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Methodology for the distribution of productive spaces for SMEs

Metodología para la distribución de espacios productivos para PYMES

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Abstract

The objective of this article is to generate a methodology that improves productive spaces in SMEs, in which the sales area available in the stores is analyzed, taking as a case study, the one made for didactic purposes in class taught by one of the co-authors in the company Super Vale, in which thanks to the work of linkage, it was allowed to carry out this research and design this methodology. Which is currently applied and which is followed.

Methodology, Improves productive spaces, SMEs

Resumen

El presente artículo, tiene como objetivo generar una metodología que mejore los espacios productivos en pymes, en el cual se analiza la superficie de venta disponible en las tiendas, tomando como caso de estudio, el realizado para efectos didácticos en clase impartida por uno de los coautores en la empresa Súper Vale, en la que gracias al trabajo de vinculación, se permitió realizar esta investigación y diseñar esta metodología. La cual actualmente se aplica y de la cual se lleva seguimiento.

Metodología, Distribución de espacios productivos, PYMES

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Introduction

Undoubtedly, the MPYMES are the main source of employment in the country, being this type of companies the generators of at least 52% of the Gross Domestic Product, besides this they are the main source of employment in the country; in 2015, only in the Micro companies 75.4% of the employment in our country was generated, through 3, 952, 422 companies (INEGI, 2016).

The previous numbers reflect the importance of MSMEs in our country, however the vast majority of academic or technical information that is available to the academic community or to micro-entrepreneurs, provide us methodologies or work schemes that are not specifically adapted to the needs of the micro entrepreneur. There are few authors that generate information for this sector of the economy.

Size	Business		Busy staff
	Number	Participation (%)	Participation (%)
Micro	3 952 422	97.6	75.4
Small	79 367	2.0	13.5
Medium	16 754	0.4	11.1
Total	4 048 543	100.0	100.0

Table 1 Companies by size and busy staff
Source INEGI 2016

It is important to emphasize the fact of the specific needs of micro and small entrepreneurs, since they not only sustain Mexico's employment and economy, but also by themselves are an unexploited source of knowledge, that is why design a simple model and at the same time adapted to their needs, is transcendental for the effects of their economic results.

That is why design a system or methodology that allows them to be competitive in terms of cost reduction and in turn use of the physical space of sales, is a priority.

The costs that have to face micro entrepreneurs, are sometimes unaffordable because they lack a prior market study and are released to the market without knowing if their business model will really allow them to compete.

Once a business has started, backing down or simply detecting failures in companies that lack experience or their owners or managers, have no knowledge, is nothing short of impossible, what is sought is to generate a methodology that allows Simple way to analyze results and make decisions.

Case Study: Super Vale

The case study that is addressed corresponds to a commercial company, considered in the catalog of the Ministry of Economy as a small company, which is a Commercial Warehouse of groceries and raw materials, in which the inhabitants of the Municipality make their purchases.

It is important to note that this company has to compete in this small municipality on the coast of Veracruz, with other commercial chains such as Super Farmacia Medina (Cadena Regional), Tiendas Lores (Regional Chain), as well as stores OXXO (National Chain). These stores, due to their size and economic potential, have a wider dealer network and preferential prices with many of their suppliers.

The population of the locality, mostly have a low income, so the market has an economic constraint to purchase groceries in large quantities, contrary to large cities where the income of families is more abundant.

The main problem observed in the case study in question, was the short rotation of inventories that counted, increasing inventory costs for maintenance. However, it is important to point out that there was an excessive exposure of certain products, leaving a smaller exhibition space for the sale of some others, or shelves in which there was no product to exhibit.

Derived from the observation proceeded to investigate the cause of this problem, which was obtained as a conclusion that the decision-making does not have a solid analysis in terms of distribution of products in store, in addition to a crude economic analysis of purchases:

- Merchandise is purchased when it is discounted, regardless of the purchase volume and without analyzing the existing inventory.
- Most purchases are made in cash, minimizing financing through suppliers.

- There is no classification of goods in financial terms, in some cases they are unaware of historical costs, since their inventory is too old
- Accumulate non-perishable inventory, without considering the maintenance cost of the inventory or the opportunity cost of using that space only as a warehouse.

That is why a simple methodology was designed by microentrepreneurs with situations similar to those mentioned above.

Methodology

For the creation of the strategy of distribution of store spaces in commercial warehouses taking as a particular case the commercial warehouse SUPER VALE object of study of this research, it was necessary to create certain indicators that allowed to make the classification of the product lines.

Based on the indicators obtained, it is possible to classify the product lines in terms of performance (ratio of sales volume vs. revenue). The indicators seek from the information obtained from their database, call inventories, as well as sales reports, the yields obtained in sales per square meter and the space used in store ready for marketing. The designed indicators are shown developed and detailed below.

$$IV \div LP^1 = \frac{Ventas\ totales}{Ventas\ de\ la\ linea\ "x"} \quad (1)$$

This index provides the percentage that represents each line of products in relation to the total sales that are being analyzed.

This first indicator seeks to identify the production lines that offer the greatest income, in order to classify them into at least three large groups, sales.

Groups can be classified as follows: Main (a), support (b) and low income (c). This classification allows us to make decisions regarding the purchase of more inventory or to determine again the reorder points of each order, as the case may be.

It is preponderant that this methodology is simple, since in most cases SMEs are companies that do not adhere to a method, being the people who manage, generally owners and managers at the same time, also according to the Bulletin of press no. 285/16 where it presents the National Survey on Productivity and Competitiveness of Micro, Small and Medium Enterprises (ENAPROCE), in Micro, small and medium enterprises, have a distribution of only 14.7%, 20.9% and 18.0% with higher level education, respectively. Therefore it is inferred that most of them lack a scientific methodology for their daily work.

#	Line	Monthly sales	Total sale of monthly store	% sales per product line
1	Groceries	$250,000.00	$505,000.00	49.50%
2	Detergents	35,000.00	505,000.00	6.93%
3	Fabric softener	15,000.00	505,000.00	2.97%
4	Chlorine	12,000.00	505,000.00	2.38%
5	Diapers for baby and adult	10,900.00	505,000.00	2.16%
6	Dairy products	11,000.00	505,000.00	2.18%
7	Sausage	13,500.00	505,000.00	2.67%
8	Perfumery	10,900.00	505,000.00	2.16%
9	Cleaning articles	25,000.00	505,000.00	4.95%
10	Fruits and vegetables	18,000.00	505,000.00	3.56%
11	Chilies and seeds	7,460.00	505,000.00	1.48%
12	Wines and liquors	25,000.00	505,000.00	4.95%
13	Refreshments	14,000.00	505,000.00	2.77%
14	Bath soap	6,800.00	505,000.00	1.35%
15	Shampoo	9,700.00	505,000.00	1.92%
16	Disposable	12,000.00	505,000.00	2.38%
17	Veladoras	7,600.00	505,000.00	1.50%
18	Frozen	8,600.00	505,000.00	1.70%
19	Toilet paper	12,500.00	505,000.00	2.48%

Table 2 Monthly Sales
Source: Super Vale (company case study)

As part of the case study we observed that the line of groceries represents 49.50% in relation to the total income, followed by the line of detergents, which are those with higher indexes.

Now the lines with the lowest index are the lines of bath soap, candles, chiles and seeds just to mention the three lowest.

But this does not determine a classification for the distribution of spaces of lines within the store so it was necessary a more in-depth analysis to know the relation with the square meters that they occupy within the store area, for it they were analyzed and calculated the following indicators:

$$Effective\ sales\ area\ (AEV) = total\ store\ area - \Sigma\ area\ occupied\ by\ line \quad (2)$$

This indicator allows to know what is the effective area occupied by the product lines, which are what are generating the current productivity of the store.

Such result does not mean that the space considered that generates an additional cost does not contribute to the sales process, since a large part of it is distributed in corridors and accesses that allow customers to carry out the purchase activity, but in the same way check that there are quite spacious areas without occupying.

To reduce the costs for additional area occupied by spacious areas that are not generating any value, it is advisable to insert small commercial islands, whether they are their own or given to rent, thus expanding the diversification of their services or products offered within the establishment. , allowing you to occupy said space profitably, by means of a distribution by calculation of the additional cost per area assigned to the store.

This is done once the spaces of corridors and accesses of purchase have been defined so that they are not limited in terms of comfort, and once knowing the excess space, implement said strategy.

$$Productivity\ for\ sale\ per\ m2\ of\ line\ of\ product = \frac{Total\ sales\ of\ product\ line}{m2\ occupied\ per\ product\ line} \quad (3)$$

The indicator of productivity in sale per m2 of product line allows to know what is the capacity of each product line to generate sales per m2. Currently the store operates 19 lines which are detailed in the table below.

#	Line	Monthly sales	m2 occupied by line	Productivity per m2 occupied of the product line
1	Groceries	$250,000.00	19.35 m2	$ 12,919.90
2	Detergents	$ 35,000.00	6.66 m2	$ 6,003.43
3	Fabric softener	$ 15,000.00	2.44 m2	$ 6,147.54
4	Chlorine	$ 12,000.00	2.6 m2	$ 4,615.38
5	Diapers for baby and adult	$ 10,900.00	6.17 m2	$ 1,766.61
6	Dairy products	$ 11,000.00	3.22 m2	$ 4,954.95
7	Sausage	$ 13,500.00	2.90 m2	$ 3,253.01
8	Perfumery	$ 10,900.00	2 m2	$ 5,450.00
9	Cleaning articles	$ 25,000.00	9.12 m2	$ 5,133.47
10	Fruits and vegetables	$ 18,000.00	91.5 m2	$ 196.72
11	Chilies and seeds	$ 7,460.00	2.02 m2	$ 3,693.07
12	Wines and liquors	$ 25,000.00	2.07 m2	$ 12,077.29
13	Refreshments	$ 14,000.00	20.15 m2	$ 1,272.73
14	Bath soap	$ 6,800.00	2.1 m2	$ 3,238.09
15	Shampoo	$ 9,700.00	4.14 m2	$ 2,343.00
16	Disposable	$ 12,000.00	6.94 m2	$ 1,729.11
17	Veladoras	$ 7,600.00	1 m2	$ 7,600.00
18	Frozen	$ 8,600.00	3 m2	$ 2,866.66
19	Toilet paper	$ 12,500.00	9.25 m2	$ 1,351.35

Table 3 Productivity $ per m2 in Super Vale
Source: Super Vale (company case study)

As can be seen according to calculations made, with the sales data and the measurement of the real space of the site occupied by product line, it was obtained that the line that generates the most sales per square meter is that of groceries, followed by wines and liquors and candles having these the highest productivity per m2. In the same way, the lines with the lowest productivity are fruits and vegetables; soda and toilet paper just to mention a few.

The calculation of this indicator allows knowing which product lines are the most productive in terms of income. This allows the entrepreneur to decide on a better policy for distributing space for sales, since it allows him to suppress sales lines or, failing that, designate more space for those that are more productive and that his turnover of inventory is greater.

For example, in the current case of the SUPER VALE store, the lines that take up the most space are Groceries, Refreshments, Toilet paper and fruits and vegetables. In this case the grocery space is justified, since it is the line with the highest level of sales, but in the case of soft drinks, toilet paper and fruits and vegetables are the lines with the lowest sales levels. , and therefore according to the strategy approach should be the least space occupied within the store area.

In addition they must be given as a priority to get offers as they are low turnover and assign a place close to those that have more output and thus accelerate the sale process.

Otherwise it is the one of the lines of Veladoras, Wines and liquors said lines are some of those that occupy smaller space in store and of those that more sales generate, therefore these lines mainly will have to assign a greater space to them.

The strategy of categorization of these lines within the shop under study SUPER VALE is specified as follows:

Line with high level of sale	Line with average sales level	Line with low sales level
Groceries	Chlorine	Frozen
Wines and liquors	Dairy products	Shampoo
Veladoras	Chilies and seeds	Diapers for baby and adult
Fabric softener	Sausage	Disposable
Detergents	Bath soap	Toilet paper
Perfumery		Refreshments
Cleaning articles		Fruits and vegetables

Table 4 Classification of product lines according to their level of sale
Source: Super Vale (company case study)

Therefore, in general terms, it can be concluded that the lines included in the "Line with a high level of sale" classification are those that should be allocated the greatest possible space within the store, while those that are located as "Line with average level of sale "a space inferior, and that therefore the classified ones within" Line with low level of sale "will have to assign them the smaller space compared with the first and second.

In the same way, they should be considered as primordial to get offers or be located next to the lines with the highest degree of attraction, especially those that are in the last positions of the same list, in order to accelerate the sales of said products.

$$\%\ of\ effective\ sales\ space\ per\ product\ line = \frac{m2\ per\ product\ line}{Total\ store\ area} \quad (4)$$

The percentage of effective sales space per product line is an indicator that allows knowing the proportionality of the space occupied per line with respect to the total store area, in the same way it is a way to determine which lines are those that occupy more or less space.

#	Line	m2 occupied per line	Total area of store occupied for sale	% of effective sales space per product line
1	Groceries	19.35 m2	700 m2	2.76%
2	Detergents	6.66 m2	700 m2	0.95%
3	Fabric softener	2.44 m2	700 m2	0.35%
4	Chlorine	2.6 m2	700 m2	0.37%
5	Diapers for baby and adult	6.17 m2	700 m2	0.88%
6	Dairy products	3.22 m2	700 m2	0.46%
7	Sausage	2.90 m2	700 m2	0.41%
8	Perfumery	2 m2	700 m2	0.29%
9	Cleaning articles	9.12 m2	700 m2	1.30%
10	Fruits and vegetables	91.5 m2	700 m2	12.20%
11	Chilies and seeds	2.02 m2	700 m2	0.29%
12	Wines and liquors	2.07 m2	700 m2	0.29%
13	Refreshments	20.15 m2	700 m2	2.88%
14	Bath soap	2.1 m2	700 m2	0.30%
15	Shampoo	4.14 m2	700 m2	0.59%
16	Disposable	6.94 m2	700 m2	0.99%
17	Veladoras	1 m2	700 m2	0.14%
18	Frozen	3 m2	700 m2	0.43%
19	Toilet paper	9.25 m2	700 m2	1.32%

Table 5 Effective space of sale x line
Source: Super Vale (company case study)

For this case study can be seen that the line of Fruits and Vegetables is the one with more space, followed by the line of soft drinks, groceries, toilet paper, cleaning items to mention the highest percentages. And in terms of lower percentage of occupied space compared to the store area are Veladoras, perfumery, wines and liquors, chiles and seeds.

So when performing this calculation in addition to categorizing which are occupying a greater or smaller area.

Allows a comparison with the income levels that allows you to generate such percentage of space within the store in relation to the production and total area of store. This has allowed to define the strategy of classification of the product lines that were detailed in this indicator, as well as the indicator that will be specified below.

$$Productivity\ in\ utility\ by\ product\ line = (VT\ for\ LP)\ (\%\ of\ profit\ margin) \quad (5)$$

This indicator allows us to know which product lines managed by the store are those that generate the most sales profits, something very different from sales levels, which does not mean that by selling more than one line, the store obtains greater utility. Therefore, calculations have also been made for this specific case.

It is important to mention that for the purpose of the investigation, an average of 14.83% was applied as a percentage of profit margin per product line, since for reasons of confidentiality the store provides an estimate.

To what is grossly obtained the utility generated by line, and allows to know broadly that the line that apparently generates the highest productivity in terms of profit margin is that of groceries, followed by detergents, wines and spirits, cleaning supplies, detergents etc. and those that generate the least profit margins are candle, frozen, chili and seeds just to mention the lowest. But this classification would not allow us to really know how much profit is obtained per square meter of each line that is why this indicator serves as support for the subsequent calculation of the indicator of "productivity in real profit per m2" in which if you consider the square meters occupied per line.

$$Actual\ profit\ per\ m2 = \frac{Utility\ by\ line}{m2\ occupied\ per\ line} \quad (6)$$

This indicator, as the name indicates, represents the real value of productivity in utility generated by the product line, that is, the relation between utility and square meter.

In this way it is known exactly how much each line generates with respect to the others.

#	Line	m2 occupied per line	Utility obtained by product line	Average utility per m2 occupied per product line
1	Groceries	19.35m^2	$37,075	$ 1,916.02
2	Detergents	6.66 m^2	$5,190.50	$ 779.35
3	Fabric softener	2.44 m^2	$2,224.50	$ 911.68
4	Chlorine	2.6 m^2	$1,779.60	$ 3,930.92
5	Diapers for baby and adult	6.17 m^2	$1,616.47	$ 261.94
6	Dairy products	3.22 m^2	$1,631.30	$ 506.61
7	Sausage	2.90 m^2	$2,002.05	$ 690.36
8	Perfumery	2 m^2	$1,616.47	$ 808.23
9	Cleaning articles	9.12 m^2	$3,707.50	$ 406.52
10	Fruits and vegetables	91.5 m^2	$2,669.40	$ 29.17
11	Chilies and seeds	2.02 m^2	$1,106.32	$ 547.68
12	Wines and liquors	2.07 m^2	$3,707.50	$ 1,791.06
13	Refreshments	20.15m^2	$2,076.20	$ 103.04
14	Bath soap	2.1 m^2	$1,008.44	$ 480.21
15	Shampoo	4.14 m^2	$1,438.51	$ 347.47
16	Disposable	6.94 m^2	$1,779.60	$ 256.43
17	Veladoras	1 m^2	$1,127.08	$ 1,127.08
18	Frozen	3 m^2	$1,275.38	$ 425.13
19	Toilet paper	9.25 m^2	$1,853.75	$ 200.40

Table 6 Real Utility per m2
Source: Super Vale (company case study)

Through the comparative analysis carried out by product line we can give an account of the most profitable lines, that is, those that allow you to obtain the highest levels of utility to the store.

When said objective and the interest of the store is to obtain greater profits. According to calculated results, it is defined that the line that generates the highest profit margin is that of chlorine which, despite not having large sales volumes and with a small area compared to that of groceries or wines and liquors, has a capacity of generate per square meter a little more than double the profits.

Now the line with the lowest capacity to generate profits is Fruits and Vegetables, however it is the one that occupies the largest area within the store space, in the same way it happens with the area occupied with the line of soda and toilet paper to mention those that generate less profits.

Those lines are the following and have been categorized as follows:

High performance lines	Average performance line	Low performance line
Chlorine	Sausage	Cleaning articles
Groceries	Chilies and seeds	Shampoo
Wines and liquors	Dairy products	Baby and adult diapers
Veladoras	Bath soap	Disposable
Fabric softener	Frozen	Toilet paper
Perfumery		Refreshments
Detergents		Fruits and vegetables

Table 7 Categorization of product lines according to their performance
Source: Super Vale (company case study)

In this way the winery can distribute these lines in the store area according to a value order and assign them specifically the largest possible space more than any other, since this would favor in having a distribution of spaces obtaining the maximum performance in utilities per square meter.

The lines that are within the category "High performance lines" are those that generate higher profits and therefore are the most important to monitor, assigning them the largest possible space and a placement that ensured the greatest purchase attraction for the customer. Likewise, as those in "Average performance line" for these it is advisable to set an area lower than those used for the lines of the first category, and consequently the same distribution procedure is carried out for the last category with respect to the previous.

On the other hand, as an aim of increasing the benefits of said strategic classification, it is recommended to extend the catalog of brands of those same lines, preferably to those of the first and second categories, since they are the ones with the highest profit margins. Likewise, it is suggested that a surveillance should be maintained with the low-margin cataloged products to take the subsequent decision of substitution and / or purchase reduction, contributing to a reduction in costs.

The perfect combination between productivity per sale and productivity per utility allows the distribution of more profitable space that the store can have, since at the same time selling large volumes is also contributing to obtaining higher profits.

But this is at the discretion of the entrepreneur once carried out such classification methodology, choosing which lines he prefers to continue selling in large quantities and which are the most convenient to generate profits, because they will not always be on par with sales with profits, that is to say that the same line is the one that generates more profits or it may be found that a certain line has a good level of sales but does not generate profitable profits.

Calculation of soil occupation coefficient

By calculating the coefficient of occupation of the floor, the degree of comfort of the establishment is measured, for the case study of the SUPER VALE store, the following data is available:

$$Linear\ meters = N°\ of\ gondolas\ X\ N°\ of\ element\ of\ gondola\ X\ length\ of\ each\ element\ X\ N°\ of\ facades \quad (7)$$

15 gondolas	12 gondolas	8 gondolas
3 elements	3 elements	1 element
Long. of c / elem.1.23 mts	Long. of c / elem.1.23 mts	Long. of c / elem.1 mt
2 facades	1 facade	4 facades
Linear meters of the floor = 15x3x1.23x2 = 110.7	Linear meters of soil	Linear meters of the ground = 8x1x1x4 = 32

Table 8 Metering and calculation of linear meters occupied by the gondolas within the establishment.
Source: Super Vale (company case study)

$$COS = \frac{Number\ of\ linear\ meters\ x\ 100}{Sales\ area\ in\ m2} \quad (8)$$

Total linear meters	186.98 meters
COS= 186.98 Mx100/700 m2	126.71%

Table 9 Calculation of the soil occupation coefficient
Source: Super Vale (company case study)

With the calculation of the coefficient of occupation of the floor has been able to account if the store needs to expand its corridors, as this allows us to know how broad and defined are the accesses in relation to the amounts of gondolas exposed and space linear that has been destined for your exhibition.

A favorable result with a C.O.S of 26.71% has been obtained, since according to the percentages of an ideal C.O.S this should range between 25% and 40%. Far below these figures there will be a feeling of emptiness and conversely a feeling of stacking regardless of the discomfort of transit in the corridors. Therefore it is found that it is not necessary to design a new shopping route within the store space, since it is in the favorable ranges of convenience, derived from changes made by the store after the study performed process reengineering.

Results

To date, more than a year after having carried out the research that gave rise to the present, the company case study, has implemented part of the recommendations that were generated, resulting in abatement and / or reduction of some costs in the incurred, as well as a better distribution of the store in terms of space and productivity of the same.

In global terms, since the information the company keeps in terms of confidentiality, they report having obtained a reduction in their overall costs of 3%. It should be mentioned that it was not implemented throughout the store, due to the uncertainty that originally represented.

Conclusions

The aforementioned case study, represents in a very simple way a methodology for the analysis of occupation of spaces for a store and thus make it more productive. It is of the utmost importance that SMEs have simple and above all useful methodologies, since as mentioned at the beginning of the present, in a large percentage they are the productive force of the country, but also their productive life is very short, due to many restrictions that these face.

There are undoubtedly factors such as the tax burden, inflation and other macroeconomic factors that complicate the actions of this type of companies, coupled with the lack of methodology that SMEs often suffer when competing against large consortiums or commercial groups costs of operating from one to the other are exponentially between one and the other.

The training of micro and small entrepreneurs is imperative, since most of them always operate under an empirical scheme, the creation of methodologies or tools to be operated by these micro and small entrepreneurs, are definitely one of the keys to business success the same.

It is worth mentioning that this methodology was carried out in a company with commercial activities, however it is not exclusive of this type of business, since the use, in terms of yields per square meter, for SMEs is of the utmost importance in the search for consolidation within the market whom they face daily.

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