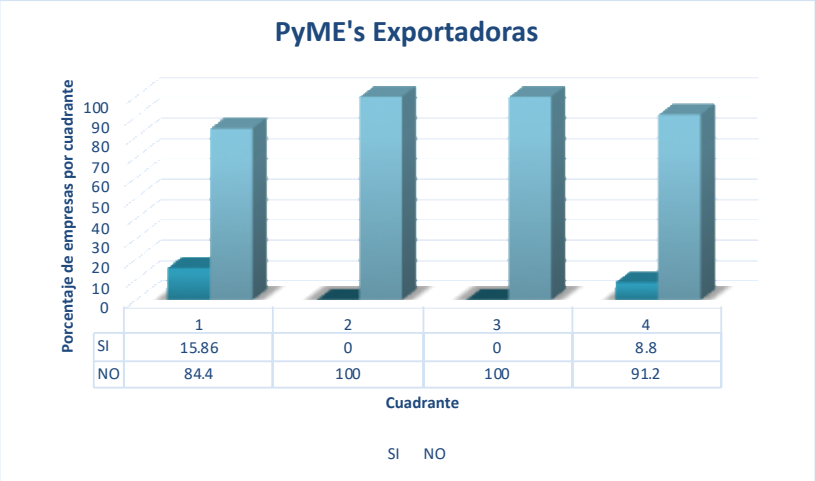
		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válidos	NACIONAL	28	82.4	82.4	82.4
	EXTRANJERO	6	17.6	17.6	100.0
	Total	34	100.0	100.0	

Fuente: Elaboración propia

The companies in quadrant IV that are shown in tables 9 and 10, as mentioned before, are the ones that have the best performance in logistics. In total, there are 34 that are in these conditions and, of these, only 3 export. In their majority, they belong to the sector of basic metals, besides being of small size; the origin of capital is predominantly national.

The following graphs show an analysis of the percentages of the companies within each of the quadrants.

Figura 2. PyMEs exportadoras



Fuente. Elaboración propia con base en la encuesta original

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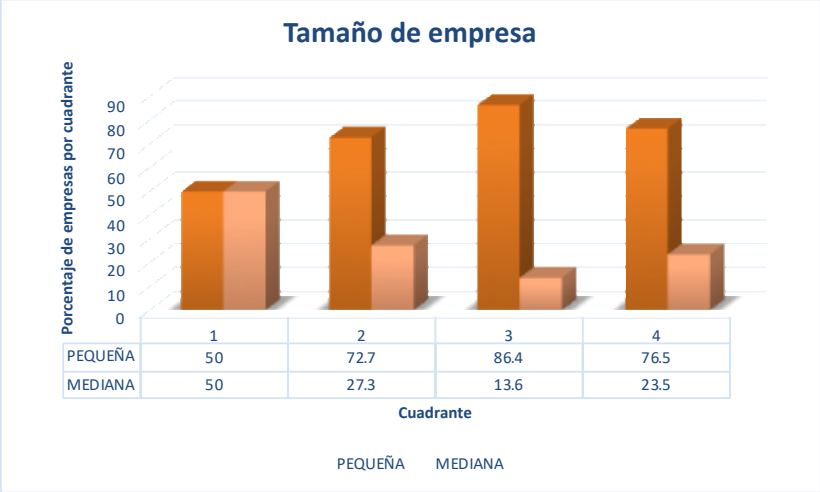
In Figure 2 it can be seen that, of the total of the companies surveyed and the different quadrants, most are not exporters. The interesting thing about this graph is that the largest number of companies that do export are in quadrants I and IV. The similarity of these two quadrants lies in that, in both, companies are found with the best logistical practices, that is, those that are above the average. This proves that companies connected to globalized chains carry out best practices.

Figura 3. PyMEs por tamaño de empresa



Fuente. Elaboración propia con base en la encuesta original

Regarding the size of companies, figure 3 shows the quadrant that has the highest percentage of small companies, which is III. As already mentioned, those that belong to this sector are the companies that have their logistics practices and their costs below the average.

Figura 4. PyMEs por origen de capital

Fuente. Elaboración propia con base en la encuesta original

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Regarding the origin of capital (figure 4), companies in quadrants I and IV are those that have a greater number of companies with foreign capital origin and, as already mentioned, it seems that companies connected to globalized chains are those that perform best logistical practices.

Conclusions

The most interesting finding was that the companies that perform best logistic practices belong -in a greater percentage- to the group of companies that export or that have a foreign capital origin, which means they are making better logistic practices, because they are connected to globalized chains . This seems to be logical reasoning, because if a company has a client that is a world-class company and is established in a different country, the SME will have to have a greater degree of sophistication in regard to their logistics practices, just to be able to fulfill the deliveries to that client. However, a company that has clients that are not so demanding, will not be given the task of increasing their logistical capabilities, since, with the activities performed in its most basic form, you can meet deliveries without costing too much.

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Curación de datos	**Irvin Edgardo Loza covarrubias**
Escritura - Preparación del borrador original	**Rocío Montserrat Campos García y Salomón Montejano García (igual)**
Escritura - Revisión y edición	**Rocío Montserrat Campos García y Salomón Montejano García (igual)**
Visualización	**Irvin Edgardo Loza covarrubias y Salomón Montejano García**
Supervisión	**Rocío Montserrat Campos García**
Administración de Proyectos	**Rocío Montserrat Campos García**
Adquisición de fondos	**Miguel Alejandro García Vidales**