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THE IMPORTANCE OF THE USE OF TOOLS IN INVENTORY MANAGEMENT IN MPES: APPLICATION OF THE ABC CURVE IN THE DATA OF A SMALL RETAIL COMPANY IN THE STATE OF RIO DE JANEIRO

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Area: *2 - LOGISTICS*
Sub-Area: *2.1 - SUPPLY CHAIN MANAGEMENT*

Abstract: *IN VIEW OF THE CHALLENGES FACED BY MICRO AND SMALL ENTERPRISES (MSE), SUCH AS INVENTORY BREAKDOWN, OBSOLETE INVENTORY AND PRODUCT BREAKDOWN, THE IMPORTANCE OF THE USE OF INVENTORY MANAGEMENT TOOLS AT MSES WILL BE DEMONSTRATED IN THE STUDY. THE USE OF THE ABC CURVE WILL BE PRESENTED TO REDUCE COSTS AND CONSEQUENTLY INCREASE THE BUSINESS PROFIT. THEREFORE, IT IS SEARCHED TO INDICATE THE ABC CURVE AS A MEANS OF SOLUTION TO REDUCE BOTTLENECKS IN THE STOCK ORGANIZATION PROCESSES, THROUGH THE APPLICATION OF THE ABC CURVE WITH DATA FROM A SMALL COMPANY, WHICH SELLS PERSONAL PROTECTION EQUIPMENT (PPE), LOCATED IN THE STATE OF RIO DE JANEIRO. FOR THIS, PURCHASE AND SALE DATA WERE COLLECTED OF 40 ITEMS OF THE COMPANY UNDER STUDY IN 2020, WHICH THESE DATA WERE AVAILABLE IN ABC CLASSIFICATIONS BY TOTAL COST AND CONSUMPTION, ALLOWING COMPARATIVE ANALYSIS. WITH THIS, IT IS EXPECTED TO DEMONSTRATE THE REDUCTION IN LOGISTIC COSTS AND OPTIMIZE OPERATIONAL PROCESSES, REDUCING THE LOSS OF DAMAGED ITEMS, IN ADDITION TO ALLOWING A MORE CONSISTENT PLANNING ABOUT WHEN AND WHAT TO BUY, INCREASING THE BARGAINING POWER OF THE PURCHASING DEPARTMENT AND ENSURING THE LEVEL OF CONSUMER SATISFACTION.*

Keywords: *ABC CLASSIFICATIONS; MSE; INVENTORY MANAGEMENT; COST REDUCTION.*

THE IMPORTANCE OF THE USE OF TOOLS IN INVENTORY MANAGEMENT IN SME S: APPLICATION OF THE ABC CURVE IN THE DATA OF A SMALL RETAIL COMPANY IN THE STATE OF RIO DE JANEIRO

Resumo: *DIANTE DOS DESAFIOS ENFRENTADOS DIARIAMENTE POR MICRO E PEQUENAS EMPRESAS (MPE), COMO EXEMPLO: A RUPTURA DE ESTOQUE, O ESTOQUE OBSOLETO E A AVARIA DE PRODUTOS, SERÁ DEMONSTRADO NO ESTUDO A IMPORTÂNCIA DO USO DE FERRAMENTAS DE GESTÃO DO ESTOQUE NAS MPES. SERÁ APRESENYADO O USO DA CURVA ABC PARA REDUZIR CUSTOS E CONSEQUENTEMENTE AUMENTAR O LUCRO DO NEGÓCIO. COM ISSO, SE BUSCA INDICAR A CURVA ABC COMO MEIO DE SOLUÇÃO PARA REDUZIR GARGALOS NOS PROCESSOS DE ORGANIZAÇÃO DO ESTOQUE, ATRAVÉS DA APLICAÇÃO DA CURVA ABC COM DADOS DE UMA EMPRESA DE PEQUENO PORTE, QUE COMERCIALIZA EQUIPAMENTOS DE PROTEÇÃO INDIVIDUAL (EPI), LOCALIZADA NO ESTADO DO RIO DE JANEIRO. PARA ISSO, FORAM COLETADOS DADOS DE COMPRA E VENDA DE 40 ITENS DA EMPRESA EM ESTUDO NO ANO DE 2020, EM QUE ESSES DADOS FORAM DISPONIBILIZADOS EM CLASSIFICAÇÕES ABC POR CUSTO TOTAL E POR CONSUMO, PERMITINDO UMA ANÁLISE COMPARATIVA. COM ISSO, ESPERA-SE DEMONSTRAR A REDUÇÃO DE CUSTOS LOGÍSTICOS E OTIMIZAR OS PROCESSOS OPERACIONAIS, REDUZINDO A PERDA DE ITENS DANIFICADOS, ALÉM DE PERMITIR UM PLANEJAMENTO MAIS CONSISTENTE SOBRE QUANDO E O QUE COMPRAR, AUMENTANDO O PODER DE NEGOCIAÇÃO DO SETOR DE COMPRAS E GARANTINDO O NÍVEL DE SATISFAÇÃO DOS CONSUMIDORES.*

Palavras-chaves: *CLASSIFICAÇÕES ABC; MPE; GESTÃO DE ESTOQUE; REDUÇÃO DE CUSTOS.*

1. INTRODUCTION

1.1 Contextualization

In the contemporary world, logistics plays an important role for companies. It makes it possible to integrate information about the quantity of a certain material in stock and the sale of this material to customers, in addition to allowing a company's managers to make more assertive decisions, through tools and data.

According to a study carried out by SEBRAE (2014), on the main causes that led small companies to bankruptcy in the first 5 years of life, carried out with 1,846 companies, 46% of them were unaware of their customers' consumption habits. In addition, 33% did not know the best suppliers for their business and 50% did not plan ways to deal with product waste, demonstrating that these are logistical factors relevant to the institution's survival.

With this, Ribeiro and Bouzada (2017) state that most companies, institutions and government agents need help, in some instance, of a logistics specialist. In addition, it is noticeable that the demand for professionals specialized in areas of logistics activity, especially at the managerial level, exceeds the supply of well-trained personnel.

Logistical methods and processes are used all over the world, from the most developed countries to the third world. According to the World Bank (2018), the 2018 *Logistics Performance Index* (LPI) shows that the 5 countries with the best index this year were Germany, Sweden, Belgium, Austria and Japan. On the other hand, using this same index, Brazil is in position 56 of the rank. Therefore, we can see that we still need to make a lot of progress in this regard to get closer to major world references.

1.2 Problem Description

In the 21st century, organizations have constantly sought a balance between the amount of materials needed to meet demand and the cost of these stored items, in which the lack of sought after products on the shelves generates loss of sales and confidence, as well as having a stock in excess represents paralyzed capital and operating costs related to the space occupied, preventing more relevant materials from being stored (AMIRI-AREF; KLIBI; BABAI, 2018; BOWERSOX et al, 2014).

In addition, inventory management is essential for a good competitive strategy and to generate revenue for an organization, with supply chain management being responsible for capturing 60 to 80% of sales, according to Ballou (2007) and Baptista (2020). With this, we can say that companies without investment in their inventory management are doomed to a reduction in profitability.

In this context, Vago et al (2013) highlights the ABC curve as a tool to assist in inventory management, by prioritizing the items most desired by customers and with greater consumption value. The benefits of this tool are very noticeable in MSEs, as they do not have a high financial reserve to withstand times of crisis.

Knowledge of logistics costs is essential for any retail company. According to Segreti, Farber and Mondini (2004), inventory maintenance represents about two thirds of an organization's logistical costs, and it is essential to have accurate information about available space, missing items, excess items, etc.

Inventory management failures, such as malfunctions, lack or excess of a stored item, are problems caused by the lack of information about the company's stock. Bertaglia (2016)

states that items with little movement can become obsolete, generating high storage costs, as well as the lack of them incurs in lost sales.

These problems can be seen more clearly in MSEs, resulting in an increase in storage costs both with excess materials and with the level of service offered to the customer, as he leaves the store without the desired product.

With this, this study seeks to answer the following question: how is it possible to avoid and solve bottlenecks in the purchasing and storage processes of a small Brazilian retail company?

In this sense, the objectives of the study are to elaborate the ABC curve per total cost and per consumption, estimate the costs generated by consumer dissatisfaction, carry out a comparative analysis of the ABC curve per total cost and per consumption and indicate the ABC curve as a means of solution. to reduce bottlenecks in the process of organizing the stock of a retail MSE in the state of Rio de Janeiro.

2. THEORETICAL FOUNDATION

For the military, logistics was designed for war strategies, worrying about how to supply and feed soldiers, in addition to devising strategies to move ammunition, equipment and food (SILVA; MUSETTI, 2003). In this case, GS1 Brasil (2009) conceptualizes logistics as a war strategy with active participation in planning and carrying out activities such as storage, transport, material evacuation and distribution, being able to apply this knowledge and experience in companies.

In addition, Ballou (2007) states that logistics is a fundamental part for the functioning of commerce as we know it in today's decades, and it is essential to have it fully functioning in business, as it contributes decisively to providing improvements to the general economic standard of living. , so that logistics does not need, nor should it be seen, only as an industrial or business process, but as knowledge that can be applied to personal aspects of the lives of others.

In this way, it is known that inventory is one of the most difficult resources to work with that a company can have, and it is important to have a balance between items stored in greater quantity and items with strategic quantities so that the company does not lose sales and customer confidence. consumer. Therefore, it is a logistical resource that must be under constant analysis, in order to understand which items are in quantities above or below demand and make the necessary adjustments (ANDRADE et al, 2020; BOWERSOX et al, 2014).

Thus, Ballou (2007) defines inventory as an accumulation of several classifications of products, among them: raw materials, materials in process and finished products, which appear in several logistic points and production channels. In addition, Pozo (2019) expresses that the costs involving inventories can represent 40% of their value, demonstrating the importance of investing in planning and ways to manage inventories.

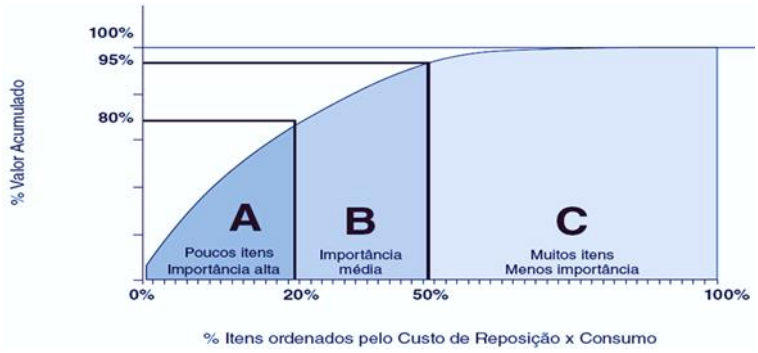
Beyond that, inventory management works directly with the analysis of current and expected inventory levels, with strategic processes and with the relationship between the members, while transforming all these steps into value for the consumer. In this way, logistical tools are important in helping inventory management, as they facilitate decision-making through data (AGARWAL; VIJAYALAKSHMI, 2019; CHING, 2010).

In this sense, one of the tools that provides this aid is the ABC curve, also known as the 80-20 principle or Paretto diagram. According to Paoleschi and Castiglioni (2018), the ABC curve was developed by Walfredo Paretto in the 1950s, revealing that few individuals concentrated most of the wealth in the US, besides becoming an important tool for managing inventories, due to its simplicity and low cost of application.

Based on this, Pozo (2019) points out that the items are classified according to their impact on the business, in which class A represents the greatest impact, B median and C the smallest impact. It is important to note that, although each class has these levels of impact, this information should not be analyzed in isolation, as there may be *outliers*.

Chart 1, below, represents the division of the ABC curve classes explained so far:

CHART 1 – ABC classification.



Source: Adapted from Nogueira (2018).

Chart 1 represents how the strategic division between the classes should be, with class A items being receptive to greater care and control, as they are responsible for 80% of the value of all materials in stock. Opposite to class A, group C represents the largest amount of items in stock, but this amount is responsible for only 5% of the stored value (SOUZA et al, 2017). In

this way, care should be taken when handling products with class A items, while keeping a critical eye on *outliers*.

3. METHODOLOGY

According to Vergara (2016), this study, regarding its purposes, is descriptive, explanatory and applied, as it intends to expose and clarify the situation of retail MSEs in Rio de Janeiro, as well as the main problems involving the management of inventories, in addition to proposing improvements with the use of the ABC curve to reduce bottlenecks in logistics processes of a small retail company in Rio de Janeiro and indicating how it can impact and facilitate the management of inventories in other companies.

The Universe relevant to the study is a small retail company from Rio de Janeiro. The sample is given in a non-probabilistic way and identified by the existing storage process in this company, using the accessibility criterion, since the authors worked directly with the process in question for a year, making it possible to know the bottlenecks and points for improvement.

Data were collected through bibliographic research, that is, through books, articles, specialized magazines and dissertations on the subject, serving as a basis and support for the bibliometric study and theoretical foundation on the main problems in inventory management and how to alleviate them. Purchase and sale data of 40 items from the company itself in 2020 were also collected.

Through this data collection, two spreadsheets were developed, with 8 columns each, one of them being the ABC curve for total cost and the other for consumption. Thus, it was possible to carry out an analysis of the two models developed to point out two possible decision-making about two of the 40 items analyzed, serving as a practical example of how MSEs can apply the ABC curve in their business.

However, the study is limited to proposing the ABC curve approaches as a means of solving the problems listed, not making use of other tools nor being applied in the company, as the authors no longer work in it, restricting themselves to proposing and explaining how the application of the ABC curve can be beneficial to reduce the bottlenecks pointed out in the study. The method is also limited to using and analyzing the 40 items with the greatest impact for Ling's EPI, not analyzing the other items that are also marketed.

4. DISCUSSION AND RESULTS

4.1 Market and Company Analysis

The retail market has a large share of the Brazilian GDP. Although household consumption fell from 2014 to 2016, due to the increase in unemployment, from 2017 onwards, this indicator grew again, reaching 1.8% in 2019. In addition, until February 2020, the aggregate value retail sales corresponded to 11.5% of GDP, with growth forecast for the entire year (SBVC, 2020).

This factor is also due to the development of the e-commerce sector in Brazil, being an important channel for the survival of physical stores during the pandemic, since only essential businesses (supermarkets, pharmacies, pet shops, etc.) were able to maintain their activities face-to-face According to G1 (2020), virtual stores had a 47% growth in revenue in the first half of 2020, indicating the enormous differential that having an online store brought them.

In this context, the company object of this study is inserted, being a small retailer with a focus on PPE. In this study, this company will be called Ling's EPI, and it is located in the state of Rio de Janeiro. Ling's EPI appeared in 1989, offering other items, in addition to PPE, such as tools, casters, etc. However, in recent years, it has had a higher growth than expected and decided to focus on the PPE trade.

The company is divided into two sectors: the store, where physical and legal customers can purchase materials, and the CD, where the items are stored. As a result, its main customers are large construction companies, which deal with height risks, chemical products, oil platforms, among other activities. Physical customers also demand PPE, but in smaller quantities, having a smaller impact on the company's cash flow.

By marketing hygiene products, Ling's EPI was able to keep its physical store open during the pandemic, having a huge advantage over its competitors. However, existing problems in managing your inventory generate operating costs and reduce this competitive advantage.

The main problems are the lack of knowledge of the customers' consumption, carrying out the acquisition of quantities of more than one item with a low demand curve, which becomes obsolete, and quantities below the necessary of another material, which generates the stock out and dissatisfaction of the client. In addition, there are no parameters to store the items on the DC, generating a longer *lead time* for product delivery and damage to some items that have high financial relevance for the business, either due to damage or due to expiry date.

4.2 Impacts on the business

All the problems mentioned in the previous topic impact consumer satisfaction (*Customer Experience*), a factor that is currently highly valued by the market. In this case, customers leave the store dissatisfied, causing the company not only to lose that sale but also to suffer contraindications from this dissatisfied customer.

Thus, considering Word-of-Mouth marketing, for each dissatisfied customer, another 9 possible consumers may not visit the company, due to negative reports from this customer *(FERNANDES; SANTOS, 2008; GREIF, 2018).* In this scenario, 10 dissatisfied customers are responsible for the possible loss of 90 potential customers. However, in the current scenario of digital media, a dissatisfied customer can reach thousands of potential consumers in a few hours, bringing a greater loss to the company.

To estimate the capital loss related to dissatisfied customers, contraindications made by Word-of-Mouth will be considered, since measuring the impact through social networks requires an in-depth analysis and such analysis would change the focus of the present study. With this, the following analysis uses the proportion of one dissatisfied customer for 9 potential customers lost and the desired product value of R$ 50.00, not analyzing other products that suffer similar effects.

Thus, 10 Ling's EPI customers travel daily to the store in search of an item with high market demand, worth R$50.00. However, Ling's EPI did not plan properly for the demand and its stock is at zero, so these 10 consumers will not be served as they expected. This event causes Ling's EPI to fail to invoice BRL 500.00 (considering purchases of a product for each customer) and possibly fail to invoice BRL 4,500.00 due to the contraindications made. The lost values have a low impact, when analyzed in isolation, considering the company's monthly billing of 300 thousand BRL.

However, when this analysis is carried out during the entire month in which this situation occurred, a loss of 130 thousand BRL is expected, considering the business month and the 26 days in which Ling's EPI opens monthly. This relationship can be seen in Table 1 below:

TABLE 1 – Dissatisfied customers X lost revenue per day.

Valor do produto desejado	Clientes insatisfeitos (CI)	Clientes em potencial perdidos (CP)	Faturamento perdido (CI)	Faturamento perdido (CP)	Faturamento perdido total/dia	Faturamento perdido total/mês
R$ 50,00	1	9	R$ 50,00	R$ 450,00	R$ 500,00	R$ 13.000,00
	2	18	R$ 100,00	R$ 900,00	R$ 1.000,00	R$ 26.000,00
	3	27	R$ 150,00	R$ 1.350,00	R$ 1.500,00	R$ 39.000,00
	4	36	R$ 200,00	R$ 1.800,00	R$ 2.000,00	R$ 52.000,00
	5	45	R$ 250,00	R$ 2.250,00	R$ 2.500,00	R$ 65.000,00
	6	54	R$ 300,00	R$ 2.700,00	R$ 3.000,00	R$ 78.000,00
	7	63	R$ 350,00	R$ 3.150,00	R$ 3.500,00	R$ 91.000,00
	8	72	R$ 400,00	R$ 3.600,00	R$ 4.000,00	R$ 104.000,00
	9	81	R$ 450,00	R$ 4.050,00	R$ 4.500,00	R$ 117.000,00
	10	90	R$ 500,00	R$ 4.500,00	R$ 5.000,00	R$ 130.000,00

Source: Authors (2021).

Based on Table 1, it is possible to see that dissatisfied customers bring high costs to companies, especially MSEs. With this, Ling's EPI estimates a daily loss of BRL 5,000.00, as the revenue lost by potential customers (BRL 4500.00) is added to the sales lost by dissatisfied customers, corresponding to BRL 500.00 per day. When this estimate is expanded to the entire month, the value of 5,000 BRL is multiplied by 26, resulting in a total of 130,000 BRL lost monthly.

Through this table, it is also possible to observe a linear growth trend, in which, for every 9 potential customers lost, Ling's EPI does not earn BRL 13,000.00 per month. This loss has a great impact on the organization, as it is capital that could be used to invest in innovation and growth or to pay suppliers.

4.3 Possible solutions found

4.3.1 ABC curve by total cost

According to what was presented in the theoretical foundation, this classification aims to present the products that stand out among the other items of Ling's EPI and that need more attention in their management, since their impacts are more noticeable for the company.

With this, the main objective of the ABC curve by total cost is to indicate which are the products with greater cost importance for the company and to facilitate the decision making on the place where they should be stored so that they do not suffer damages, as well as the quantity to be purchased so that these items do not become obsolete, losing their validity over time.

Table 2 below represents the ABC Curve by Total Cost, which was developed considering the period of 1 year, between January and December 2020:

TABLE 2 – ABC classification by total cost.

Código do item	Consumo	Custo/Un	Custo Total	Total acumulado por produto	Percentual por Produto	Percentual acumulado por produto	Ordenação ABC
41655	209.570	R$ 10,00	R$ 2.095.700,00	R$ 2.095.700,00	48,96%	48,96%	A
44225	67.551	R$ 13,00	R$ 878.163,00	R$ 2.973.863,00	20,52%	69,48%	
42893	29.308	R$ 11,89	R$ 348.456,00	R$ 3.322.319,00	8,14%	77,62%	
45132	4.880	R$ 26,00	R$ 126.880,00	R$ 3.449.199,00	2,96%	80,59%	
42738	117	R$ 750,00	R$ 87.750,00	R$ 3.536.949,00	2,05%	82,64%	B
44359	218	R$ 272,00	R$ 59.296,00	R$ 3.596.245,00	1,39%	84,02%	
42607	14.791	R$ 4,00	R$ 59.164,00	R$ 3.655.409,00	1,38%	85,40%	
43329	60	R$ 750,00	R$ 45.000,00	R$ 3.700.409,00	1,05%	86,46%	
43685	59	R$ 750,00	R$ 44.250,00	R$ 3.744.659,00	1,03%	87,49%	
42301	83	R$ 502,50	R$ 41.707,50	R$ 3.786.366,50	0,97%	88,46%	
41606	974	R$ 38,60	R$ 37.596,00	R$ 3.823.962,50	0,88%	89,34%	
41608	1.561	R$ 23,00	R$ 35.903,00	R$ 3.859.865,50	0,84%	90,18%	
41602	446	R$ 60,00	R$ 26.760,00	R$ 3.886.625,50	0,63%	90,81%	
45736	1.173	R$ 22,50	R$ 26.392,50	R$ 3.913.018,00	0,62%	91,42%	
45417	4	R$ 5.414,91	R$ 21.659,64	R$ 3.934.677,64	0,51%	91,93%	
42328	400	R$ 53,90	R$ 21.560,00	R$ 3.956.237,64	0,50%	92,43%	
42016	487	R$ 42,00	R$ 20.454,00	R$ 3.976.691,64	0,48%	92,91%	
42036	14.744	R$ 1,30	R$ 19.160,70	R$ 3.995.852,34	0,45%	93,36%	
42381	5	R$ 3.800,00	R$ 19.000,00	R$ 4.014.852,34	0,44%	93,80%	
41554	467	R$ 38,92	R$ 18.175,64	R$ 4.033.027,98	0,42%	94,23%	
42929	24	R$ 750,00	R$ 18.000,00	R$ 4.051.027,98	0,42%	94,65%	
43625	7.173	R$ 2,50	R$ 17.932,50	R$ 4.068.960,48	0,42%	95,07%	
41569	515	R$ 28,61	R$ 14.734,50	R$ 4.083.694,98	0,34%	95,41%	C
42927	21	R$ 684,00	R$ 14.364,00	R$ 4.098.058,98	0,34%	95,75%	
43330	19	R$ 750,00	R$ 14.250,00	R$ 4.112.308,98	0,33%	96,08%	
41557	1.656	R$ 8,60	R$ 14.241,60	R$ 4.126.550,58	0,33%	96,41%	
43304	178	R$ 78,22	R$ 13.923,57	R$ 4.140.474,15	0,33%	96,74%	
45739	1.100	R$ 12,00	R$ 13.200,00	R$ 4.153.674,15	0,31%	97,05%	
42619	345	R$ 36,00	R$ 12.420,00	R$ 4.166.094,15	0,29%	97,34%	
45968	601	R$ 20,09	R$ 12.071,99	R$ 4.178.166,14	0,28%	97,62%	
43312	4	R$ 3.000,00	R$ 12.000,00	R$ 4.190.166,14	0,28%	97,90%	
42587	18	R$ 650,00	R$ 11.700,00	R$ 4.201.866,14	0,27%	98,17%	
44619	422	R$ 27,50	R$ 11.605,00	R$ 4.213.471,14	0,27%	98,44%	
43303	135	R$ 78,02	R$ 10.532,85	R$ 4.224.003,99	0,25%	98,69%	
43870	70	R$ 150,00	R$ 10.500,00	R$ 4.234.503,99	0,25%	98,93%	
41581	280	R$ 36,00	R$ 10.080,00	R$ 4.244.583,99	0,24%	99,17%	
40601	4.953	R$ 2,00	R$ 9.906,00	R$ 4.254.489,99	0,23%	99,40%	
42332	794	R$ 11,78	R$ 9.353,32	R$ 4.263.843,31	0,22%	99,62%	
41834	575	R$ 15,00	R$ 8.625,00	R$ 4.272.468,31	0,20%	99,82%	
44568	255.002	R$ 0,03	R$ 7.650,00	R$ 4.280.118,31	0,18%	100,00%	
Total			R$ 4.280.118,31		100,00%		

Source: Authors (2021).

Through the analysis of this ABC curve model, it is possible to observe that class A is represented by only 4 products, which are the most valuable that the company has and, therefore, should not suffer damages, as they represent a great investment by Ling's EPI in that the loss of the item generates a greater loss for the company.

On the other hand, class B encompasses 18 products with a significantly lower cost, especially if we compare the first item in class A with the others in class B. As a result, these materials do not require as much attention and dedication as items A, however, it is important to carry out periodic analyzes in order to know when to replace their quantities and which ones are not being converted into profit for the company.

Similarly, class C products have a low total cost compared to items in other classes. Items belonging to this class are the ones that require less effort and attention, being necessary to carry out a review of their quantities and sales in more spaced periods, for example, once a month.

4.3.2 ABC curve by consumption

In this ABC curve model, the annual inventory turnover, from January to December 2020, of each product will be analyzed. This analysis will allow you to make a comparison

with the items previously classified in the model by total cost and obtain more accurate information about each item. Table 3 below represents the ABC curve by consumption:

TABLE 3 – ABC classification by consumption.

Código do item	Consumo	Custo/Un	Custo Total	Total acumulado por produto	Percentual por Produto	Percentual acumulado por produto	Ordenação ABC
44568	255.002	R$ 0,03	R$ 7.650,00	255.002,00	41,0775%	41,0775%	A
41655	209.570	R$ 10,00	R$ 2.095.700,00	464.572,00	33,7590%	74,8365%	
44225	67.551	R$ 13,00	R$ 878.163,00	532.123,00	10,8816%	85,7180%	B
42893	29.308	R$ 11,89	R$ 348.456,00	561.431,00	4,7211%	90,4392%	
42607	14.791	R$ 4,00	R$ 59.164,00	576.222,00	2,3826%	92,8218%	
42036	14.744	R$ 1,30	R$ 19.160,70	590.966,00	2,3751%	95,1969%	
43625	7.173	R$ 2,50	R$ 17.932,50	598.139,00	1,1555%	96,3523%	C
40601	4.953	R$ 2,00	R$ 9.906,00	603.092,00	0,7979%	97,1502%	
45132	4.880	R$ 26,00	R$ 126.880,00	607.972,00	0,7861%	97,9363%	
41557	1.656	R$ 8,60	R$ 14.241,60	609.628,00	0,2668%	98,2031%	
41608	1.561	R$ 23,00	R$ 35.903,00	611.189,00	0,2515%	98,4545%	
45736	1.173	R$ 22,50	R$ 26.392,50	612.362,00	0,1890%	98,6435%	
45739	1.100	R$ 12,00	R$ 13.200,00	613.462,00	0,1772%	98,8207%	
41606	974	R$ 38,60	R$ 37.596,00	614.436,00	0,1569%	98,9776%	
42332	794	R$ 11,78	R$ 9.353,32	615.230,00	0,1279%	99,1055%	
45968	601	R$ 20,09	R$ 12.071,99	615.831,00	0,0968%	99,2023%	
41834	575	R$ 15,00	R$ 8.625,00	616.406,00	0,0926%	99,2949%	
41569	515	R$ 28,61	R$ 14.734,50	616.921,00	0,0830%	99,3779%	
42016	487	R$ 42,00	R$ 20.454,00	617.408,00	0,0784%	99,4563%	
41554	467	R$ 38,92	R$ 18.175,64	617.875,00	0,0752%	99,5316%	
41602	446	R$ 60,00	R$ 26.760,00	618.321,00	0,0718%	99,6034%	
44619	422	R$ 27,50	R$ 11.605,00	618.743,00	0,0680%	99,6714%	
42328	400	R$ 53,90	R$ 21.560,00	619.143,00	0,0644%	99,7358%	
42619	345	R$ 36,00	R$ 12.420,00	619.488,00	0,0556%	99,7914%	
41581	280	R$ 36,00	R$ 10.080,00	619.768,00	0,0451%	99,8365%	
44359	218	R$ 272,00	R$ 59.296,00	619.986,00	0,0351%	99,8716%	
43304	178	R$ 78,22	R$ 13.923,57	620.164,00	0,0287%	99,9003%	
43303	135	R$ 78,02	R$ 10.532,85	620.299,00	0,0217%	99,9220%	
42738	117	R$ 750,00	R$ 87.750,00	620.416,00	0,0188%	99,9409%	
42301	83	R$ 502,50	R$ 41.707,50	620.499,00	0,0134%	99,9543%	
43870	70	R$ 150,00	R$ 10.500,00	620.569,00	0,0113%	99,9655%	
43329	60	R$ 750,00	R$ 45.000,00	620.629,00	0,0097%	99,9752%	
43685	59	R$ 750,00	R$ 44.250,00	620.688,00	0,0095%	99,9847%	
42929	24	R$ 750,00	R$ 18.000,00	620.712,00	0,0039%	99,9886%	
42927	21	R$ 684,00	R$ 14.364,00	620.733,00	0,0034%	99,9919%	
43330	19	R$ 750,00	R$ 14.250,00	620.752,00	0,0031%	99,9950%	
42587	18	R$ 650,00	R$ 11.700,00	620.770,00	0,0029%	99,9979%	
42381	5	R$ 3.800,00	R$ 19.000,00	620.775,00	0,0008%	99,9987%	
45417	4	R$ 5.414,91	R$ 21.659,64	620.779,00	0,0006%	99,9994%	
43312	4	R$ 3.000,00	R$ 12.000,00	620.783,00	0,0006%	100,0000%	
Total	620.783				100,00%		

Source: Authors (2021).

With the use of this classification, it is possible to indicate which are the most sold items during the year 2020, being a very relevant indicator for the comparison of the ABC curve tables in the future. In this way, it is observed that items 44568 and 41655 are the only ones with a sales volume greater than 200 thousand, as well as the only ones ordered in class A, which requires a greater degree of observation and follow-up compared to other products.

In addition, it is necessary that the indicators of the management systems are accurate when indicating the existing quantities in stock, as these are products that have a high demand curve. As they are materials that are highly sought after by Ling's EPI customers, it is also important that they are stored close to the DC loading outlet, in order to reduce transport time and facilitate movement by employees.

4.3.3 Comparison between ABC classifications

By comparing the ABC curves elaborated, it can be seen that item 45132 has a high-cost importance for the company while it has a low inventory turnover. With this, a possible decision would be to store this item in a place further away from the DC output, with the objective of reducing the possibility of being damaged with the movements.

On the other hand, item 44568 must be stored as close as possible to the output of the DC, as it has the highest turnover among the 40 items, in addition to representing a lower cost importance for Ling's EPI, being able to be more exposed and facilitating the movement between DC and store or suppliers and DC.

5. CONCLUSIONS

From the analyzes carried out in topic 4, it is possible to observe the importance of the ABC classification to reduce the total cost and increase the opportunities for business growth, especially for MSEs, since most of them do not have a structured planning or a sector. focused on mitigating business risks.

In addition to cost reduction, the ABC classification allows Ling's EPI, as well as other MSEs, to manage the items in stock in a prioritized way, being able to dedicate more efforts and investments to products that have a greater impact on the business, such as items 45132 and 44568, covered in topic 4.3.3.

Thus, even though the ABC classification has not been applied, there is a possible solution to some of the problems, such as the replacement of materials with high inventory turnover, as the ABC curve brings visibility to the products with the highest demand in a period, which allows establishing strategies to meet this demand, in addition to avoiding the excessive purchase of other items with low inventory turnover, reducing storage costs.

It is also noticed that the application of the ABC curve is a short to medium term investment to improve the consumer experience, as the decision making about which items to buy will be based on data obtained from the customer's consumption habits, solving one of the main causes of the closure of MSE activities pointed out by SEBRAE (2014).

With this, the study brings as its main contribution the indication of the ABC curve for the countless MSEs that do not have an effective control and management of the stock, being able to reduce the operational costs and increase the revenue of their business. In this way, the study essentially contributes to the development of the country's economy, since MSEs are responsible for more than 50% of formal jobs in Brazil, according to SEBRAE (2020).

For the academic community, the present study brings more visibility to the existing logistical problems in retail MSEs, in which other studies can be developed to increase the effectiveness of the ABC curve, when applied with other tools, such as the reengineering of processes, or indicators, the example of the *Net Promoter Score* (NPS), in order to improve the performance of these companies and, consequently, encourage greater consumption in the neighborhoods where they are located.

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