

ERP System inventories module implementation Procedure

Carolina Maldonado and Paola Pinos

LIDI, Engineering of Production School,
Universidad del Azuay,
Cuenca, Ecuador

caromaldonadocastillo@es.uazuay.edu.ec; paop@es.uazuay.edu.ec

Esteban Crespo-Martinez

LIDI, Engineering of Production School, Computer Science Engineering School,
Universidad del Azuay,
Cuenca, Ecuador

ORCID: <https://orcid.org/0000-0002-3061-9045>
ecrespo@uazuay.edu.ec

Catalina Astudillo-Rodriguez

LIDI, Computer Science Engineering School,
Universidad del Azuay,
Cuenca, Ecuador

ORCID: <https://orcid.org/0000-0001-8369-5300>
cvastudillo@uazuay.edu.ec

Ana Vasquez-Aguilera

LIDI, Engineering of Production School,
Universidad del Azuay,
Cuenca, Ecuador

ORCID: <https://orcid.org/0000-0003-2204-5405>
anavasquez@uazuay.edu.ec

Gabriela Chica-Contreras

LIDI, Accountant and Auditory School,
Universidad del Azuay,
Cuenca, Ecuador

ORCID: <https://orcid.org/0000-0002-7922-6509>
magaby@uazuay.edu.ec

Abstract

Information technologies play an important role in companies, as they are a fundamental pillar in the process's management and automation. Thus, the purpose of this research is to evaluate an adoption guide for ERP computer systems through the deployment of the inventories management module. As a result, it was evidenced that successful software adoption requires considering aspects that are not necessarily technical, such as commitment and business culture, or properly defined processes. We conclude that the successful implementation of this ERP module in the warehouse will serve as a starting point for its deployment in other business areas.

Keywords

ERP, UDA-ERP, SMEs, Inventories and Enterprise Resources.

1. Introduction

Today, the technology has become an essential tool for business development, where its diverse range offers support to transactional tasks and facilitates the execution of processes and activities. However, despite its development, there is a limitation within the country, especially for the MSME sector, caused by factors such as the high cost of acquisition and implementation, Astudillo-Rodriguez et al. (2018) along with the ignorance about the existence of these tools. Universidad del Azuay along with teachers and students, has created the UDA-ERP tool, a computerized management system for planning business resources. The objective is to contribute to the development of MSMEs in the region, providing an affordable, safe, and easy-to-use tool, which, in the market, becomes difficult to obtain Astudillo-Rodriguez et al. (2018).

This paper shows the adoption of the UDA-ERP in the company “Comercial Pamelita”, hoping that it will contribute to the registration, control, and planning of its inventory in the warehouse. The main activity of “Comercial Pamelita” is to sell first need products wholesale and retail. The inventory is made up of several products from ten different categories, which are: confectionery, first need products, cleaning products, bulk products, balanced, disposable, snacks, kitchen products, liquors, and beverages, because of the great number of references, the warehouse control becomes complicated. The adoption of the software, in this paper, is focused on the Inventories module, since it is a priority to focus on the critical problem of the company: the improper storage of the products in the warehouse. This situation has led to significant losses of assets overtime. Additionally, the company has billing software that includes the inventory module, without achieving good results.

When an organization adopts an ERP system, they can: i) reduce costs, ii) simplify information management tasks, iii) generate customer satisfaction; and iv) treat the information generated by the volume of data resulting from daily operations in a structured manner Astudillo-Rodriguez et al. (2018). Likewise, for the execution of the ERP system, companies need training, for which, during its implementation, an accompaniment will be carried out, exposing the advantages that the company will have when using the system.

This paper is divided into six sections as follows: i) objectives, where the goals to be achieved with this work are set out; ii) literature review; iii) the applied methodology; iv) the results obtained and the discussion about them; and, finally, v) the conclusions to the work carried out.

1.1 Objectives

This research focuses on the evaluation and implementation of the inventory’s module of the UDA-ERP software in a grocery store or retailer in Cuenca, Ecuador. The purpose is to highlight important aspects that are required in the implementation of this module. For this, the results of the previously applied procedures are contrasted and then the achieved changes are verified; for the proper control of the store's products, in addition to implementing the proposed methodology and evaluating the results, to optimize inventory management, reduce the search time for an item and minimize product losses due to mishandling of inventories.

2. Literature Review

An ERP is an information system used to identify and plan all the resources of the organization, to achieve the efficiency of the processes, reducing times, standardizing, and optimizing resources, including each of the activities carried out within the organization and in this way receive, make, send, and account for customer orders. The objective of it is to coordinate each of the business activities of a company, starting with the evaluation of the suppliers until finally billing the clients.

Like any software, an ERP works based on a programming platform, followed by the management of endless databases corresponding to the different departments to be integrated. ERP systems are organized through modules, which are connected to different databases, depending on what is required for each department. The hardest job of an ERP is its development, although this resource is used for different companies, it does not mean that they perform the same functions, this happens because each company is different and therefore needs a personalized development of the different modules that are used the most Jituri et al. (2018).

“ERP systems integrate two types of data obtained from other business planning software; in first instance, the ERP is based on the internal management of the company, so it is concluded that it does not obtain information from the

dealings with customers, that is why they are called (Back Office or Back Office). To obtain information external to the company that may affect internal processes, there are data opening systems (Front Office) that deal with the administrative relationship of the consumer or consumer service (CRM); that is, they deal directly with customers or electronic business systems and deal with suppliers (Supply Relationship Management)” (Mora Roa, 2011).

The main advantage of ERPs is the real-time management of information and its interaction with the information and products logistics, supply chain, financial statistics and other areas that use constantly changing information (Montaño Badilla, 2010). The correct implementation of an ERP has an impact on the increase in productivity of all departments, as well as the better use of time, where before time was needed for the exchange of reports intra or inter-departmental, now that time is used in other functions” (Montaño Badilla, 2010).

However, one of the disadvantages of ERP lies in the fact that for most companies it is impossible to assume the cost of licenses, implementation and especially maintenance, since they are dynamic systems Villegas et al. (2021). In addition to the cost, the time that the implementation suggests is a problem for SMEs, this problem begins with the inflexibility that ERPs have. It is difficult for a particular company to develop its own system, therefore, there is a variety of generic ERP solutions on the market, which tend to be adapted to companies from their main structure Limantara and Jingga (2017).

The life of a MSME is subject to overcoming internal problems and then facing external ones and achieving the projected financial results. It is important that MSMEs develop in an environment of continuous improvement, with sustainable growth over time, ensuring the objective of consolidating and staying in the market, with adequate sources of financing Yance Carvajal et al. (2017).

MSMEs are an important factor for the socio-economic growth of each country, which makes important to increase their performance and requires the implementation of strategies that benefit operations, to reduce operating costs, improve the efficiency of processes, inventory levels, product quality and increase productivity Yance Carvajal et al. (2017).

Ecuadorian cities have an accelerated growth and development regarding the MSMEs; however, they must face competition from large business with great economic power, who are distinguished by their high level of productivity, which is achieved by the correct operations management in their process. MSMEs are a key sector of economic development, according to the 2010 National Economic Census, 99 out of 100 establishments are categorized as SMEs, which confirms their importance within the productive system of Ecuador. In addition, in this same census it was revealed that, approximately for every 100 dollars generated by sales concepts, 39 of them are contributed by MSMEs (Araque, 2012).

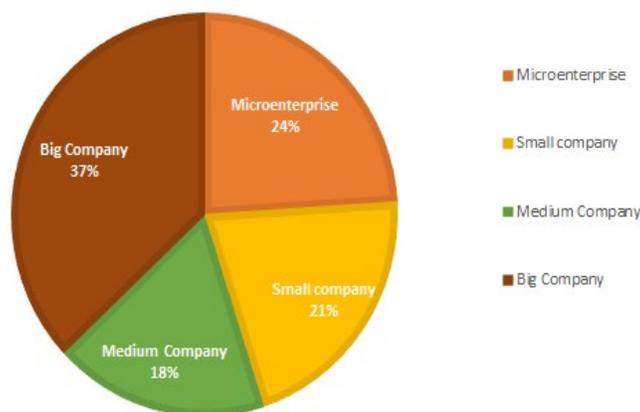


Figure 1. Contribution of the Generation of Sales Revenue

Since the 20th century, the concept of quality has been evolving, from the fulfillment of technical specifications established by specialists to satisfying customer requirements, the adaptability for the usage and for the cost involved including in the economic aspect, as an additional consideration to the elements. Finally, the concept of satisfaction

of latent requirements is reached, which surprises the customer with qualities and attributes that have not yet been required Shibas et al. (1995).

MSMEs have little or no specialization in business administration, commonly the management oversees a single person, who has very few assistants and in most cases, they are not prepared to carry out this function.

According to Bermeo Córdova and Maldonado Matute (2009), the implementation of a process reengineering methodology, an ERP Business Resource Planning system model and strategic planning, are summarized in necessary tools that help to optimize and improve a company. In addition, Paute Nieves and Astudillo-Rodriguez (2016), mention that the ERP system allows managing the elements and processes involved in the manufacture of a finished good, referring to the good results generated by this tool in the industry.

3. Methodology

The UDA-ERP software was developed with ORACLE APPLICATION EXPRESS APEX Astudillo-Rodriguez et al. (2018) which provides an environment for the programming of business applications that serve for the support and treatment of databases. Despite not being a consolidated system, several aspects have been adapted to achieve a manageable and friendly development Jennings et al. (2016). For the internal management of the database, an Entity - Relationship model is put into practice, which serves to structure it Jennings et al. (2016).

Since commercial “Pamelita” already had a billing system, as a first stage, it was decided to implement the inventory module. Employee training was organized on ERP processes, flows, options, and screens, to familiarize staff with the UDA-ERP software. Additionally, more than 1,500 existing items were registered in the warehouse of this company, so the inventory module is considered as the first phase, since it can manage all the information related to this business unit, the system classifies the information based on the identification of the product: classification, unit of measure, and personalized information of the item, among others Jennings et al. (2016). These characteristics are defined by the company based on its organization and inventory classification, for this case, it was considered:

Table 1. General classification of products within the System

Category	Description
Confectionery	Candies, sweets, lollipop gummies, etc.
First need products	Rice, sugar, oil, salt, tuna fish, pasta, etc.
Cleaning products	Toilet paper, disinfectant, detergent, soap, etc.
Bulk products	Any product that can be sold by weight, especially pet food.
Disposables	Spoons, cups, napkins, etc.
Snacks	Chips
Kitchen products	Any product that is necessary for the preparation of meals
Liquor	Alcoholic Beverages
Drinks	All kinds of packaged drinks

Based on this information and given that the company had previously coded the products in its inventory, it was decided to continue with the existing coding, so a modification was made into the system, where the structure is changed from hierarchical to non-hierarchical, since before, it was required to know if the items created were group or movement items, to determine the fixed extent of their coding. It is precisely for this reason that the changes were made to the system since the existing codes do not follow a fixed pattern of characters for encoding.

Prior to implementation, the employees received a training about the software, in which the functionality and correct operation of the system were explained. Prior to the implementation of the software, the warehouse was organized and redistributed, optimizing the space, and placing the products in the different classifications previously made in the system. (Table 1).

The employees were accompanied throughout the implementation, with the aim of clarifying and clearing up any concerns regarding the operation and management of the system, and as witnesses of the advantages and disadvantages of the software, and the fulfillment of the objectives for which the system was applied, and thus generate feedback and continuous improvement.

As part of final phase, once the system was implemented, a satisfaction survey was applied, in which the benefits or barriers produced during the deployment and execution of the UDA-ERP software were identified, recognizing that the general perception of the employees was summarized in having a friendly, safe, and reliable system that facilitates planning, analysis and presentation of results to work.

4. Results and Discussion

Irregularities were identified in the supply, storage and distribution processes within the company when implementing the inventories module, which generated confusion and slowed down the process. Therefore, the reduction of 48,84% of repeated or out of stock items was considered.

Table 2. Inventory Analysis

	Quantity of products in the inventory
No ERP implementation	2.553
With ERP implementation	1.247

Another significant result is the creation of a database of all warehouse products, which, although it was part of the process of creating the items, also allowed a control through indicators such as the classification assigned to each product.

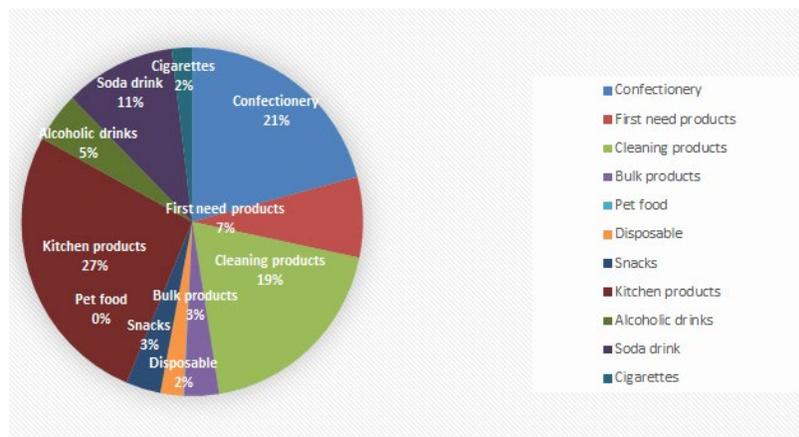


Figure 2. Inventory according to its category

As can be seen in figure 3, the implementation of the inventory module corrected the errors caused by the inadequate storage management of the products in the warehouse, one of the most relevant problems of the company that has caused losses in its assets throughout the operation of the company. The employee's training was also positive, since as they are the ones who handle the merchandise. After the implementation, they are aware of the importance of entering each of the data and having control over the movement of the products. This was achieved thanks to the socialization of the general objective, that is to improve inventory management and reduce merchandise losses.

In addition, when applying the survey once the inventory module was up and running, workers defined the following advantages:

- Accessibility: Access to the system from any computer with internet.

- Costs: Avoid hardware and software purchase costs.
- Resources: Avoid hiring more staff to maintain the system.
- Visualization of the information and results daily

However, the following disadvantages were cited:

- Internet speed: Dependence on the internet service on the computer where the system is accessed.
- Security: They consider that, when accessing through the internet, it is a vulnerable system.

As can be seen despite the negative aspects, the reception of the program was positive for the store employees, however, work must be done to reinforce the idea that it is safe to use the system even when linked to the Internet. The ERP system is a fundamental support for micro, small, medium, and large companies, because it promotes production processes and allows improving control over them. With ERP software, adopted, installed, and running, companies are forced to organize efficiently to take advantage of the different modules, allowing to dedicate more time to planning the organizational future. Quinde (2017) indicates that 48.62% of the companies evaluated by the Telecommunications Ministry and the Information Society of Ecuador (MINTEL), which have IT resources, have optimized their operating times; 41.13% have mentioned that IT has optimized its processes; and that 36.56% have benefited from a cost's reduction.

Current and future trends force companies to increase their competitiveness (Brume, 2017), so they need the optimization and integration of the internal flow of information and their external commercial relationships to achieve basic objectives, such as productivity, quality, customer service and cost reduction Limantara and Jingga (2017). Therefore, the UDA-ERP software for SMEs is made up of several modules: in the first stage, the manufacturing and inventory modules were considered, where processes for managing products, structures, production routes, work centers are implemented, capacity planning and generation and control of the production order. In the second stage the accounting and costs modules were developed and in the third stage the purchasing and sales modules.

For the implementation in the selected organization, only the inventory module was considered, with the guidance of Mogrovejo et al., (2020), who, in addition to leaving a guide for the adoption of the UDA-ERP for MSMEs, take for granted that the correct software adaptation depends on the coordination and collaboration between the company and specialists, through the support and provision of accompaniment during the gathering of information. In this case, it was relevant to take advantage of the first phase of implementation, however, in addition to this, it is essential to implement training processes before applying the system, as well as the gathering of prior information to assess the current state of the organization. In addition, it is important to consider the application of strategic management tools, since as defined (Brume, 2017) they are essential for the analysis and assessment of the current situation of the company. Thus, investing in ERP software should not be considered a cost, but rather should be considered as a strategic element that allows decision-making, considering that information is power and that whoever has it and knows how to use it, will obtain a clear competitive advantage Crespo et al. (2018). Finally, it can be ensured that not all MSMEs share the same benefits or restrictions presented by the ERP implementation guides, due to different factors that influence, both internal and external, however, in the collected literature, the benefit that is obtained is evident in most of them.

5. Conclusion

Through the gathering of information in this first stage of INVENTORIES, it was taken for granted that information technologies, specifically ERP as strategic management tools, are fundamental for business development and control. Even though software is expensive, through linking society and academia as a response to social responsibility, Universidad del Azuay has developed this system, considering the guidelines for improving the productive matrix of the region and the country, through enhancing the growth of MSMEs. UDA-ERP is adaptable to any business model and does not require a considerable investment. The company that served as a pilot presented deficiencies in terms of control, therefore the implementation of the inventory module contributed to the management processes of this business area. Through the identification of the groups or classifications assigned to the different products, it is evident throughout the work that an ERP is a scalable, flexible, and low-cost solution, and that it can be used by SMEs in Ecuador at a required moment.

For future research, it is recommended to evaluate the results of the implementation of all software modules, which will allow to identify advantages or disadvantages when implementing an ERP. Thus, the information generated by

the business dynamics itself can be used in its entirety for assertive decision-making and in the definition of more objective strategies, which will improve the contribution of other business areas. The maintenance of this tool is provided by the manufacturer, which will ensure its stability during its life cycle. Accessibility, security, and cost reduction are positive points found in its implementation and highly considered by the people who evaluated the system. Finally, this article reveals the positive qualities offered by the deployment of one of the ERP software modules in a grocery store in the MSME sector, validating the adaptability of the system and laying the foundations for its development within the city.

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Biography

Carolina Maldonado is a final year student of the Production and Operations Engineering career at "Universidad del Azuay", he has carried out several internships in different lines of business, the most outstanding being the development in industrial engineering in the multinational company Continental Tire Andean; Currently she works in product and service development at Banco del Austro, which is a financial entity, in Cuenca. She is linked to multidisciplinary research projects such as ERP software development for SMEs, supply chain management at Aquamarinna, Lean Club and occupational health and safety for SMEs. His research interests include Design Thinking, Lean Manufacturing, among others.

Paola Pinos-Suárez is a final year student at the School of Production Engineering and Operations of the University of Azuay, Cuenca, Ecuador, has done internships in manufacturing companies doing production programming and industrial safety, in addition, implementation of Lean Manufacturing tools and in-service companies developing Process Management. Linked in Research Projects through the University of Azuay as ERP Software for SMEs.

Catalina Astudillo-Rodríguez is an Associate Professor-Researcher at the School of Computer Science Engineering and the Faculty of Administration Sciences of the Universidad del Azuay, Cuenca, Ecuador. She is a Computer Engineer. Has a specialty in University Teaching and a master's degree in Multimedia Design, she is currently pursuing doctoral studies in Computer Science at Universidad Nacional de la Plata, La Plata, Argentina. She is linked to multidisciplinary research projects with professors from the University of Azuay, titled projects: development of ERP software for SMEs, Development of online product catalog for SMEs, Linguistic Documentation Project, Socio-linguistic Cartography, Augmentative Systems and Communication alternatives with FOSS technologies and Attentional Processes. Her research interests include programming, usability, user experience, and web applications.

Esteban Crespo-Martínez is Computer Engineer, a master's degree in Strategic IT Management, a master's degree in Business Administration, master's degree in Marketing Management and Doctoral candidate at Universidad Pablo de Olavide, Spain, in the Business Management and Administration program. Is an Associate Professor-Researcher at Universidad del Azuay, in Cuenca Ecuador. Is the creator of the ECU@Risk methodology for Information Risk Management. In addition, he is a member of the University Council and Cybersecurity coordinator of the same institution. Many International Certifications like Microsoft International Certificate in Information Security and Windows Operating Systems. Ethical Hacking Training Certificate issued by The Hacking Day, Scrum International Certificate, and International Certificate in CISCO Network Academy. In 2020, he was also invited professor by Metared and the University of Murcia to teach the Risk and Threat Management module in the First International CISO training course for universities.

Ana Vásquez-Aguilera is an Associate Professor-Researcher, and Director of Master of Manufacturing and Industrial Operations, member of the academic board of Production Engineering of Universidad del Azuay. She earned her Production and Operations Engineering from Universidad del Azuay, in Cuenca, Ecuador. Master's degree in Advanced Manufacturing, Logistics and Supply Chain at Universidad Politécnica de Valencia, Spain. She has published journal and conference papers.

Gabriela Chica is an Occasional Professor-Researcher at the School of Higher Accounting and the Faculty of Administration Sciences of the Universidad del Azuay, Cuenca, Ecuador. She has a Commercial Engineering, Accounting and Auditing Engineering, a Diploma in Tax Management and a master's degree in Business Administration. She is linked to multidisciplinary projects in conjunction with professors from the University of Azuay, titled projects: Development of ERP software for SMEs, Development of online product catalog for SMEs, Presence of the principles of tax law in taxes. Her research interests include enterprise resource planning systems, usability, web application, finance, costing, cost management.