



# The Inventory as a determinant in the profitability of pharmaceutical distributors

## *El inventario como determinante en la rentabilidad de las distribuidoras farmacéuticas*

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### **Abstract**

In the competitive world in which business operates, it is necessary to develop internal control mechanisms that allow companies to reduce their costs to obtain greater utility. The present work has the objective of analyzing the control of inventories, contextualized in the sector of pharmaceutical distribution of the province of Guayas-Ecuador, in order to determine their incidence in the costs and the profitability of the companies.

The methodology to follow in order to carry out an in-depth accounting diagnosis is based on scientific methods and techniques (observation, interviews and surveys) applied in a pharmaceutical distribution company, in the field of inventory management, being this exploratory and descriptive research. The results obtained, present the main drawbacks of inventory control in pharmaceutical distribution, which focus on the lack of control mechanisms, associated with the time of rotation. These results will serve as reference points for future research, considering other factors of the conduction of inventories in marketing companies, which allow the design of accounting control systems to contribute to optimize the marketing costs of this sector, highlighting the need for critical and reflexive use of Accounting theory throughout the investigative process.

### **Resumen**

En el mundo competitivo en que se desenvuelven los negocios, es necesario desarrollar mecanismos de control interno que permitan a las empresas reducir sus costos para obtener mayor utilidad. El presente trabajo tiene por objetivo analizar el control de inventarios, contextualizado en el sector de distribución farmacéutica de la provincia de Guayas-Ecuador, a fin de determinar su incidencia en los costos y en la rentabilidad de las empresas. La metodología a seguir para realizar un diagnóstico contable a profundidad, se sustenta en métodos y técnicas científicas (observación, entrevistas y encuestas) aplicadas en una empresa distribuidora farmacéutica, en la esfera del manejo de inventarios, siendo esta investigación exploratoria y descriptiva. Los resultados obtenidos, presentan los principales inconvenientes del control de inventarios en la distribución farmacéutica, que se centran en la carencia de mecanismos de control, asociado con el tiempo de rotación. Estos resultados servirán de referentes para futuras investigaciones, considerando otros factores de la conducción de inventarios en las empresas comercializadoras, que permitan diseñar sistemas de control contable para contribuir a optimizar los costos de comercialización de este sector, resaltando la necesidad del uso crítico y reflexivo de la teoría contable a lo largo del proceso investigativo, para presentar el siguiente trabajo.

### **Palabras clave | keywords**

Control, cost, inventories, distribution, pharmaceutical, profitability  
Control, costos, distribución, farmacéutica, inventarios, rentabilidad.

## Introduction

It is indisputable the importance of inventory control as the primary account of any type of commercial enterprise, since the rotation of these becomes cash immediately after the sale of the same. Pharmaceutical distributors manage a large number of inventories, including medicines that must be stored in an organized manner in environments that are suitable for storage, placed or packaged in a specific way, which makes it necessary to establish adequate controls through policies, processes and functions, which lead to an adequate organization and control of inventories in their warehouses. However, the disorganization and the lack of control mechanisms on the inventories within the company, generate errors of control in the short and medium term, inefficiency in the use of resources and reduction of business profitability. In this context, it is interesting to analyze the aspects associated with inventory control that affect the profitability of pharmaceutical distributors.

Therefore, the present work seeks to find explanations to internal situations that affect the company, through the revision of theories and concepts, that allow contrasting these accounting concepts in a concrete reality. To achieve the research objective research techniques such as the interview and surveys to measure the control in the inventories were used. . With the obtained results, it is possible to propose a concrete solution to the posed problems, such as the design of a Manual of Organization and Control of inventories that allows to organize the management of control of the internal auditor in the departmental organization in the management of inventories, with its adequate processes that minimize losses and guarantee the reliable results of the inventories and therefore in the financial statements of the organization.

An inventory system is a structure that serves to control the level of existence and to determine how much to ask for each item and when to do it (Guerrero, 2009). The inventory also represents the existence of stored goods destined to carry out an operation of purchase, rent, sale, use or transformation (Ruiz, 2011). Inventories represent one of the main resources available to a commercial or industrial entity (Romero, 2012).

Inventories are, in most cases, one of the main components of the working capital of the organizations and the investment decisions in this area. Therefore, it should be taken into account, in addition to the cost factor, which is the main objective of the management approaches, some elements associated with risk and performance of it (Ramírez & Manotas, 2014).

Within every organization, the purchase and sale of goods or services is of vital importance; hence the importance of inventory management (Sánchez, Vargas, Reyes & Vidal, 2011). Goods that are available for production or sale or internal consumption (Zapata, 2011). An inventory is definable as that set of goods, both movable and immovable, with which a company can trade (Barzallo, & Solórzano, 2013).

In general, inventories are the largest asset within companies' balance sheets. These contain all the items or merchandise that the company disposes for its commercialization, allowing the buying and selling in a determined economic period. Durán (2012) and Aguilar-Santamaría (2012) recognize the inventory as a buffer between two systems: one of supply (production or supply) and another of demand (customers or distributors). With these characteristics, it can be understood that the size of the inventory will depend on the behavior of these systems. Therefore, the longer the supply chain delays, the larger the inventory size, due to the whip effect of demand. An adequate level of inventory must be maintained to avoid possible maintenance costs or losses due to surplus deterioration, which directly affects the profitability of the company. Maintaining high levels of inventories implies greater utilization of immobilized financial resources, affecting the flow of operations. On the contrary, maintaining a low level of inventories would lead to a larger amount of orders being made to suppliers, as well as not satisfactorily covering demand, causing customer loss, decrease sales and profitability (Durán, 2012).

Currently, probabilistic inventory systems fall within two broad classifications: systems with continuous review and periodic review (Gutiérrez, Panteleeva, Hurtado & González, 2013).

The application of a Inventory Management System is one of the most influential alternatives in the effort to reduce costs and improve economic efficiency (Pérez, Cifuentes, Vásquez & Ocampo 2012). Thus, the management of inventories must take into account the organizational aspects and the actors that affect it (López & Gómez, 2013).

Warehouses, Storehouses and Distribution Centers are a key success factor for the effective management of the supply chain and distribution of organizations (Mora, 2011). In this sense, inventory management is fundamental, due to characteristics that generate problems with two kinds of complexity: (i) First, there is the great amount of items that comprise the commercialized lines and (ii) the second class, is due to the nature of the system and the external variables that influence its behavior (Toro &

Bastidas, 2011). In this context, inventory management has become one of the major challenges faced by managers with regard to planning and control (Aguilar-Santamaría, 2012).

The management of inventories within corporations is important because they fulfill vital functions such as maintaining independence between operations, covering uncertainty of demand, giving flexibility to production scheduling, protection against delays in delivery time of the supplier and take advantage of discounts from suppliers (Izar and Méndez, 2013).

The inventory theory has its roots in the Economic Order Quantity (EOQ) model, proposed by Harris in 1913. Currently, this model allows a good approximation of the optimal inventory policy in several real-life situations. However, in inventory systems where deterioration has a significant economic impact, assuming that products have unlimited lifetime leads to the adoption of inventory policies that are very far from optimum. Decreasing product quality adds an additional penalty to inventory maintenance, and therefore a major challenge in inventory management with perishable products is to determine an efficient way to maintain the availability of items while avoiding excessive losses due to overdue products (Pérez and Torres, 2014).

Other models of inventory management are known as reorder points with lots depending on the inventory level, which indicates that under continuous review, an order is made with a variable sufficient to have the inventories near the desired level. However, it is quite probable that it will be missing during the delivery period of the order. Another model, such as the periodic review with lots depending on the inventory level, indicates that it orders a quantity of supply that can be variable, which will depend on the level of inventory held in storage. This system has potential disadvantages, such as the excess inventory that may be required to maintain this policy. Likewise, when seasonal demand is presented, the possibility of incurring in shortages increases when this seasonality is not considered within the review period. Periodic revision with reorder points and inventory-dependent lots has the advantage of having the cheapest overall cost of previous systems. However, greater resource and effort is required at the computational level (Osorio, 2013).

The classification of goods can be established according to several criteria, such as: the physical state; the properties of durability or expiration, that influence its conservation and maintenance; the degree of danger; the degree of rotation and the role they play within the logistics flow; shape, size or density (Escudero, 2014).

The management of inventories is increasingly important within the administrations of companies, as it determines the fulfillment or failure of the established objectives (Toro and Bastidas, 2011). Management is developed through the control of operations, knowledge of the process, and considering the externalities that can favor or impair business operations. For this reason, internal control has become a key element in the achievement of specific objectives in companies. Within the strategies of optimization of resources there always have a due planning and structuring of the processes for the internal control, since these give a reasonable security on the fulfillment of goals and objectives during a determined period. At present, administrative decisions are based on the information revealed by these controls. Another of the purposes of internal control is to minimize deviations and risks, allowing the anticipation of events by detecting possible alterations to the processes (Márquez, 2011). Thus, a good control system allows organizations to have greater opportunities to achieve their objectives, playing a fundamental role in the finances of business administrations (Chumpitaz, 2015).

The effectiveness of inventory control systems depends on factors such as adequate measurement of replenishment times, the design of global efficiency indicators capable of considering all the implicit variables for inventory control, and especially the implementation of methods of demand forecasts that allow an accurate estimation of the trend and variability of the demand of each of the products that are kept in inventory - minimizing the error itself in the nature of these methods - when taking into account realistic data on the demand, the exclusion of atypical data and the adequate selection of the base period for the calculation of forecasts (Aguirre, Ardila, Figueroa and Romero, 2015).

The most common problem in companies is the existence of surpluses and shortages. Many managers consider that it is convenient to have too much of what is not sold and many exhausted from what does have volume of sales. The interesting thing about this problem is that it happens practically in any company of the industrial or commercial sector (Vidal, Londoño and Contreras, 2011).

The main causes for the need to maintain inventories in any company are the gap between the demand of consumers and the production or supply of these products and the random fluctuations of demand and replenishment times in the supply chain. The most common strategies to manage these fluctuations are the improvement of the quality of the infor-

mation, the maintenance of security inventories and the collaboration in the supply chain (Vidal, Londoño and Contreras, 2011).

According to Osorio (2013), inventories need the presence and implementation of a reliable control policy. An optimal inventory policy should answer the questions of how much inventory should be reviewed, when to order, and how much to order, whether it be independent or dependent demand items. The methodology for estimating policies to answer these questions can vary significantly due to the type of product and the production environment (Gutiérrez and Vidal, 2008). The choice of the control system depends on the complexity of the operation scenario, the number of items that need to be controlled, the number of facilities where the inventory can be stored and the availability of the information in real time (Osorio, 2013).

The debate about the importance of the overall result versus that of the net result affects the decision whether or not to disclose the former in an independent accounting statement, since its information is included within the variations of the net present in the balance sheet, and not It would be necessary to present separately disaggregated information if it were not relevant (Arimany, Moya & Rodríguez, 2011). The methodology resulting from the analysis has three exclusionary phases in the integral analysis of profitability (Santiesteban, Fuentes and Leyva, 2011):

Phase I – Characterization

Phase II – Diagnosis

Phase III - Projection of the solution

### **Suggested Calculation Model for purchasing**

This model is designed based on fluctuations in demand variables and delivery times, as well as the levels of service offered by the company to its customers (Mora & Martiliano, 2012).

### **Inventory relative to atmospheric contamination**

To classify the atmospheric pollutants it is attended to: (i) The physical and chemical characteristics of the pollutant; (Ii) The effects of the pollutant; (Iii) The sources of production or emission and; (Iv) The transformation of pollutants.

## Materials and method

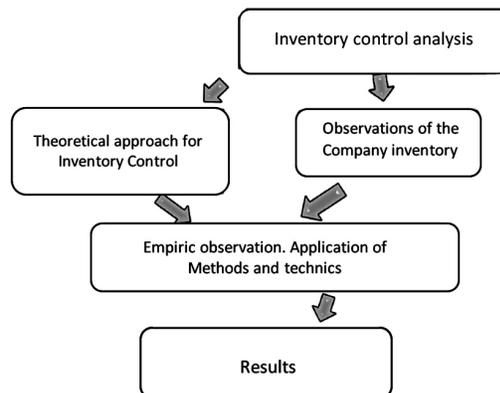
### Research design

In carrying out the accounting analysis within a pharmaceutical distribution company in the province of Guayas (Ecuador), it was decided to employ a mixed approach (qualitative-quantitative). According to Hernández, Fernández, & Baptista (2010, p.7) “the qualitative approach uses data collection without numerical measurement to discover or refine research questions in the interpretation process.” Through this approach, it will be possible to conceive the particularities in the relevant aspects of inventory control, using the technique of observation by means of the direct approach with the employees of the distributor and the structured interview with techniques and field instrument.

While the quantitative approach aims to perform statistical analysis (Hernández, Fernández, & Baptista, 2010). For this purpose, a questionnaire of closed questions inherent to the investigated subject was applied with the purpose of evaluating its process, the questions were directed to the employees of the company and that allowed to gain understanding about the management that realizes the Department of Inventories of this Pharmaceutical distributor. With this methodology, the theoretical review and analysis of the current trends of the object of study (inventory control) and its business profitability, as well as its behavior over time, is carried out.

From these conceptions the qualitative-quantitative empirical exploration of non-probabilistic character is realized and the results of the analysis are obtained with the following methodology:

**Figure 1. Methodology for conducting inventory control analysis**



Source: own elaboration

## Population and sample

For the development of the present study, pharmaceutical distributor JRC PHARMA S.A was taken as a case study. It has 25 employees who work in different areas of the company. From this population, the sample of fifteen employees related to the accounting and administrative area is determined.

Castro (2003) states that if the population is less than fifty (50) individuals, the population is equal to the sample. In a non-probabilistic sample, the choice of members for the study will depend on a specific criterion of the researcher, which means that not all members of the population have equal opportunity to conform it. The manner of obtaining the sample is of this intentional type.

**Chart 1. Sample Determination**

Ítem	Department	Quantity
1	Management	2
1	Finances	3
3	Commercialization and sales	3
4	Purchases-Imports	2
5	Warehouse	5
	Total: Sample size	15

Interviews were conducted with personnel involved in the inventory control process, for purposes of establishing levels of controls and assessments. The departments of the process are: finance, purchases-imports, warehouse and sales (Annex 1).

**Chart 2. Questions for Interviews by department**

Questions by department	Total
Finances Dept.	5
Purchases Dept.	5
Warehouse Dept.	16
Sales Dept.	6
Total	32

The evaluation of the controls is based on compliance with the organization and the inventory controls. Five types of controls were established which, according to the researcher's criteria, are considered necessary for compliance, which are:

**Chart 3. Departmental evaluation in inventory control**

Type of controls	Meaning
1- Informal controls	Improvised controls
2- Stablished but not written	Verbal and non-written controls
3- Standardized	Basic controls
4- Monitored	Written and monitored controls
5- Maximized	Strict and monitored controls

In order to determine compliance in the controls, maximum scores were established which each area should meet to establish its effectiveness in the controls. The maximum scores that the areas should meet once the questions were tabulated according to the levels of control that were evaluated, are detailed in chart 4.

**Chart 4. Departmental evaluation in inventory control**

Department Evaluation	Maximun Score
Finances Dept.	25
Purchases Dept.	25
Warehouse Dept.	1680
Sales Dept.	30
Total	160

In order to determine the maximum scores, weights have been established to be determined as the basis for each type of control, and an average of the existing weights (average 15) was calculated, which will serve to determine the company's scores with the current level of control and organization.

**Chart 5. Evaluation in weights of the level of control and organization**

Controls	Weights	%
Informal controls	5	7%
Stablished but not written	10	13%
Standardized	15	20%
Monitored	20	27%
Maximized	25	33%
Total	75	100%

The questions, once tabulated with their scores, will be weighted to establish whether the company controls are: acceptable, intermediate controls or deficient controls. For this we have considered compliance levels according to the following percentage range:

**Chart 6: Evaluation of compliance**

Description of compliance	Compliance
Acceptable	76% a 100%
Intermediate	51% a 75%
Deficient	10% a 50%

For purposes of determining the weights and evaluating compliance levels, we proceed to tabulate. In the counting of the questions by area, we multiply by the general average (15) of the maximum weights of the controls and multiplied by the percentage of each control. This will provide the average weight that will serve to evaluate the company's controls.

**Chart 7: Total controls by department**

Controls	Departments				Total evaluation
	Finances Dept.	Purchases Dept.	Warehouse Dept.	Sales Dept.	
Informal controls	2	1	2	1	6
Stablished but not written	3	4	5	5	17
Standardized	0	0	9	0	9
Monitored	0	0	0	0	0
Maximized	0	0	0	0	0
Total	5	5	16	6	32

The following chart presents the result of this operation, with the weights by department for the determination of compliance in the evaluations of the controls and organization. These figures will be contrasted with the maximum values established for the control of inventories by each area of the company.

**Chart 8. Total weight per control**

Weight per control	Departments				Total peso por control
	Finances Dept.	Purchases Dept.	Warehouse Dept.	Sales Dept.	
Informal controls	2	1	2	1	6
Stablished but not written	6	8	10	10	34
Standardized	0	0	27	0	27
Monitored	0	0	0	0	0
Maximized	0	0	0	0	0
<b>Total</b>	<b>8</b>	<b>9</b>	<b>39</b>	<b>11</b>	<b>67</b>

### Analysis and results

From the total of 32 questions asked to the interviewees of different departments regarding compliance with inventory control and whose main objective is to know if the controls are effective or deficient, the following findings were found:

**Chart 9: Description of compliance by department**

Departaments	Maximun socres	Obtained score	Compliance Of teh company	Description Of compliance
Finances Dept.	25	8	32%	Deficient
Purchases Dept.	25	9	36%	Deficient
Warehouse Dept.	80	39	49%	Deficient
Dpto. de Ventas	30	11	37%	Deficient
<b>Total</b>	<b>160</b>	<b>67</b>	<b>42%</b>	<b>Deficient</b>

As can be seen, the levels of compliance of the company's departmental controls are deficient and are concentrated on informal controls and established, but not written, controls followed by standardized controls.

It can also be evidenced, from the point of applied evaluation, that the company lacks the monitored and maximized control levels.

### Organization, control and inventory management

In order to know the perception of the employees of the company regarding the organization and control of inventories as well as possible alternatives of solution, a survey was applied to 15 employees of the accounting and financial area, whose results are the following:

**Chart 10. Survey applied to the employees of the accounting-financial area**

N°	Questions	Answers							
		Yes	%	No	%	Doesn't	%	Total	%
1	Do you consider that the Company has adequate procedures in the organization and control of inventories?	4	27%	8	53%	3	20%	15	100%
2	Does the institution have design of inventory control processes?	2	13%	8	53%	5	33%	15	100%
3	Are evaluations of the organization and control of inventories made to make financial management decisions?	2	13%	10	67%	3	20%	15	100%
4	Is the inventory requisition management generated with agility and efficiency?	4	27%	9	60%	2	13%	15	100%
5	Do you consider that with the design and implementation of a manual of procedures in warehouse would help to improve the organization and control of inventories?	15	100%	0	0%	0	0%	15	100%

The obtained results in the survey highlight the lack of organization and control of inventories that this pharmaceutical distribution company has, expressed in 67% who manifest such situation. Likewise, there is evidence of poor agility and efficiency in the management of inventory requisition with 60%; as well as an inefficient manual of processes and procedures for the management of the inventory with a 53%. It is interesting to note that 100% of the sample indicates the need to have a manual of procedures for the organization and control of inventories.

### **Incidence of inventories in profits**

To know the incidence of inventory control in the company's profits, we proceeded to review the accounting documentary information where it was possible to detect that in the amount of invoicing made in 2011 was US \$ 63,000,000, selling a total of 15 033 421 items in merchandise, and there were no reports of closure of inventories of merchandise that fit the inflows and outflows of merchandise, in accordance with what was invoiced in that period; therefore, in that year no losses or missing can be quantified.

In 2012, there is also an invoicing amount of US \$ 21,114,000, equivalent to a total of 91,023,423 items, and in the sum of total departure inventories, there was not a respective rotation of inventories valued at US \$ 9 235.46, which was allowed for certain products to enter into expiration date; generating an economic loss for the company, not counting differences between the number of items invoiced and missing in warehouses that were discovered for a total of US \$ 1,030.56, which could be generated by bad counts during the delivery of the orders to customers.

### **Discussion and conclusions**

The results presented reflect the main difficulties for the control of inventories for that this pharmaceutical distributor has, which are associated to the little departmental organization, lack of process flow and control of the items purchased for sale, as well as the non-fulfillment by part of the personnel in charge of said control which would allow to obtain better business profitability. The control of inventories should be focused on the reorganization of warehouses, through the implementation of a control system that starts from the moment of requisition of a material to the exit of the product to the market, passing through the different logistic processes of the commercialization and ordering in warehouse.

In accordance with the objectives set out in the research, this report reflects the main findings obtained in the observation and analysis of inventory control that affects business profitability contextualized in a pharmaceutical distributor, which focus on:

- The lack of annual and monthly budget control in the departments of accounting, finance, sales and purchases, does not allow having forecasts in the cash flow planning, inventory rotation and physical space for the warehouses.

- Invoicing is carried out in an unsuitable space (warehouse of inventories), which allows warehouse personnel to observe the prices of sold products, which may lead to conflicts of interest, theft, or any other situation that affects the company economically.
- The little internal control, since the signatures of responsibility of the documents in warehouse only has the signature of the warehouse manager. These must have at least 3 signatures: elaborated, reviewed and approved.
- The lack of coordination between the physical taking of the monthly inventories and the participation of the accounting department does not allow having certainty about the physical inventory and there is no technical report of the pharmaceutical products that are in quarantine.
- The handling of pharmaceutical products requires a general understanding of the processes of inventory control by the people of the warehouse staff and other departments.

Likewise, the results of the present study can serve as a reference for future research that allows presenting strategies for solving the problem, such as the design of a Manual of Inventory Control that serves as an instrument for optimizing resources, minimizing costs and conservation of medicines, supplies and products for sale, which will allow the organization to establish its own inventory management system to adequately solve the aspects related to the questions: how much to buy, when to buy and how much to have ?. This solution alternative and its proposed schemes are shown in annexes 2 and 3.

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## **Annex**

### **Annex 1**

#### **Questions for interviews**

##### **Finance department**

1. Does the Department of Finance have a policy and procedures manual?
2. Are budgets made for the purchase of inventories?
3. How often are budgets for the purchase of inventories made?
4. Does the company have credits with medicine providers?
5. Do you have an established credit limit with suppliers for inventory purchases?

##### **Purchases- imports department**

1. Does the purchasing department have a policy and procedures manual?
2. How many quotes are requested from suppliers before deciding on the acquisition of inventories? What is the process when imports are made?
3. What are the main factors when deciding the purchase of inventories?
4. When they request the purchase of medicines are they acquired to cover maximum and minimum quantities of stock in warehouse?

##### **Warehouse department**

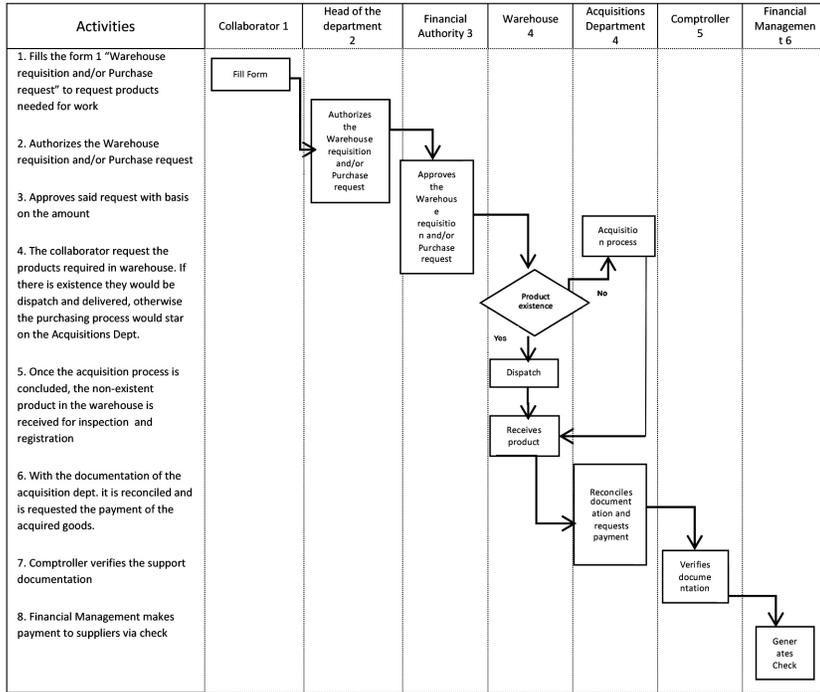
1. Does the Warehouse department have a policy and procedures manual?

2. What are the processes already documented? Which are the processes that are in the process of elaboration to be documented?
3. Who is the person in charge of receiving the medicines?
4. How are the warehouses structured?
5. Does this documentation contain a numerical sequence, date, product description, quantities, sales order reference, invoice or customer, which allows the control of warehouse movement?
6. If there is documentation, is there any degree of responsibility, with the proper signatures that authorize the movements of the inventories in the warehouse?
7. In what types of documentation do the warehouse revenues and expenses are supported, in relation to purchases, imports, sales, casualties, Etc. Does Warehouse have an automated inventory system?
8. Which personnel have access to this inventory system, if any?
9. In the warehouse area do users of the system have access to the inventory costs?
10. What is the inventory costing system used by the company? Are physical inventories done regularly?
11. How are medicines stored in the warehouse? Is there a mechanism for the exit of medical samples? N/A
12. In cases of expired drugs, what is the process?

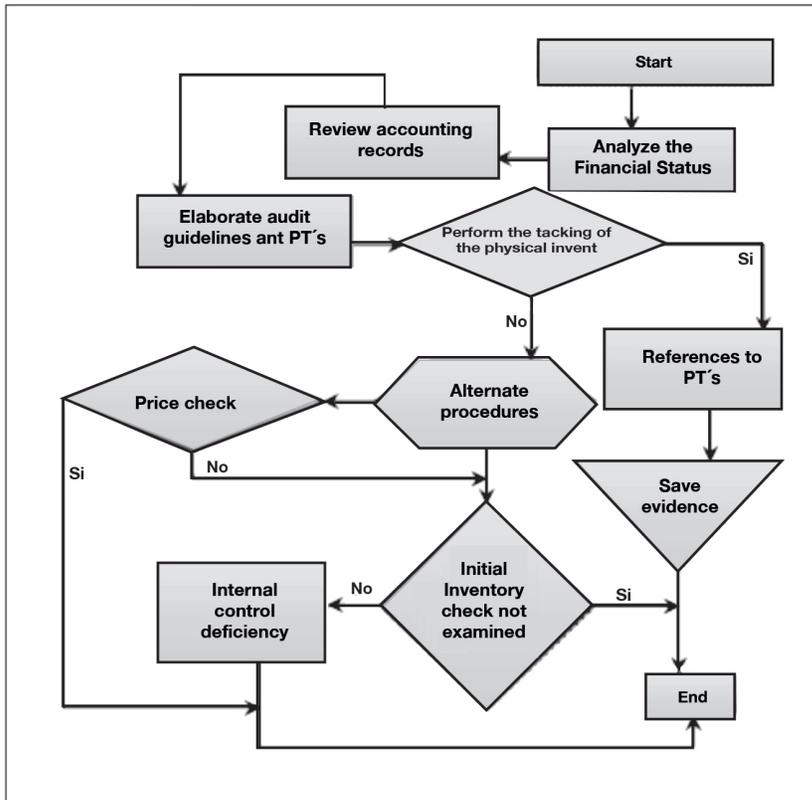
### **Sales department**

1. Does the sales department have a manual on policies and procedures?
2. What is the process of commercialization of the medicines?
3. Who approves sales to new clients' credits, in relation to deadlines and amounts?
4. Is there a pre-issue document to the invoice, with the respective authorizations of prices and quantities by the management?
5. What is the process of requesting medical samples to the warehouse?
6. What are the commercialization activity, advertising and/or marketing, in order to be able to disseminate the medicines to your customers? N/A
7. Who authorizes the dispatch of medical samples and what is the limit amount? N/A

### Annex 2. Purchasing Cycle



### Annex 3. Flow chart of the proposed inventory procedure for the company



The flow chart shows the procedures to follow, in a very simple way so that the person in charge of the review, does not have problems to execute it, since it contains the necessary audit procedures, for the truthfulness and the reasonability of the financial statements.