

## ORIGINAL ARTICLE

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## SUMMARY

The text is part of the Doctoral research carried out by the Universidad Americana de Asunción/Paraguay that discussed the administration of materials: a new logistics for a methodology of inventories and addressing in the Department of Material of the Federal University of Amazonas – UFAM. Its problem is: the main challenges encountered by the Coordination of Central Warehouse of the Federal University of Amazonas; and as objective to make a comparison between the warehouses of UFGM / UEMG / UFAM. Regarding the approach, it deals with a bibliographic and field research. It is concluded that in the warehouse the location of materials is becoming increasingly complex when the volumes are large and their tendency is to grow even more.

Keywords: Warehouse, new methodologies, stock location system.

## INTRODUCTION

Inventory management in the Warehouse Coordination of the Department of Material (DEMAT) of the Federal University of Amazonas (UFAM) is important, due to the fact that its objectives are aimed at meeting the needs of the various sectors of the institution (capital/interior). In this sense, the need for a system of localization of existing materials in the Central Warehouse of UFAM is extremely important for the materials to be democratized, this process ensures quality services and acquisition of products for the units to manage correctly the materials requested.

In this sense, to obtain a good planning, is to realize the real needs of materials that can maintain the activities for a certain period of time; have effective control mechanisms that can show managers what materials to actually buy, in the right amount and at the right time, avoiding the lack or waste of them; to request the sector responsible for purchasing the materials in an appropriate manner, thus avoiding unsuitable acquisitions and monitoring the arrival of materials in the Warehouse Coordination, verifying that they are in the correct quantity and quality and according to the specifications requested by the Academic Units, Supplementary Bodies, Administrative Sectors to the Coordination of purchases.

The Federal University of Amazonas (UFAM), has a great complexity, because in addition to the capital operates throughout the state through academic units in five (05) of our municipalities that are the poles of: Coari with the Institute of Health and Biotechnology with six (06) courses; b) Benjamin Constant with six (06) courses; c) Humaitá with six (06) courses; d) Itacoatiara with nine (09) courses; and, e) Parintins with seven (07) courses. Its administrative structure consists of seven (07) Pro-Rectories thus distributed. Also in its structure UFAM has fifteen (15) supplementary organs.

Today UFAM has approximately 20,000 students enrolled, out of the more than 270 indigenous, in the National Plan for Teacher Training (PAFOR), is in a range of 5,000, already in Distance Education there is about 1,500, and in the Graduate Program above 1,000, in relation to servers today are: above 6,000 among teachers and administrative technicians,

today around 40,000 people in the university's facilities , and it is this population that are served via the requesting sectors that the Department of Material meets, in this circumstance of a population of an average city. (PROEG/UFAM).

With this broad structure we understand that managing an institution such as the Federal University of Amazonas, specifically in the products requested by the various sectors and units, requires an effective logistics in the process of organizing the activities related to the warehouse. In this sense, we formulate a problem that will lead the way of the construction of this text, we propose to investigate: What are the main challenges encountered by the Central Warehouse Coordination of the Federal University of Amazonas? As a result, we propose to analyze the importance of planning, inventory management and addressing to the Central Warehouse of UFAM.

In order to achieve the suggested objective, bibliographic research was adopted as a methodology. In relation to the approach, we have selected to make a theoretical analysis, subjected to the following methods: Bibliographic analysis from the literature review under the subject that covers articles, books, collections, magazines, encyclopedias and others.

The text is organized in two parts, the first presents a comparison analysis between the warehouses of (UFMG/ UEMG /UFAM) and addressing to the Central Warehouse of UFAM; the second deals with methodological notes so that the products are located more easily by the servers working in the warehouse center sector of the Federal University of Amazonas; and finally, the final considerations.

#### METHODOLOGICAL NOTES TO FACILITATE THE LOCATION OF PRODUCTS IN UFAM

Systems Administration (AS) is the use of the administrative knowledge of a project is the creation of an integral complex system. This system aims to define goals, design solutions for choices and control the tasks necessary for the creation of a more complex system.

Thus, we can take advantage of computer systems that meet the stock policies of the werehouse of UFAM, which may have uninterrupted or periodic review. These systems enable all inventory management calculations that decide the economic purchase lot according to measured parameters. Therefore the system is able to check the quantities and how often

are necessary the requests for purchase alone or conjugated, “in the INPOL system the purchase proposal was given due to accessibility both related to the cost of acquisition and its ease of training of the personnel who will work with it, in this sense the cost to qualify the servers will be lower” (BALLOU , 1995).

The proposal to purchase the INPOL system, is just a way to show that the SIE system that is currently used by UFAM, is not compatible with the needs of a warehouse of the size of the institution, because we will see some of its deficiencies, we do not have in the system applications where you can register data for maximum inventory verification, minimum stock, restocking point among others , because what we have has never been implemented by those responsible for supporting the SIE system, and with this are not met our real needs.

We also have other solutions outside the purchase of a new system, there is also the possibility of being developed by one of our agencies such as: Computer Institute (ICOMP), Ceteli, or also by the Data Processing Center, in addition to having all these sectors, we also have technicians and teachers who can develop systems that meet our needs, and also do the training of servers crowded in the Coordination of Material through theoretical and practical classes , as well as make a manual that details all the steps that have to be taken in to have a system that is up to the UFAM, and with this we can have a more appropriate material control, and that shows us all the phases that is of total precision in the information about the warehouse for greater savings in purchasing costs.

Inventory control depends on a policy that includes the Order Point (PP) quantity, and the Order Interval (IEP), and the order for each order, through the Economic Purchase Lot (LEC). The use of INPOL software implies a supply chain with a distribution location and also a single stock. After this step the INPOL software will calculate and improve the cost of purchase, transportation, order cost, cost of the safety stock, as well as the total of all the costs listed.

All this data can also be done through other programs, as long as the request is made within our needs.

Soon after analyzing and optimizing the items will be improved the costs of the INPOL system so that it will be an ideal system for the Warehouse of the Federal University of Amazonas (UFAM), our goal is to compare our current System of SIE with the system we are proposing.

Other than that, we are suggesting that a comparison be made between the two systems, so that there is a difference in the service that we crave so much in the Warehouse.

Based on the inventory system, suggestions will be made for the implementation of a new inventory management for the warehouse of UFAM, the recommendations are being inserted in the use of the INPOL system so that all calculations can be performed and thus increase the chances of applying the modeling mentioned in the inventory management system.

#### COMPARISON BETWEEN WAREHOUSES/UFMG/ UEMG/UFAM

The Central Warehouse of the Federal University of Minas Gerais (UFMG) is subordinated to the Material Division. It is a recently built building all in masonry, with two floors, and on the ground floor are stored consumables and perishables such as: coffee, sugar; it has a gridded room for the sole purpose of storing tires and lubricants, as well as a room properly suitable for computer products.

The building has a built area of 1,900 square meters, having two docks, one for entrance and one for exit, has three rooms on the second floor, the rest is for storing consumables intended for rectory. The building was built in a separate area from the other buildings. In the same building works the equity sector where it receives the assets, but is soon sent to the sectors that requested them. The Central Warehouse stores the materials destined to the administrative bodies of UFMG, the other materials are acquired by the Academic Units and stored in their own warehouses.

The warehouse receives, stores, controls and distributes the supplies and other materials intended for administrative bodies linked to the institution's superior administration and the items listed in the Institution's CommonLy Used Material Acquisition Program, and its storage is done on shelves and pallets.

The Central Warehouse Sector of the State University of Minas Gerais uses a system of receipt, registration and control developed by UEMG itself.

UEMG and UFAM comparison.

State University of Minas Gerias (UEMG)	Federal University of Amazonas
Does not have a building suitable for a warehouse, works in a room	Building adapted for warehouse purpose
You only receive business supplies	Adaptation for receipt and distribution
Does not have receiving and distribution docks	There is also no
No room to store building cleaning material	There are, with major shortcomings
Does not have exclusive car for delivery of materials	No vehicle in condition for delivery

Source: Pereira (2016).

The UEMG Warehouse operates in only one room of a building that is located in the University City, and its storage in a precarious way is done inside cabinets and that consist only of consumer and computer materials.

The requesting sectors have to go to the warehouse to receive their materials in the warehouse itself, which is done by prior appointment so that employees can make the separation of all the requested materials, the other materials are requested to the Secretariat of State Administration, and there is no definition of date for the fulfillment of the requests , and with this they are met according to the needs of each sector.

Every month, physical inventory of the materials is made to have a control and thereby facilitate the inventory at the end of the year. There is a standardized material relationship. For this reason it is important the localization system so that the warehouse can meet the requests efficiently and effectively, the processes that influence the system of order fulfillment must be in sync.

The storage process is one of the most important of the order fulfillment system, because it is from it that part of the inventory information, it is also his responsibility to store the product and ship it at the time the order is made. The costs of maintaining a warehouse are very high and so any gains in improving tasks or infrastructure is an important gain for the company. In companies dealing with short-shelf materials, the care with inventory management using the PEPS system (First that enters first that comes out) become even more rigorous. Inventories need to be made more frequently in order to ensure more reliable inventory information.

Another advantage of the localization system is the optimization of idle spaces within the warehouse, which is either a concern within companies, which tend to make the most of their

storage capacity. In this sense, the company must use all the tools to optimize idle spaces within the warehouse and also facilitate the location of the product. Thus, the stock location system has a great influence on the process of storage of materials, from their entry into the warehouse until their departure. It also facilitates inventory inventory, where the material must be located inside the warehouse for a physical count.

Within this context we will exemplify order separation that is “the assembly of a number of items that are stored in the warehouse and that have the purpose of fulfilling a customer’s request” (CHING, 2001, s. p.). It is estimated the most absorbing work in the warehouse, ensure that it is around 65% of the cost of operations of a warehouse can be attributed to the function of separation of orders, “due to this activity generate a high cost in the storage system, its location and the area reserved for it inside the warehouse must be well analyzed” (CAIXETA-FILHO; MARTINS, 2001, s. p.).

#### INVENTORY TRACKING SYSTEMS

The inventory addressing system aims to record the whereabouts of each item that is stored in the warehouse, “lists three basic categories of localization systems: memory systems, defined or fixed location systems, and random location systems” (MOURA, 1997). The most suitable location system is one that should help reduce storage costs and adapt to the company’s strategy.

The memory-locating system is the system that depends on people’s memory. This system can work well if some requirements are taken into account: a) only one person works in a particular storage area; (b) the number of SKU (individual storage unit) must be relatively small; (c) the number of different storage locations is relatively small.

In this sense, if the requirements are not met, the memory system can be calamitous, due to the system using the operator’s memory, which is limited. It should also be taken into account that this type of system can cause problems at the time of the change of operators, due to the location information of the materials being stored in the memory of the previous operator.

The fixed location system is when an SKU is indicated for a specific location or set of locations

in the warehouse, “two types of storage are generally used: the fixed storage of items in numerical sequence and the determination of the location based on the activity of an SKU and its inventory levels” (MOURA, 1997, s. p.).

In the fixed location system, the spaces are defined by the maximum stock that can be deposited in them, “an estimate of the space is indispensable to define the fixed storage is to estimate twice the average stock” (BALLOW, 1999, s. p.). For Moura (1997, p. 65): the number of empty spaces assigned to a SKU must store its maximum level of inventory. Then, the number of empty spaces for definite storage is equal to the sum of the empty spaces required for each SKU.

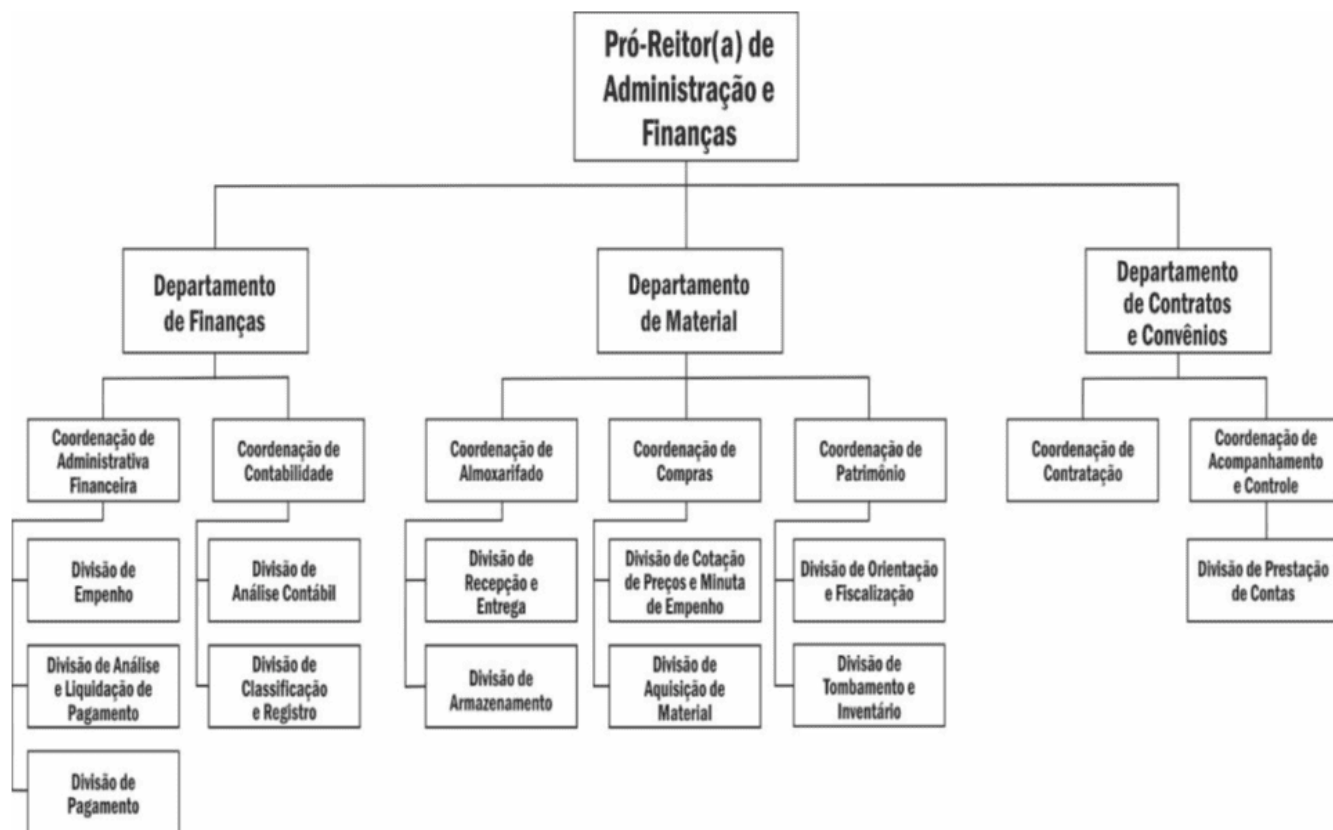
#### CASE STUDY

The current Pro-Rectorate of Administration and Finance that is one of the Pro-Rectorates of the Federal University of Amazonas, and which has under its responsibility 03 (three) Departments, one of them being the Department of Material that has the following Coordinations: Coordination of Purchases. Coordination of Heritage and the Coordination of Warehouse that is the object of our study.

Currently the Warehouse Coordination consists of two divisions one of Reception and Delivery Division and the Storage Division, which are responsible for the following activities: receiving, checking, storing, stocking the materials in the appropriate locations, checking all the processes of entry of consumables with the properly complete documentation and that everything is right is forwarded to the Finance Department for later payment, delivery of all materials purchased directly to the Units or all requested material from stock in the period that is quarterly that is made by more than 100 (one hundred) ordering units, as well as those that are made through crafts in periods outside the quarter.

Current structure of the Pro-Rectorate of Administration and Finance (PROADM).





Source: DMA/PLOPLAN.

Prepared by the researcher.

It is important to consider that to perform tasks that are the responsibility of the Warehouse Coordination the unit has only 09 (nine) servers. The main activities by sector follow the mentioned methodology, the steps taken within the Warehouse Coordination were identified and verified, with the existing resources. The following sectors were analyzed: Direction of Warehouse Coordination, Storage Division and Reception and Delivery Division.

Procedures made by the Coordination: In addition to coordinating all the activities of the Warehouse Coordination, it is also the responsibility of making invoices for the requirements for delivery of consumables in the requesting units, still has the responsibility all invoices of consumables from the poles of the interior, as well as receiving the notes from the projects that receive the materials in their sectors , due to some being outside the place of the state.

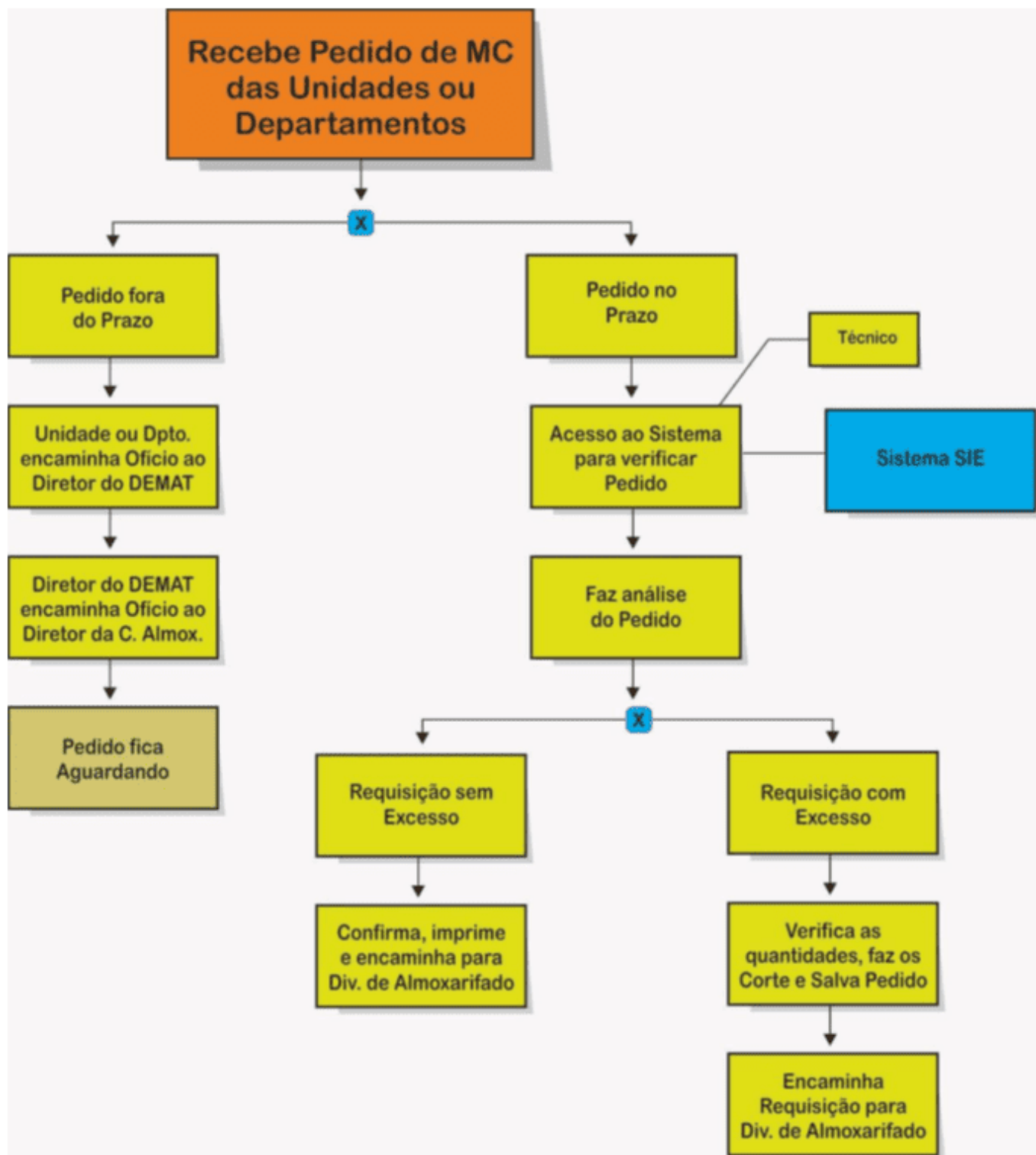
Today the purchase orders are made as follows: the purchase requests go directly to the

Administrative Pro-Rector or to the Direction of DEMAT, which forwards them to the Direction of The Purchasing Coordination that performs all the procedures necessary for the acquisition of them.

Currently the requesting unit makes the request for consumption material through the SIE system that goes straight to the mailbox of the Warehouse Coordination. The Director accesses the system, and checks if there is a request, having request for material, it opens the request and makes an analysis of the same for the verification of the quantities requested, having the materials in stock, then analyzes if the quantities requested are not over-, being the same is made the cuts according to the needs of the requester therefore an evaluation of the existing quantities in stock is made, because it must be examined the demand that we have to meet the entire Federal University of Amazonas, soon after this activity is made the approval of the request, prints the invoice and is forwarded to the responsible for the stock to be made to dispatches of all materials requested, after this activity the box where the materials are dispatched is made a new conference by another person , this process is done every time a request is made, after this operation is made the update of the stock made by the system itself.

Periodic visits are performed from 03 (three) in 03 (three) months being all within a normal range, when a requesting unit does not request within the deadline established by the Superior Administration the request that is commonly from the first to the tenth of the month indicated for the request of the material for its quarterly consumption, it is mandatory that the unit make a letter to the Director of The Department of Material or to the Pro-Rector of Administration and Finance , after the analysis is sent to the Warehouse Coordination to meet the request, so it is waiting to be met after all requests made within the established deadline.

Procedure for issuing MC Requisition for delivery to units/departments.



Source: Pereira (2016).

Note: Prepared by the author.

The structure of the Federal University of Amazonas, UFAM, all units based in the interior of the state, has autonomy to make their own purchases, because it has USAG to manage its own resources, and for this reason makes its own bids that decides which materials to be purchased, and that they are delivered to the unit's head office that is making the purchase, as well as some projects, even if the bidding is made by the Bidding Committee, the materials are delivered to the responsible who made the purchase request, due to the specificity of the materials.

With this, only the Ficaís Notes that were duly stamped by the person who received the materials are forwarded to the Warehouse Coordination, attesting that the material received is all in accordance with the commitment note, then the invoice is sent to the Warehouse Coordination, if it is not in accordance with the current regulations, they will be returned for the pending issues to be normalized, and everything according to the established standards is processed input and exit of the materials, after this procedure is forwarded to the Department of Finance for payment.

The sector of the Reception and Delivery Division that in its competence is to receive all the consumer material that are destined to the Federal University of Amazonas (UFAM), it may be that the material is purchased or given, whether destined to the stock, in addition to the material that is purchased already with the destination of the requesting unit of UFAM.

In this sense, receiving any Consumables, both that arrives for immediate delivery, as well as all materials that are purchased destined to stock, and that is under your responsibility the delivery of all consumables in the Academic and/ or Administrative Units of UFAM, are developed by the Reception and Delivery Division. Thus, the function of the reception and delivery division is to receive all the consumer material that are destined to the requesting units, and the person responsible is the head of the sector.

The Head of the Reception and Delivery Division or an administrative Technician qualified for this procedure receives the invoice of the consumption material that was purchased exclusively for the units, requests that the person responsible for the delivery of the material wait so while he goes to the Storage Division which has the responsibility to keep copies of all efforts and requests a copy of the commitment or the draft of the commitment.

In possession of the copy checks if the Invoice is in accordance with the Commitment note, everything being correct, requests that the material be unloaded, being all items is correct receives the material and allocates it in a place that is intended for all materials that are purchased directly for the units, they are within an area of the Warehouse intended for this purpose , still not being an appropriate place for such a task, if there is any disharmony between the Invoice and Commitment it is returned to the delivery man of the material so that the company returns to the appropriate divergent corrections, being all right between the Invoice and the Commitment Note the process is taken to the Storage Division where the entry and exit of the material destined to the unit is processed , in possession of the invoice the material that is in a reserved place is shipped in a vehicle to the ordering unit, if there is no server to receive the material the same is returned to the Coordination of Warehouse, and is communicated to the person responsible for the requesting unit that when it has someone to receive to receive the same it is taken back.

Head of the Reception and Delivery Division or an administrative technician qualified for the task receives the invoice of the consumption material that was purchased solely for inventory replacement. Then the server asks the person responsible for delivering the material to wait for it as it moves to the Storage Division where it requests a copy of the commitment or the draft of the material.

In possession of the document first checks if the Invoice conforms to the Commitment note being all correct, it is requested that the material be unloaded, if all items are correct receives the material and allocates it in a place, within an exclusive area of the Warehouse intended for this purpose, even if it is not a more appropriate place for such occupation , if there is any divergence between the Commitment Note and the Invoice, is returned to the delivery man of the material for the return of the company for the appropriate corrections, everything in agreement between the Invoice and the Commitment Note is taken to the Storage Division where the entry is processed, the same processed the material is taken into the Warehouse where the material is stored in the places destined to them.

Soon after receiving the invoice from the Warehouse Coordination, the person responsible for the Warehouse makes the separation of the material and leads to an area that has been adapted to be the place of shipment of the materials that is checked by another person who communicates the Division of Reception and Delivery that has material to be delivered to the

requesting units.

The responsible takes all invoices that have already been dispatched and makes a schedule for the delivery of the materials in the units provided that he has a vehicle and helpers to perform the task, because it is not always that one has the conditions to make the delivery immediately, having the necessary conditions the material is shipped in the vehicle that is not the most suitable for this type of service. The driver and the helper are outsourced, the person responsible for delivery who is a server of the UFAM board picks up the invoices that are printed in two ways and go to the units to which the materials are destined, when arriving at the unit if you have a server to receive the material is checked and if you have everything in accordance the same is received otherwise it is returned or then is taken the material that is missing, after this activity the server signs the invoice giving the receipt of the same, if it does not have a server for the receipt of the material is returned to the Warehouse Coordination and the material is to be delivered last or else the responsible for the sector comes to pick it up.

## CONCLUSION

In Brazil with the need for the country to enter a very competitive market internationally, the optimization of policies and methodologies has to be modernized in the information system. Thus, the public service has to follow all development in relation to the private sector, currently, it is necessary to strengthen public companies, due to the situation in which Brazil passes, and that demands clarity, efficiency and effectiveness of government companies.

As it could not fail to be the Federal University of Amazonas (UFAM), it is also inserted in this situation due to the need to have a more evolved administration and logistics organization, due to its location in the State of Amazonas that has an area of great proportion because its area of activity is not only in the capital but also in five poles of the gutters of our rivers.

Currently with the complexity of the market that determines that services and products of better quality and with a lower cost are delivered, and still having to meet the requirements of customers, and with that logistics becomes a very complex operation and a great differential in competitiveness with other companies and in relation to the public service have

efficiency and effectiveness.

In the warehouse the location of materials is becoming increasingly complex when the volumes are large and their tendency is to grow even more, so to have a location that is efficient and effective we can use three (03) addressing systems as a working tool: a) memory system; b) fixed system; and, c) random system All addressing systems have their peculiar characteristics and benefits, so to know the best addressing system it is necessary to know what the purpose of the company is, in the case UFAM we verified that the best system is the random system.

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