International Journal of Engineering Science Invention (IJESI)
ISSN (Online): 2319-6734, ISSN (Print): 2319-6726
www.ijesi.org ||Volume 10 Issue 12 Series II || December 2021 || PP 01-09

Use of the SHERPA model for software selection in the implementation of a warehouse system in a wholesale food company –case study

Camilo Gómez Linares[1], MBA Ing Ever Angel Fuentes [2]
[1](Student, Universidad Libre de Colombia, Colombia)
[2](MBA, Universidad Libre de Colombia, Colombia)

ABSTRACT: *Implementing business management systems is often a headache for organizations, as they usually present cost overruns, delays, or setbacks in operations. This article intends to explain the use and application of the "SHERPA" (Systematic Help for an ERP Acquisition) software selection model, using as a case study an example of the selection of Warehouse Management Software (WMS) installed in a food distribution company. The application model steps and the main objectives to be achieved in the "future software" will be described, as well as the guide on how to select a winner from different applicants. For this, concepts like the elaboration of the value stream map will determine the principal criteria of selection and key reports needed by the company. Once the selected software is installed, we will demonstrate how it improves warehouse management, saving costs and operation times, and thanks to better synchrony with the customer, an increase in the demand is achieved.*

KEYWORDS: *Archive facilities, planning, comparative research, acquisitions*

Date of Submission: 10-12-2021 Date of Acceptance: 24-12-2021

I. INTRODUCTION

Called SHERPA "Systematic help for the acquisition of an ERP" methodology that has been tested and demonstrated in the "Workshop on Software Specification and Design, Shelter Island, San Diego, California", and based on the article "Formalizing ERP Selection Criteria" (Burgués, Franch, & Pastor, 2000)[1]

The SHERPA model is a methodology that facilitates the acquisition or selection of ERP (Enterprise Resource Planning) software, based on a series of guidelines and recommendations that can be used by different types of companies. It consists of 5 phases that start from the preselection of the different candidates, while an internal analysis is carried out within it to define the main evaluation and qualification criteria, then, they are grouped according to their category (functional, service, technical type, business type, supplier, economic and strategic) to later carry out a technical evaluation, resulting in a filtered and qualified series of alternatives and suppliers, which will make the final selection process of the software easier, having into account qualitative criteria and the greatest convenience for the company (Burgués, Franch, & Pastor, 2000)[1]

In this article, we will work on all the phases that the model recommends for the selection of a WMS Software (Warehouse Management System), which will be implemented as a practical example in a wholesale distribution company of food products; This manages day by day the entry and dispatch of a large number of products and references in the warehouse, all its SKUs (Stock Key Unit) are boxes or "master boxes", such goods enter on pallets and is stored according to a specific area. A product reception, picking and the preparation procedure is executed, then loaded on trucks in the form of pallets to be distributed to the customers.

Due to the nature of its products, its trucks must be equipped with refrigeration, because the cold chain must be maintained at all time. The company has implemented new logistics management processes to cover more immediate requirements, the information is very limited and is not possible to integrate at other business data, for proper management and decision making.

"It is worth mentioning that ITCs in the supply chain provide potential advantages such as reducing cycle times, reducing inventories, minimizing the whip effect and improving the effectiveness of distribution channels." (Correa & Gomez, 2008)[2]

In the context, the company is adapting to better management of its supply chain, by analyzing the results of an internal evaluation, some critical aspects of its performance at the warehouse were identified, there are no more updated warehouse management systems. “the implementation of a software like WMS inside a company is a very complex process, because countless variables must be considered for the implementation, but the principal one is the appropriate selection of the tool and methodology as they are directly linked to

company's capabilities and should be selected using methodologies to guarantee its correct operation" (Llanos Liipez, 2018)[3]

The company is committed with the improvement of their systems, choosing a suitable methodology to use in the search and final selection of the WMS, they are also preparing internally to increase the rhythm of work, this must manage in addition to their daily tasks, the integration of information, the important participation of the work team, and the technical and organizational aspects that influence the success of the project. This article attempts to serve as a guideline for different companies that are dealing with the selection of an ERP or WMS software for their business, using the example of a practical case study.

The ERP selection process is a process of learning and knowledge of the company itself, is to know in organizational terms how to choose a tool that meets the requirements (Burgués, Franch, & Pastor, 2000)[1] is to learn to recognize the extent to the technological innovations allow to solve unforeseen events.

This decision consists of an in-depth study of each alternative (internal or external custom development, integration of the best vertical packages, maintenance of existing systems, etc.), to adopt one (or a mixture of some) of them. (Burgués, Franch, & Pastor, 2000)[1]It is important to highlight that the need for the participation of consulting companies and human capital is evident since they are the main participants in the choice of a new system (Rivera & Pérez, 2013)[4]

II. MATERIALS AND METHODS

To achieve the objective and explain the model from a real case, a step-by-step explanation of the use of the SHERPA methodology will be presented with examples obtained by the author during the research made on the company, to begin with, some factors will be revealed that allow understanding the context in which the company develops and in turn, the requirements generated from its desire for continuous improvement, and the vision of its management.

The SHERPA model is made up of 5 phases, the development of each one allows the company to understand and create security in the final selection of the tool, from the search for candidate ERPs to the signing of the contract with the selected ERP provider and related services. . (Burgués, et al., 2000)[1] On the other hand, it does not cover the implementation of the selected ERP, nor its use or maintenance, extension, evolution, or retirement since the model can accommodate the budget, technical capabilities, and effectiveness in the selection of software, as shown in figure 1.

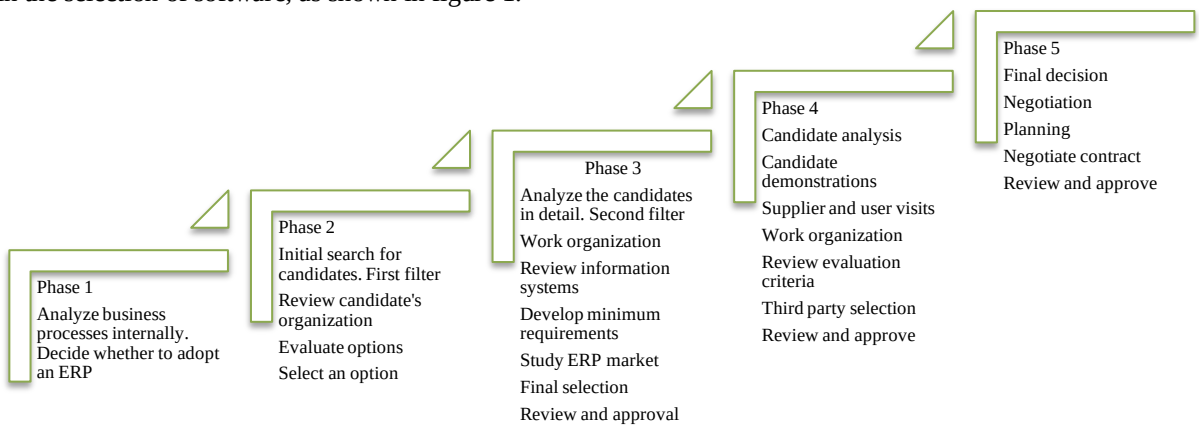

Fig. 1. SHERPA model
Source: The authors, 2021

PHASE 1. Study the strategy and business processes, decide whether to adopt an ERP

This decision consists of an in-depth study of each alternative (internal or external custom development, integration of the best vertical packages, maintenance of existing systems, etc.), in order to adopt one (or a mix of some) of them (Burgués, Franch, & Pastor, 2000)[1] In this phase, the company starts by making a selection of criteria, according to the needs of each department, among which the warehouse operations stand out, in this first analysis the main concepts and criteria that will be gradable when filtering and selecting a software supplier can be determined.

Based on an analysis performed in the company, the main issues detected in the warehouse and logistical areas are described before the selection and implementation process begins:

- No tool can handle goods output using barcodes, expiration dates and batches
- The new processes are adopted manually, by filling in multiple documents in Excel, or by rewriting some information

- There is a problem with the programming of the current system, not allowing to automatically block products that are not available, leading to loss of precise inventory control in the warehouse
- The process of receiving orders to be placed in the warehouse is dependent on the decision and experience of the Warehouse Manager, or the person who replaces him, due to the lack of a written and automatized process, which may result in human factor errors
- The purchasing area is affected by not having a detailed report of the inventory of outgoing products and its availability in the warehouse; for the entry of new products, it is impossible for the company to have a scheme of maximum and minimum stock quantities per item, because there is no proper inventory control

In addition, the institutional capacity profile of the organization continues to be developed to ensure compliance with the key success factors, where it is most needed to develop strategies to respond with the times. The company's management must evaluate different criteria or key success factors, and in view of these requirements, fundamental criteria for the evaluation are proposed, in addition, for each of the criteria, the company performs an analysis to determine the distinctive capabilities required to provide a solution or response to the key success factors. A general analysis is made, in which qualifiers of strengths and weaknesses are raised and an analysis is made in each of the different groups or departments of the company, remembering that the analysis is made on the capacity at the level of the institution.

Once the institutional capacity report has been performed, a low valuation is identified in the factor of "Timely response in the delivery of goods to the client", detecting that a large part of the problem is due to the low integration of data in the commercial and logistic procedures and that there is no automatic synchronization with the data entered from the orders on the data managed in the warehouse, according to the analysis of the diagnosis presented previously, the company notes that the most important factor to prioritize is the "timely response in the delivery of goods to the customer", which is fundamental because the customer's recognition and the image they remember.

A categorization of the main requirements and expectations in the management of the warehouse is made to which a group nominal value was given, following the institutional capacity matrix, to begin to organize and classify the first criteria and objectives in which it is necessary to be intervened, on the other hand, the technical nominal evaluation makes a selection of criteria, according to the individual needs of each department, and especially those that are directly related to the improvement (Baez, et al., 2017)[5], in this case of the "response timely delivery of goods to the customer".

Additionally, in the diagnosis performed, use is made of the value stream map methodology described by (Salazar, 2019)[6] an engineer specialized in production systems modeling. The author recommends the development of these maps in the current measurement, and subsequently after having made or implemented improvements a future measurement. This technique allows an organization to understand and measure the entire input-output cycle of the company, and allows to recognize value, differentiate it from waste, and create an action plan to eliminate it within the process. In addition, it involves the analysis of internal and external factors, which allows for a more sensitive measurement of the impacts that directly affect the dispatch operations handled in the warehouse.

The value map shows that there are processes to improve and inventories to reduce. The next step will be to build the future value stream map in which improvement events must be identified. The critical factors called "improvements in the warehouse processes" are listed.

In the construction of the value map the main concepts of analysis are determined

The takt time: The takt time is an indicator of the customer's purchase frequency.

Target time: To which the production system must adapt to meet customer expectations.

Takt time = Available time / Demand.

Individual cycle time: The standard time associated with each operation in the process, the time associated with picking a part or the standard time associated with packaging.

Total cycle time: (Lead Time of dispatch) It is the time that all operations take, it is calculated by adding the individual cycle times (Salazar, 2019)[6]

For the above, the trading company takes the necessary data to calculate the TAKT time.

TAKT time
Available time = 27000 seconds / day
Daily demand = 75 Orders / day
TAKT time = 27000/75 = 360 seconds / Order.

Source: Authors, 2021

Analysis of the results means that customers shop with an average frequency of 6 minutes per order, so this time is the production target.

PHASE 2. Search for candidates first filter

In this case, the project team needs much more information on the ERPs obtained in phase 1. This information should be obtained in one or more interviews with suppliers, obtaining as many data sheets, catalogs, articles, etc. as possible (Burgués, Franch, & Pastor, 2000)[1] In this phase the different system options that will be part of the study are created, and the first selection criteria are organized, based on the first budgets, in these first approximations the organization's operations and the capabilities of its solution are taken into account, in addition to its information systems and their cost, in this way the first candidates for the company are selected. The budget is a determining factor and precisely for this reason it was decided to apply the SHERPA methodology, in order to achieve an adequate filter of suppliers and possibilities, making the most of the market offer.

Review the organization. The company created a desktop research, in which it establishes fundamental concepts of the market, in which a list of the main software candidates is made, whose first filter is the budget; To choose the right software, it is necessary to know its capacity and its cost, the latter being a fundamental decision criterion since the software market is very competitive and has solutions and developments for all types of companies.

In order to select the first candidates, the company prepares a brief questionnaire with questions about the supplier, the software package offered, the personnel dedicated to the project, the price of the license, the price/hour of the consultancy, or the implementation package offered, in addition, in which the fundamental requirements needed for the new WMS system are discriminated. All the departments involved have participated in the elaboration of this questionnaire, especially the operations and warehouse departments, which establishes the initial criteria to be consulted with each of the pre-selected candidates.

It is a requirement that the solution has the following modules or functions, or in the case of custom developments that are included in the initial proposal.

- Inventory Requisition Module
- Purchase orders and purchase orders module
- Inventory receipt and collection module
- Inventory and movement units control module
- Picking and Picking Scheduling Module
- Packing Enlistment Module
- Inventory maximums and minimums module
- Warehouse product location module
- RFID tracking module
- EAN barcode function
- Barcode picking function
- Barcode packing confirmation function
- Quick product search function from the keypad
- User security module
- Transaction audit module
- Role control module
- Printer and connection control module

Evaluate the options. In this process, a first analysis document of the candidate and its organization is made. The basic technical requirements are determined, reviewed by all departments of the company, applying a long list of selection criteria, now more detailed, which must be refined and adapted to the organization, the project team must choose 2 or 3 candidate ERP solutions (Burgués, Franch, & Pastor, 2000)[1] This phase and the following ones are those in which the use of a formal notation can be more useful.

Candidates selection. From the first exercise a selection of 10 prospects is made, up to 5, this includes the sending or formal request of an invitation to quote, interviews, visits and demonstrations, also the first filters are established according to the financial conditions, implementation and capacity of the tool. The company decides to opt only for a packaged software or server-client because the technical functions that are intended to be introduced in the warehouse require the integration of different hardware and peripherals, especially in logistics processes such as RFID technologies, bar code readers, for which software that supports it is sought.

Main candidate software selected, 5 candidate software is established:

SAP (BSONE version),
Microsoft Dynamics,

Sage50,
Microsoft SQL Based software,
Quickbooks Warehouse.

With a clear understanding of the key objectives to be met, such as timely response in the delivery of goods to the customer, the operations to be intervened in the warehouse are established, such as the storage of several units and SKUs, the increase in customer service needs, requests for inventory reduction, requests for increased efficiency in the use of space in the warehouse, requests for customization of orders by customers, the need to integrate the warehouse with logistics systems, the reduction in the number of steps or procedures within the logistics chain and the corresponding changes in the organization of more direct delivery profiles.

PHASE 3. Search for candidates and evaluate the first filter

At this point, ERP vendors have to demonstrate their products to the project team, senior management, middle management and a selected group of future end users. The purpose here is to gain a much deeper understanding of each solution, specifically its functionality and adaptability to the organization. The client company collects all feedback; reviews and refines the application of the list of criteria to each candidate ERP; and prepares a selection proposal, which must be approved first by IT management and finally by senior management.

The requirements establish that the solution or software package has a series of modules or functions. In the case of being software companies as included in the initial proposal.

Table 1. Minimum requirements established

Development of minimum requirements	**SAP (versión BSONE)**	**Microsoft Dynamics**	**Sage50**	**Microsoft SQL Based software**
Inventory Requisition Module	YES	YES	YES	YES
Purchase Orders and Purchase Order Module	YES	YES	YES	YES
Inventory Charging and Receiving Module	YES	YES	YES	YES
Inventory Units and Movement Control Module	YES	YES	YES	YES
Picking Module	YES	YES	NO	YES
Packing Module	YES	YES	NO	YES
Inventory Maximums and Minimums Module	YES	YES	NO	YES
RFID Tracking Module	YES	YES		YES
EAN barcode function	YES	YES	YES	YES
Barcode Picking Picking function	YES	NO	NO	YES
Barcode Packing confirmation function	NO	YES	NO	YES
Quick product search function from keyboard	YES	YES	YES	YES
User security module	YES	YES	YES	YES
Transaction audit module		YES	YES	YES
Role control module	YES	YES	YES	YES
Connections and printers control module	YES	YES	YES	YES

Source: The authors, 2021

Work organization. Work organization is considered as the way or methodology in which the software supplier works, its commitment in the implementation, the number of people that will participate, the time and resources that will be available, and the support material that accompanies the process and that allows the company to have a clear and defined work plan at the moment of the implementation, to establish essential criteria in the project management and to qualify the offers based on them. The organizational review involves the analysis of available aspects such as personnel, resources, time, material, work organization criteria, monitoring capacity and project follow-up (Burgués, Franch, & Pastor, 2000)[1]

Candidates are asked to add information about their work organization, the methodology and deployment that would be carried out in the implementation, and the organization and information systems they have for its development.

Check the organization and information systems. It is important for the development of the project that the executing team has a system or tool for the management and organization of the project, the methodology and management of the activities, as well as the control and audit methods, reports, and status of the project.

Table 2 establishes the criteria for the company's internal organization and information systems and the implementation proposal.

Table 2. Review organization and information systems

CATEGORIES	SAP (versión BSONE)	Microsoft Dynamics	Sage50	Microsoft SQL Based software
Review organization and information systems	5	5	4	3.8
Project management system	5	4	3,5	3,5
Activity management system	4	4,2	3,9	3
Control and audit methods	4	4,1	3,9	3,9
Project reporting and status	4	3,5	3,1	3,7

Source: The authors, 2021

As part of the development of the minimum requirements, the criteria established above are drawn from the meetings and consensus of the work team and are part of the analysis carried out by the company.

Analysis and demonstrations of the candidates. For the following analysis, the company performs a technological categorization of the different candidates, before making the first demonstration request, a characterization exercise is performed according to the nature of the tool, in order to be able to recognize the possibilities in a deeper way. and configurations of the proposal, as well as its investment (Martinez, 2011)[7]

Table 3 shows the main characteristics of each system and the technical nature of the candidate software.

Table 3. Main characteristics of the candidate software

SAP (versión BSONE)	**Rating**	***Comments***
Version with its own database	4	Requires SAP consultants
Version without portfolio modules	2	Does not include treasury management
Accounts receivable and banks (separate)	3	Separate administrative-accounting modules
Meets 90% of the initial requirements	3	Requires additional investment to complete
Approximate investment of USD$80,000	2	Out of budget
Microsoft Dynamics	***Rating***	***Comments***
Version with MS SQL database	4	Most popular and integrable database
Version with all financial modules	4	Includes financial modules behind EMS management
Meets 90% of initial requirements	4	Reviewed
Approximate investment of USD $130,000	1	Over budget
Sage50	***Rating***	***Comments***
Version with closed database	2	Does not allow integration with other systems
Version with all financial modules	4	Includes financial modules behind the management of the EMS
70% compliant with initial requirements	3,5	Revised
Approximate investment of USD $45,000	3,5	Within budget
Microsoft SQL Based software	***Rating***	***Comments***
Open database system	4	Integrity with other systems
Version with all financial modules	4	Includes financial modules behind the management of the EMS
90% compliant with initial requirements	4	Reviewed

Approximate investment of USD 25,000	4	Within budget

Source: The authors, 2021

* values as of 2020

PHASE 4. Analyze in detail the candidate's second filter

It is conducted by making a visit to the supplier's facilities and a visit to an end user. The visit seeks to validate the functioning and operation of the fundamental functions to be handled by the system, perfecting the evaluation criteria and establishing more technical concepts, as well as filtering some candidates.

The inventory request criteria is a fundamental process for the warehouse, since it requires automatic inventory rotation.

Table 4 shows an example of the more refined analysis performed by the company in the case study, each function is rated from 1 to 5. This rating is based on the meetings and demonstrations previously performed.

Table 4. Detailed analysis of candidates

Module	Features	Sage50	SQL Base software
Inventory Requisition Module	Automatic calculation of inventory minimums	3	5
	Generate pre-requisition based on weekly inventory minimums reached	4	5
	Weekly report of items to reach minimums	2	4

Source: The authors, 2021

Prepare and analyze the demonstrations. Sufficient information must be available to make the selection and arrive at the final technical evaluation document to which a series of filters will be established to evaluate the main functions to be fulfilled by the system, based on these requirements, the Demonstration that has been requested to the suppliers.

Prepare and analyze the visits or talks with the users. The results of the evaluation carried out by the company, in the visits to the different candidates, are presented and the qualification of each one of them is established. The analysis of the technical, logistical, operational and financial concepts must be established.

For the trading company, the candidate that best offers the functions of the system and balances with the rest of the company's criteria is the SQL-BASED SOFTWARE system, which has the advantage of having an open database and performing the best demonstrations of the product, validating its experience with other similar customers, and that the system can be integrated with current peripherals, in addition to having a very competitive price.

The following are the results of the evaluation carried out by the company in the visits made by the different candidates, and the qualification by the company of each candidate (See table 5).

Table 5. Final evaluation of candidates

Applicant	First Visit	Technical Concept	Logistics Concept	Concept Warehouse	Financial Concept	Final Rating
SAGE 50	0,5	0,6	0,8	0,6	0,8	3,3
Microsoft SQL Software	0,7	0,8	0,7	0,8	0,8	3,8

Source: The authors, 2021

Review and approval. The project team negotiates the contract with the selected ERP vendor, including the cost estimate and overall implementation plan, as well as the contingency plan. Finally, IT management and senior management give final approval and the contract is signed between the parties.

To start negotiating the contract, the company establishes an SLA service agreement with the independent supplier, establishing the values and ways of working. The way the project is organized is usually based on the stages in which the implementation is to be developed, follow-up and support meetings are held, minutes of developments are drafted and the live go-live date is defined, including with the new developments.

PHASE 5. Final decision negotiation, planning

A key point in the application of the SHERPA methodology is that several tables of selection criteria are constructed throughout the different phases, gradually refining and enriching the specific evaluations for the set of ERP solutions being considered in each phase. (Burgués, Franch, & Pastor, 2000)[1]

As mentioned above, the company selected SQL BASED SOFTWARE as the best qualified candidate in technical, logistical, operational and financial terms.

Follow-up and monitoring meetings are held, minutes of new developments are drawn up and the departure date is defined. The company's management and the supplier approve the project and start its implementation.

After choosing the SQL Server-based system, as part of the initial diagnostic process, the company carries out a series of initial activities in an opening meeting, in which the supplier explains in detail the steps to be followed to implement the system, and what information needs to be collected and organized to start creating the data "masters", which will be essential in the configuration of the "data warehouse" for this system, and what information needs to be collected and organized to start creating the data "masters", which will be essential in the configuration of the "data warehouse" for this system.

In this case study, the food distribution company has adopted the fundamental policies of supply chain management, necessary for the adoption of subsequent policies of systematization and coordination of the operation.

In this way, the increase in demand is evident, thanks to the increase in efficiency in the warehouse, which is measured in time from 6 to 4 minutes in order management.

The company conducts production, logistics operation and commercial demand studies, in which it was agreed at the beginning of the project that certain measurement factors would be taken into account to determine the financial viability of the company. implementation. Table 6 shows the monetization criteria.

Table 6. Monetization criteria

Monetization	Projected value
5% - 15% increase in orders (in units). Elasticity calculation determined by % increase in orders, % change in price	Increase in orders = a sales growth rate calculation is performed
Reduction of lost merchandise - shrinkage Creation of new SKUs	28% reduction in loss due to overdue goods
Increase of orders by historical control	Increase in orders
Storage cost savings by being more efficient in inventory management	Decrease in warehousing cost by -5%
Storage cost savings by being more efficient in inventory management	Decrease in warehousing cost by -5%
Reduction time is estimated to be one hour, based on the average reduction time calculated after picking multiple picks on different days, as this varies based on the amount of order demand in a given day	Savings of 56 hours/month in personnel costs, hr value: $15.50
Increase in orders, savings in personnel costs	56 hours/month savings in personnel costs - Current sales +5%

Monetization Projected value

Source: The Authors, 2021

III. CONCLUSIONS

The use of the SHERPA methodology allowed the company to establish in an organized and strategic way the main characteristics, conditions and fundamental requirements for the correct selection and subsequent implementation of the new WMS warehouse system.

The use of the methodology allowed to find the technical aspects that the company had to emphasize, which allowed to achieve a live output with the new system in the specified times, with very few new features and with a good agreement of accompaniment and technical support to the users.

The distribution company states that with the use of the methodology it is possible to make efficient savings on the investment, compared to other tools, thanks to the fact that it was able to establish the specific needs that it could test in the demonstrations with the different candidates, which allowed it to better decant the solution that best suited its pocket, with the certainty that it did not choose only the cheapest software.

The planning and the effect on the selection of the new system were evident in the changes in the warehouse operations, which optimized response times since the new processes do not require a space configuration as the stored inventory is already organized according to its output, its expiration date or its nature.

At the moment of the implementation of the new system, the correct integration with the equipment and peripherals that the company had was evidenced, this is achieved thanks to the previous planning that was done at the moment of refining the selection criteria, since it was possible to establish which equipment was compatible or not, and to establish its budget in qualification.

The business application of technology is not always a simple process even at the time of purchase, this is due to the complexity of the management of business resources, variables and data to manage can become

overwhelming so the development of This article is intended as an example for companies that are in the process of search and selection of a new ERP type software.

The SHERPA model considers in its phase 1 the vision of the business as a starting point for the acquisition of an ERP and performs an examination of the needs and constraints of the business. On the other hand, there is the importance of the use of ICT in the supply chain. In his book "Information Technologies through supply chains", (Levary, 2003)[8] states that ICT in the supply chain can provide potential advantages such as reducing cycle times, reducing inventories, minimizing the whiplash effect and improving the efficiency of distribution channels.

REFERENCES

[1]. Burgués, X., Franch, X., & Pastor, J. *Formalising ERP Selection Criteria.* International Workshop on Software Specification and Design (IWSSD'00). 2000, 3-9. Retrieved from: https://www.researchgate.net/publication/221051951_Formalising_ERP_Selection_Criteria

[2]. Correa, A., & Gomez, R. *Tecnologías de la información en la cadena de suministro*. revistas.unal. 2008, 10-15. Retrieved from: https://revistas.unal.edu.co/index.php/dyna/article/view/9551/11475

[3]. Llanos Liipez, G. *El papel de las tecnologías de la información (TI) y la eficiencia en la gestión*. Repositorio Universidad Militar. 2018, 7-13. Retrieved from: https://repository.unimilitar.edu.co/bitstream/handle/10654/20482/LlanosLippezGiselleAlejandra2018%20%282%29.pdf?sequence=2&isAllowed=y

[4]. Rivera, I., & Pérez, M. d. *Guía de selección de ERP en las pequeñas y medianas empresas mexicanas.* Arbor. 2013, 12-150. Retrieved from: https://arbor.revistas.csic.es/index.php/arbor/article/view/1566/1627

[5]. Baez, C., & Vargas, J. *Implementación de Warehouse Management System*. 2017, 24-150. Retrieved from: http://polux.unipiloto.edu.co:8080/00003802.pdf

[6]. Salazar, B. *Mapa-de-flujo-de-valor-vsm* 2019, 1-5. Retrieved from: https://www.ingenieriaindustrialonline.com/lean-manufacturing/mapa-de-flujo-de-valor-vsm

[7]. Martinez, J. *Metodo-sherpa-para-la-eleccion-de-un-erp.* 2011, 1-5. Retrieved from: https://www.clavei.es/blog/metodo-sherpa-para-la-eleccion-de-un-erp/

[8]. Levary, R. *Supply Chain trougth information technology*. USA: McGraw-Hill, 2003

Camilo Gómez Linares, et. al. "Use of the SHERPA model for software selection in the implementation of a warehouse system in a wholesale food company –case study." *International Journal of Engineering Science Invention (IJESI)*, Vol. 10(12), 2021, PP 01-09. Journal DOI- 10.35629/6734