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# APPLICATION OF PERIODIC REVIEW INVENTORIES MODEL IN A TYPICAL MEXICAN FOOD COMPANY

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***Keywords:*** inventory management, food Mexican company, periodic review model, perishable products
***Abstract:*** The Mexican family companies must face the challenges of market volatility with greater recurrence, forcing them to use effective tools and models for the proper management of their organizations and inherent activities, such as inventory management. Therefore, this research was carried out at "Moles Santa Monica", a typical food company located in the city of Puebla, Mexico. This enterprise has reflected a high variability in the administration of its inventories, with a Coefficient of Variation (CV) greater than 0.2 in most of their portfolio products. In this way, the objective of this study was to propose an inventory management model that might reduce the shortages and overstock, and also; improves its performance and profitability when it is managed. The applied methods were Pareto and ABC model to choose correctly the best seller company products. The inventory management model chosen was the periodic review (R, S) as well, for being the most effective and the one that best suited the circumstances of the company in question. Three of the portfolio products were studied (MPP10, MPC10 and COP10) due to they are the most representative in incomes and valuables for the company managers. The results allowed us to propose the review periodic model (R), the optimal quantity of units to produce (Q), the safety stock (Ss) and the maximum inventory (S) for each product. We conclude that this model will help the company to face the uncertainty of the demand. Finally, we include limitations and future studies.

## 1 Introduction

Inventory management is one of the most important tasks for any company that produces or manufactures any product or products, and what is looking for is not to have overstock or shortages. These are two of the most common problems in inventory management [1-4]. This situation is not unfamiliar in Mexican family companies, which are immersed in a context of turbulent and changing demand but which, in addition, usually make decisions based on intuition and experience. However, these must be supported by objective and sustained criteria; to avoid permanent conflicts related to excesses and shortages in their inventories.

In order to avoid the prevalence of these conflicts, there are many tools and models that contribute to improving efficiency in inventory management. Such is the case of the periodic review model or known as (R, S), which provides solutions to inventory management problems in different real-life situations where, in addition; under the political framework (R, S) the demand is not constant and there are important variations [4-7]. Those two problems related are disjunctive that the family business Moles Santa Mónica faces; reason why it has been decided to apply the mentioned model.

Furthermore, this model contributes to reduce slow and idle inventories [8]. The essential purpose is to check inventory levels at specific time intervals. It is established that, at the beginning of each of the periods, the inventory levels must first be reviewed in order to immediately determine corresponding replacement; through instantly generated orders [9].

The objective of this study is to propose an inventory model that improves its performance and profitability when managed. This is due to the fact that the family business has gone through a contingency of business succession, along with relocation of the domicile of operations, decrease in sales and turnover of personnel. The research included analysis of documentary information of the company such as: maintenance cost, order costs, financial statements, and sales report, in addition to bibliographic references related to the subject, together with probabilistic models; specifically, the periodic review model.

## 2 Literature review

Inventory management has been studied for researchers and its policies applied in small companies mainly because it involves their financial performance and represents the survival or not of those kinds of companies [10,11]. When they must determine the right quantity of materials and to hold them the correct time in order to avoid associated costs, two typical scenarios emerge: in the first one, companies have too much inventory that represent deterioration, obsolescence, damage and loss [12]; in the second one, shortage of inventory can represent loss of sales, underutilization of the machines, and poor client relations [12,13]. Our study is related with perishable products, due to the company produces typical Mexican food._A comprehensive review of the literature on these products inventory models is available [4,14]. Furthermore, a detailed analysis of the periodic and continuous review model is also available in the literature [15]. Therefore, we briefly summarize the research related to the object of study.

The periodic review model can be used when determining a fixed inventory review and order request time, which means that the inventory management policy must consider the minimum total annual cost, order renewal time, stock of security and the types of inventories; to be able to reduce inventory management costs without affecting the quality of services [8].

Thus, there is a widespread review about optimizing inventory costs with business applications, such as one in which the minimum total cost of inventory is located with a service level of approximately 90%, avoiding in a parallel and considerable way, the shortage. In addition, with the application of the model, significant reductions were achieved in the payment of fines due to penalties; and it is postulated that the use of the policy (R, S) emanates higher storage costs but that by contrast, its management is much easier [4,6,7].

Consequently, the most used practices in the periodic review are policy (R, S) and (R, Q). In the first one, when level "R" is reached, a certain amount is ordered to reach "S"; on the other hand; in the second one, when the point “R” is reached, an order of “Q” size is sent [16].

In addition, there are recent research in which the periodic review probabilistic EOQ (Economic Order Quantity) model is adapted when there is variability in ordering costs, which results in representative savings in logistics cycle costs [17]. There are even other dilemmas presented in the periodic review model, in which the two-item model and two warehouses with transhipment are used; thereby applying heuristics based on greedy and lagrangian relaxation [2,18].

Finally, a stochastic demand periodic review model can be designed considering sudden obsolescence, in which the optimal policy is proposed, and a dynamic programming algorithm is simultaneously proposed to calculate its parameters [19].

## 3 Methodology

To develop this research, the documentation of information was carried out based on the data provided by purchasing, production and sales areas belonging to the company Moles Santa Monica located in the state of Puebla, Mexico. Printed and electronic materials from the mentioned areas were analysed, and a diagnosis of the current situation of the company was made through individual semi-structured interviews with general manager, sales manager and purchasing manager, and in this way being able to know their functioning holistically, understanding their needs according to the context in which the research was conducted. Then, 29 articles that are part of the company's product portfolio were analysed, which represent the mix of products with greater importance for the leaders of the company, by sales and production volume.

Through the use of the ABC method, the most relevant products were defined in terms of sales revenue, according to their rotation between periods from November 2018 to October 2019. Additionally, the three most relevant products were obtained; by means of the Pareto method or 80-20 rule. Finally, the detailed study of demand has been established through the deterministic model of periodic review (R, S).

## 4 Results and discussion

According to the information provided by the managers of this company; where the company has gone through a business succession contingency, along with relocation of the operations domicile, decrease in sales and staff turnover. The Pareto method was used for the 29 articles in the company's product portfolio and those with superlative preponderance were selected. The products were ordered from highest to lowest, taking as a reference the income from sales (Mexican pesos), thereby obtaining; the percentage of contribution (Table 1).

*Table 1 Sales in the period from November 2018 to October 2019*

| Pos | Code | Product name | Total | % of contribution | Accumulated contribution |
|---|---|---|---|---|---|
| 1 | MPP10 | Almondy mole poblano 10 kg | $2,164,694 | 17.8% | 17.8% |
| 2 | MPC10 | Homemade mole poblano 10 kg | $1,338,969 | 11.0% | 28.8% |
| 3 | COP10 | Chicken bouillon 10 kg | $1,219,754 | 10.0% | 38.8% |
| 4 | MPP5 | Almondy mole poblano 5 kg | $976,210 | 8.0% | 46.9% |
| 5 | PPV10 | Green pipian 10 kg | $917,231 | 7.5% | 54.4% |
| 6 | CHL10 | Chili pepper with lemon 10 kg | $794,505 | 6.5% | 61.0% |
| 7 | CHLM10 | Ground chili pepper 10 kg | $600,128 | 4.9% | 65.9% |
| 8 | MPP1 | Almondy mole poblano 1 kg | $542,995 | 4.5% | 70.4% |
| 9 | COP20 | Chicken bouillon 20 kg | $420,626 | 3.5% | 73.8% |
| 10 | PPV5 | Green pipian 5 kg | $391,133 | 3.2% | 77.0% |
| 11 | MPP20 | Almondy mole poblano 20 kg | $387,098 | 3.2% | 80.2% |
| 12 | COP5 | Chicken bouillon 5 kg | $329,072 | 2.7% | 82.9% |
| 13 | MCA10 | Mole poblano sesame seeds 10 kg | $228,634 | 1.9% | 84.8% |
| 14 | CCHMA10 | Chili chamoy 10 kg bag | $182,973 | 1.5% | 86.3% |
| 15 | MPC20 | Homemade mole poblano 20kg | $179,504 | 1.5% | 87.8% |
| 16 | MCA5 | Mole poblano sesame seeds 5 kg | $178,224 | 1.5% | 89.3% |
| 17 | CHB10 | Chili pepper for snacks 10 kg bag | $141,628 | 1.2% | 90.4% |
| 18 | MPCR500 | Almondy mole poblano 0.5 kgs. | $137,264 | 1.1% | 91.5% |
| 19 | PPV20 | Green pipian 20 kg | $132,036 | 1.1% | 92.6% |
| 20 | PPR5 | Red pipian 5 kg bucket | $112,610 | 0.9% | 93.6% |
| 21 | MPP52 | Almondy mole poblano 5 kg bucket | $103,328 | 0.8% | 94.4% |
| 22 | AJM10 | Ground sesame 10 kg bucket | $100,285 | 0.8% | 95.2% |
| 23 | CTL20 | Pickled chipotles 20 kg bucket | $93,301 | 0.8% | 96.0% |
| 24 | MACH10 | Chocolaty mole 10 kg bucket | $90,400 | 0.7% | 96.7% |
| 25 | MPP500 | Almondy mole poblano 0.5 kg | $84,381 | 0.7% | 97.4% |
| 26 | MPSO10 | Spicy mole 10 kg bucket | $79,718 | 0.7% | 98.1% |
| 27 | CTL10 | Pickled chipotles 10 kg bucket | $78,540 | 0.6% | 98.7% |
| 28 | CHLE10 | Special chili pepper lemon 10 kg | $78,198 | 0.6% | 99.4% |
| 29 | MPC5 | Homemade mole poblano 5 kg | $75,301 | 0.6% | 100% |

Based on the table above, ABC products were selected. The statistical property with which the products can be classified in a preliminary way, are those criteria of significant impact on the total value; whether from inventory, sales, or costs [20]. In the study, the classification was determined according to sales in the period indicated above. Thus, 3 classes are presented: Class A: 8 products representing 70.4% of participation; Class B: 11 products that represent 23.3% of sales and finally; Class C: 10 products with a total of 7.4% of sales.

*Table 2 ABC method*

| **Type A** | | | | | |
|---|---|---|---|---|---|
| **Pos** | **Code** | **Product name** | **Total** | **% of contribution** | **Accumulated contribution** |
| 1 | MPP10 | Almondy mole poblano 10 kg bucket | $2,164,694 | 17.80% | 70.40% |
| 2 | MPC10 | Homemade mole poblano 10 kg bucket | $1,338,969 | 11.00% | |
| 3 | COP10 | Chicken bouillon 10 kg bag | $1,219,754 | 10.00% | |
| 4 | MPP5 | Almondy mole poblano 5 kg bucket | $976,210 | 8.00% | |
| 5 | PPV10 | Green pipian 10 kg bucket | $917,231 | 7.50% | |
| 6 | CHL10 | Chili pepper with lemon 10 kg bag | $794,505 | 6.50% | |
| 7 | CHLM10 | Ground chili pepper 10 kg bag | $600,128 | 4.90% | |
| 8 | MPP1 | Almondy mole poblano 1 kg can | $542,995 | 4.50% | |
| **Type B** | | | | | |
| **Pos** | **Code** | **Product name** | **Total** | **% of contribution** | **Accumulated contribution** |
| 9 | COP20 | Chicken bouillon 20 kg bag | $420,626 | 3.50% | 22.30% |
| 10 | PPV5 | Green pipian 5 kg bucket | $391,133 | 3.20% | |
| 11 | MPP20 | Almondy mole poblano 20 kg bucket | $387,098 | 3.20% | |
| 12 | COP5 | Chicken bouillon 5 kg bag | $329,072 | 2.70% | |
| 13 | MCA10 | Mole poblano with sesame seeds 10 kg bucket | $228,634 | 1.90% | |
| 14 | CCHMA10 | Chili chamoy 10 kg bag | $182,973 | 1.50% | |
| 15 | MPC20 | Homemade mole poblano 20kg bucket | $179,504 | 1.50% | |
| 16 | MCA5 | Mole poblano with sesame seeds 5 kg bucket | $178,224 | 1.50% | |
| 17 | CHB10 | Chili pepper for snacks 10 kg bag | $141,628 | 1.20% | |
| 18 | MPCR500 | Almondy mole poblano micro 0.500 grs. | $137,264 | 1.10% | |
| 19 | PPV20 | Green pipian 20 kg bucket | $132,036 | 1.10% | |
| **Type C** | | | | | |
| **Pos** | **Code** | **Product name** | **Total** | **% of contribution** | **Accumulated contribution** |
| 20 | PPR5 | Red pipian 5 kg bucket | $112,610 | 0.90% | 7.40% |
| 21 | MPP52 | Almondy mole poblano 5 kg bucket | $103,328 | 0.80% | |
| 22 | AJM10 | Ground sesame 10 kg bucket | $100,285 | 0.80% | |
| 23 | CTL20 | Pickled chipotles 20 kg bucket | $93,301 | 0.80% | |
| 24 | MACH10 | Chocolaty mole 10 kg bucket | $90,400 | 0.70% | |
| 25 | MPP500 | Almondy mole poblano 0.500 grs can | $84,381 | 0.70% | |
| 26 | MPSO10 | Spicy mole 10 kg bucket | $79,718 | 0.70% | |
| 27 | CTL10 | Pickled chipotles 10 kg bucket | $78,540 | 0.60% | |
| 28 | CHLE10 | Special chili pepper with lemon 10 kg bag | $78,198 | 0.60% | |
| 29 | MPC5 | Homemade mole poblano 5 kg | $75,301 | 0.60% | |

The names of the products represented by their respective codes, the total sales, the percentage of contribution, as well as the accumulated number of each product are displayed in Table 2 of the ABC method, which is shown above.

Pareto diagram and the ABC model classification are illustrated below (Figure 1).

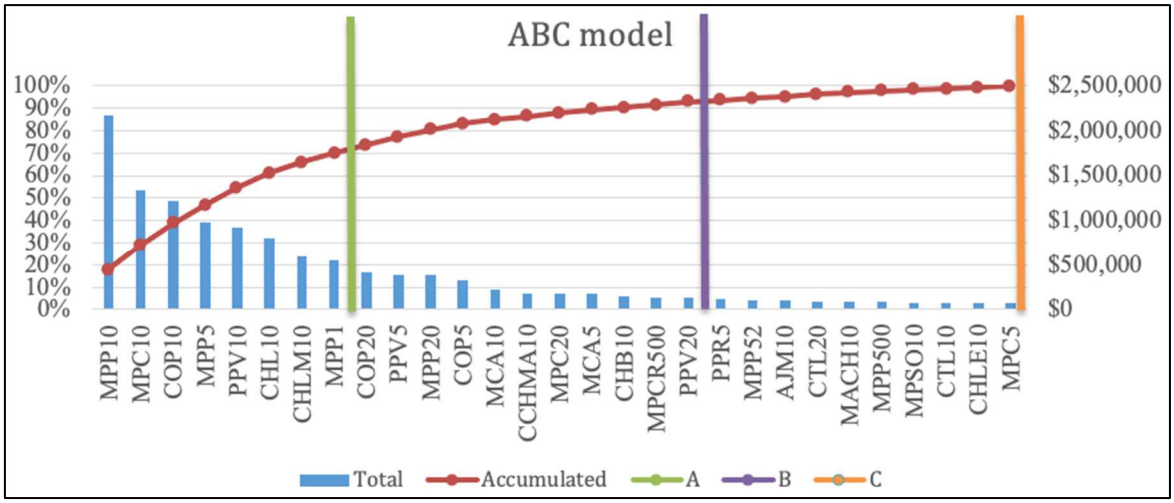


*Figure 1 ABC model classification*

The ABC model classification shown a total of 8 products, representing 70.4% of total sales revenue. For purposes of this study, the 3 most representative type A products of the company were chosen (see Coefficient of Variation) in terms of sales, which are almondy mole poblano almond bucket 10 Kg (MPP10), homemade mole poblano bucket 10 Kg (MPC10) and chicken bouillon bag 10 Kg (COP10).

It was decided to implement the Variability Coefficient (CV) index, for being useful to compare results from the different amount of sales during the study period, where the ratio of the standard deviation to the mean is presented (1). The sales of the selected products are observed for one year; explicitly from November 2018 to October 2019. Calculations of the coefficient of variation were made as follows:

$$CV = \frac{\sigma}{\bar{x}} \quad (1)$$

To start the computation, σ and x̄, were calculated separately. One-year period average sales of selected products was taken. This formula was used [$\bar{x} = \frac{\sum sales}{n}$]; next the standard deviation sales calculation of selected products was made using [$\sigma = \frac{\sum (x_i - \bar{x})^2}{n}$]. The meaning of every variable is shown below:

- *CV:* Variation relative of the mean,
- *σ:* Standard deviation,
- *x̄:* Total sales average,
- *n:* Number of products in portfolio,
- *xi:* Total amount of sales for each product.

Below is the table corresponding to the Variation Coefficient (CV) of the 29 products. Only the first three products (MPP10, MPC10 and COP10) have a CV <.20, and the rest of the products have a CV> .20. If CV is greater than 0.2, the data is probabilistic, otherwise; they would be deterministic. Therefore, if the sales of the selected products behave like a deterministic demand, the periodic review model is accepted [17].

In this way, it is chosen to work with a periodic review model, since the production of the products requires almost the same type of inputs or ingredients, which means a highly variable demand in the order of the products, which does not allow the use of a continuous review policy. The table of coefficients of variation (CV) is presented below (Table 3).

*Table 3 Coefficient of variation*

| Pos | Code | Product Name | CV |
|---|---|---|---|
| 1 | MPP10 | Almondy mole poblano 10 kg bucket | 0.1724 |
| 2 | MPC10 | Homemade mole poblano 10 kg bucket | 0.1023 |
| 3 | COP10 | Chicken bouillon 10 kg bag | 0.1282 |
| 4 | MPP5 | Almondy mole poblano 5 kg bucket | 0.6362 |
| 5 | PPV10 | Green pipian 10 kg bucket | 0.2283 |
| 6 | CHL10 | Chili pepper with lemon 10 kg bag | 0.3689 |
| 7 | CHLM10 | Ground chili pepper 10 kg bag | 0.8393 |
| 8 | MPP1 | Almondy mole poblano 1 kg can | 0.3577 |
| 9 | COP20 | Chicken bouillon 20 kg bag | 0.3623 |
| 10 | PPV5 | Green pipian 5 kg bucket | 0.4559 |
| 11 | MPP20 | Almondy mole poblano 20 kg bucket | 0.4707 |
| 12 | COP5 | Chicken bouillon 5 kg bag | 0.2210 |
| 13 | MCA10 | Mole poblano with sesame seeds 10 kg bucket | 0.7903 |
| 14 | CCHMA10 | Chili chamoy 10 kg bag | 0.5140 |
| 15 | MPC20 | Homemade mole poblano 20kg bucket | 0.1436 |
| 16 | MCA5 | Mole poblano with sesame seeds 5 kg bucket | 0.7122 |
| 17 | CHB10 | Chili pepper for snacks 10 kg bag | 0.4990 |
| 18 | MPCR500 | Almondy mole poblano micro 0.500 grs. | 0.3179 |
| 19 | PPV20 | Green pipian 20 kg bucket | 0.3009 |
| 20 | PPR5 | Red pipian 5 kg bucket | 0.3861 |
| 21 | MPP52 | Almondy mole poblano 5 kg bucket | 2.0639 |
| 22 | AJM10 | Ground sesame 10 kg bucket | 0.4425 |
| 23 | CTL20 | Pickled chipotles 20 kg bucket | 0.5775 |
| 24 | MACH10 | Chocolaty mole 10 kg bucket | 1.4142 |
| 25 | MPP500 | Almondy mole poblano 0.500 grs can | 0.2774 |
| 26 | MPSO10 | Spicy mole 10 kg bucket | 0.7406 |
| 27 | CTL10 | Pickled chipotles 10 kg bucket | 0.2869 |
| 28 | CHLE10 | Special chili pepper with lemon 10 kg bag | 0.9688 |
| 29 | MPC5 | Homemade mole poblano 5 kg | 0.1984 |

In this research, our model is the simplest according with literature (R, S). The company has a constant and determinist demand of its top three products (MPP10, MPC10 and COP10). The inventory is reviewed every "R" units of time, and "S" represents the maximum level of inventory. We expect that LT is lower than R, that is, the order is coming sooner as the next review. This model is showed in Figure 2.

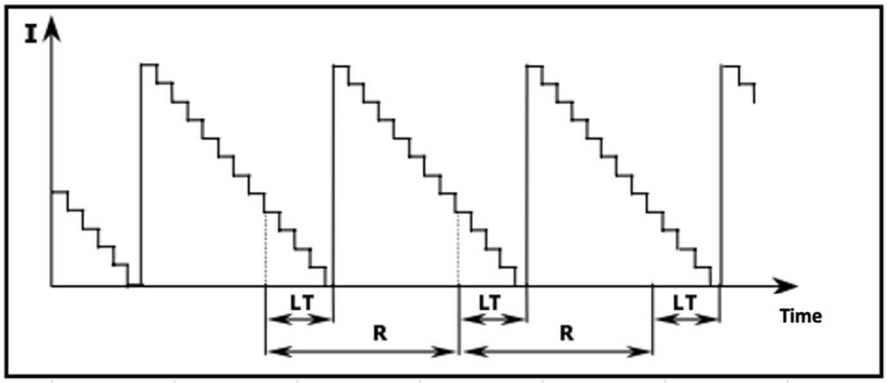


*Figure 2 R, S Constant demand model [21]*

To calculate the batch size with periodic review (Q), it was taken into account that the company carries out an inventory review every month (30 days), and that the delivery time of the most representative and important ingredients according to the Pareto method, have a *Lead Time* (LT) of six days, which represents the number of days that pass, since the order is made, until it arrives. To calculate Q, the following formula (2) was used [16]:

$$Q = \underline{d}(R + LT) + z\sigma_{R+LT} - I \quad (2)$$

To continue the computation of this formula, the reorder point (R), safety stock (ss) and the probability of depleted inventory was calculated separately. Fist, R was calculated using [$R = \overline{dLT} + z(\sigma_{\bar{d}}\sqrt{L})$]; next, for ss we used [$ss = Z_{\sigma}(\sigma_{R+LT})$]; finally, the probability was made as fallows [$\sigma_{R+LT} = \sigma\sqrt{R + LT}$ ]. The meaning of every variable is shown below:

- $\bar{d}$: Average monthly demand,
- ss: Safety stock, which is the deviation of demand during Lead Time plus the review period,
- R: Reorder point,
- *LT:* Lead time of six days,
- $\sigma_{R+LT}$: Vulnerability period Standard deviation,
- *I*: Inventory defined by company.

Using a 95% confidence level proposed for the company, based on the Z score table, we use a data of 1.96. Without subtracting the existing inventory (I), the optimal amount (Q) of inventory, according to the EOQ model, step by step for each of the 3 selected products, are shown next.

*Table 4 Optimal quantity of units to produce*

| Product | Q (units) |
|---|---|
| COP10 | 6316 |
| MPP10 | 6095 |
| MPC10 | 3925 |

Subsequently, the revision period R was calculated. This period indicates the moment in which we must review the current state of the inventory and decide the quantity of products to be manufactured; as shown in Table 5.

*Table 5 Review period for each product*

| Product | R (month) |
|---|---|
| COP10 | 1.56 |
| MPP10 | 1.69 |
| MPC10 | 1.55 |

Consecutively, safety stocks were calculated, according to the following formula, which represents the deviation of demand during *Lead Time* plus the review period, taking into account a service level of 95%.

*Table 6 Safety stock for each product*

| Product | ss (units) |
|---|---|
| COP10 | 2852 |
| MPP10 | 2885 |
| MPC10 | 1859 |

Once you have the safety stock (ss) and the revision period (R), you can determine the target inventory or maximum inventory (S). This is calculated using the following formula (3).

$$S = \underline{d}(R + L) + Z_{\sigma}(\sigma_{R+L}) \quad (3)$$

In this policy, it should be remembered that it seeks to support the variability of demand, since it is associated with greater uncertainty. The results represent the maximum inventory (S), calculated in Table 7.

*Table 7 Maximum inventory for each product*

| Product | S (units) |
|---|---|
| COP10 | 7128 |
| MPP10 | 6816 |
| MPC10 | 4431 |

In this way, the inventory policy is completed (R, S); interpreted as a review period (R) and a maximum inventory (S). Table 8; summarizes it below.

*Table 8 Periodic review inventory policy (R,S)*

| Product | Q (units) | Ss (units) | S (units) | R (monthly) |
|---|---|---|---|---|
| COP10 | 6316 | 2852 | 7128 | 1.56 |
| MPP10 | 6095 | 2885 | 6816 | 1.69 |
| MPC10 | 3925 | 1859 | 4431 | 1.55 |

To summarize these results, next figure shows graphically how the model works.

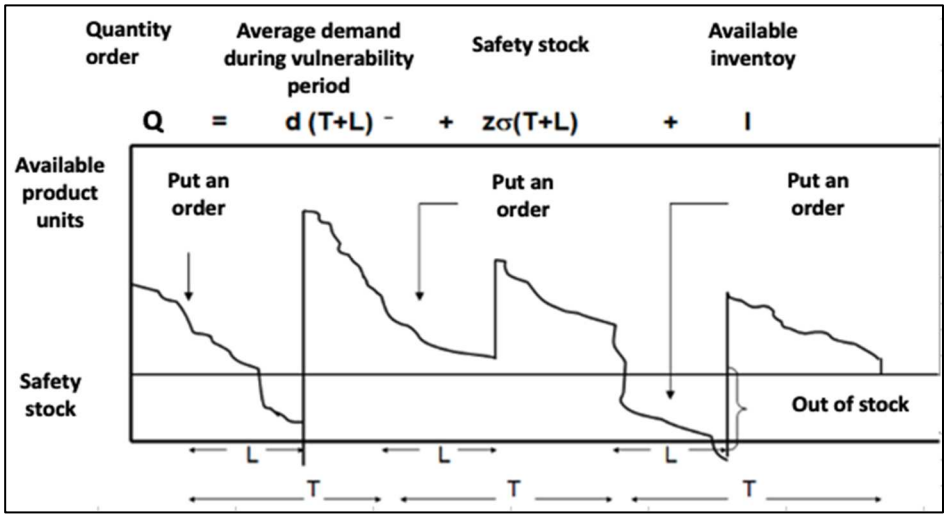


*Figure 3 Graphical periodic review inventory policy*

The results of our research study correspond in the same sense to that described in the literature of previous studies related to the periodic review inventory model, but it also contributes to this theoretical construct when determining which small family companies with limited financial budgets and with raw materials highly perishables, this model might be applied effectively by reducing inventory costs, in addition to reducing shortage problems, better time management in the company's operations and possible penalties by its clients [2,3,7,8,17,22-24].

In the case of our research, it was possible to determine the optimal number of units produced for the products with the greatest variability in demand. In other words, the optimal production quantity for the COP10 product was 6316 units, for the MPP10 it was 6095 units, and for the MPC, it corresponded to 3925 units. This may represent improvements in the way the typical Mexican food company is managed, but it is also a way of preserving the monthly income of the company.

On the other hand, regardless of the level of demand for the typical food company, safety inventories must be guaranteed to continue operating normally. Thus, for the COP 10 product, there must be a safety inventory of 2852 units, while for the MPP10 and MPC10 products, they must have an inventory of 2885 units and 1859 units respectively. In other words, this allows the appropriate amounts to be made while avoiding it, the shortage of products for the company's customers.

Therefore, for Moles Santa Monica company, it will be much easier to make decisions regarding its finished product inventory. For the COP10 product, a maximum inventory of 7128 units must be ensured; the stock will be reviewed every 1.56 months and depending on the level it is at, it must produce enough to reach the quantity associated with the value of "S". The same must happen with the other two type A products, MPP10 and MPC10; which must have a maximum inventory of 6816 and 4431 units respectively, in review periods of 1.69 and 1.55 months each. If necessary, this policy could be applied to the rest of the company's products. To achieve this, the company will need to improve its business processes and management style.

## 5 Limitations and opportunity areas

Some limitations found was that we only worked with historical data from November 2018 to October 2019. We consider it is necessary in future research to include longer periods of time to determine the statistical behaviour of sales and decide according to the information; the type of model to use.

In another sense, the periodic review model (R, S) could be applied to all the articles handled by the company, however, only the 3 most representative products were considered, so in future studies the periodic review method can be applied for those products that have deterministic demand according to the product catalogue. In addition, another model could be applied for those products whose demand is probabilistic. In this way, a specific planning can be made for each of the products in the company's catalogue.

In future studies, the breakdown of each of the raw materials necessary to produce each type of product can be analysed, since the ingredients necessary to prepare the final products are shared and the reorder values may vary. Other areas of opportunity can be extensive the use of this model to the entire Mexican food company as well as apply the periodic review model to other companies of the same Mexican food industry such as sauces and dips. Even more, it may be interesting to apply it within other family companies with highly perishable inputs; in which the impact of inflation rate must also be included. In addition to the above, a supplementary idea is to explore how management styles impact inventory management, its costs and its logistics cycle.

## 6 Conclusions

With reviewed methodology, it was obtained that critical products have a constant demand, with a behavior that only allows the use of a periodic review model of type (R, S). According to the Pareto 80-20 model, it was possible to choose the most relevant products in terms of sales, which only represent 20% of the portfolio volume, but which, taken as a whole, are equivalent to almost 80% of the production and sale of the company.

The safety stock (Ss) of a policy (R, S) allows to face the uncertainty of the demand during the review period and the lead time. No matter the type of method used for inventory management, the safety stock is essential to have reaction time to any eventuality company can face. Consequently, even Moles Santa Mónica company products have a high variation in their demand, which generates a probability distribution, they can manage their inventories using a fixed monthly review period. According to the results of the model (R, S), a review of finished product inventories will have to be made, which will be subtracted from the lot size obtained with the periodic review model. For this company and other similar SMED's, these activities need to be performed by managers, but represents financial and reputation benefits if the suggested policy is taken into consideration.

The management of orders will be made easier taking into account that fewer orders will be made and the quantity of finished product of type A products will always be available. The time used to place orders could be reduced from four monthly orders placed by the company to one order every 1.56, 1.69 and 1.55 months, for COP10, MPP10 and MPC10 products, respectively; according to the results obtained. The knowledge about the company's work system, as well as the characteristics of its products and having control over the behaviour of demand are crucial to determine inventory policy. In this case, it has its own warehouses, with capital to operate and an accounting system that records purchases and sales.

Finally, although there were limitations in the study, such as those described above, findings about the current conditions of family businesses are essential and need to be made; first to know the current status of the company in terms of warehouse management and second, to determine the type of management they should be carrying out. Today, if small businesses do not apply this type of strategy, they will be closer to disappearance than to prosperity.

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