Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2024; Vol 13: Issue 6
Open Access

Software Model for Improving Selectronic Company Using E-commerce Tools

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Cite this paper as: Henry David Arreaga Tapia ,Adrián Eduardo Alvarado Toaza,Jaime Mesias Cajas,Johnny Xavier Bajaña Zajia (2024) Software Model for Improving Selectronic Company Using E-commerce Tools .Frontiers in Health *Informatics*, *13(6) 414-423*

Abstract

The study aims to evaluate a custom e-commerce platform for Selectronic, tailored to its specific inventory and logistics management systems, to optimize supply chain and stock management. The platform will also analyze extensive data collected through the web application to measure operational efficiency and sustainability. The implementation of Agile development methodology, which involves creating user histories and product records to understand user needs. The ARIMA algorithm visualizes the best-selling products, enabling strategic decision making and marketing focus. The e-commerce dashboard provides an overview of operations, orders, and relevant products. The platform will be integrated with Selectronic's inventory and logistics management systems, resulting in effective supply chain coordination and market response. Recommendations include ongoing training, thorough testing, careful integration with internal systems, open communication, and strategic collaborations. The platform will modernize Selectronic's digital presence and improve operational efficiency.

Keywords: Platform, E-commerce, Inventory Management, Agile Development, ARIMA Algorithm.

1. Introduction

Currently, companies face a significant challenge in implementing e-commerce platforms that incorporate statistical algorithms and artificial intelligence for data analysis (Bawack et al., 2022; Shanmugapriya & Pavithra, 2024; Lin, 2019). In this context, the company Selectronic needs to modernize its operations and adapt to the growing preference for online transactions. Therefore, this research presents a proposal with a comprehensive strategy that includes technical configuration, restructuring of internal processes, and staff training for efficient online transaction management (Vijai Tiwari, 2024). The objective has been to analyze the data effectively to obtain meaningful commercial insights (Olukunle et al., 2024), in line with the business goals defined by Selectronic in the dynamic e-commerce landscape of 2024. Selectronic is implementing a project to modernize its business operations and increase transaction efficiency. This approach underlies the integration of e-commerce with the company's internal systems to gain a strategic advantage over competitors who do not use online shopping and e-commerce. This leads to the optimization of the supply chain and stock management, which will result in greater efficiency and a reduction in operational costs (Komal S., 2024; Viu-Roig and Alvarez-Palau, 2020). Additionally, the company is considering the possibility of establishing collaborations and strategic partnerships with external technology and e-commerce companies, contributing financially and creating a support network. The results of the study will be contextualized to demonstrate its impact on the business environment and how it can be replicated for other companies seeking to modernize their operations and benefit from e-commerce. Globally, e-commerce platforms have transformed business dynamics (Sarmin R. & S. Dekkati, 2022.; Thenoz et al., 2024), improving accessibility, operational efficiency, and adaptability to market trends. However, in Ecuador, despite

efforts to modernize operations, the adoption of e-commerce has not reached its full potential due to challenges such as technological infrastructure, staff training, and resistance to change (De León N., 2023). In Quito, the capital of the Pichincha province, there is a significant concentration of companies with potential for e-commerce implementation, but there is a gap in digital technology adoption compared to global business centers. Therefore, Selectronic can capitalize on this situation by addressing technological limitations and aligning with the local market's specifics and demands. An integrated initiative is needed to address technological limitations and align with the local market. The structure of this research focuses on meeting the objective of evaluating a personalized e-commerce platform integrated with internal inventory and logistics management systems that meet the specific needs of Selectronic to optimize the supply chain and stock management. Additionally, an exhaustive data analysis of the information collected through the web application will be conducted to measure Selectronic's operational efficiency and sustainability.

2. Methodology

Field research is a method used to collect data from real-life situations, such as the end user or the manager of a company, to determine the software environment. Bibliographic research is used to gather prior knowledge and approaches used in the system creation, as well as theoretical references. Observation is a key research method, as it allows for a detailed analysis of sales interactions between sellers and customers. Interviews are another technique used to gather personalized information on events, experiences, and opinions. At least 298 people participate in an interview, generating interaction around user satisfaction regarding the study subject. These methods help understand the system requirements and its potential improvements.

The system requirements for the development of a web application were addressed, including admin and user logins, catalog management, dashboards, customer and product management, orders, product search, and payment gateway. Development tools included XAMPP, PHP, JavaScript, HTML, Visual Studio Code, Google Analytics, Firebase, and SCRUM. XAMPP is a free software package that includes Apache, MySQL, PHP, MySQL, and Perl (Ching-Yu, 2019), while PHP is a server-side programming language used for web development (Apiag et al., 2023). On the other hand, JavaScript is an interpreted object-oriented programming language used for client-side development (Rashmi & Lal Bhagwan, 2021). HTML represents the markup standard for web page design (Siam et al., 2022). Visual Studio Code is a subtle but powerful source code editor (Tan et al., 2023). Google Analytics provides statistics and analytical tools for SEO and marketing (Deepak B., 2024; Sdeek S., 2023). Firebase is a platform for the development of web and mobile applications by Google (Saraf, 2022).

3. Results

The agile development methodology involves creating user stories to detail the needs of the beneficiaries, including the story number, the actor, the description, and the importance. The product backlog details the requirements, with the ID, task, responsible party, priority, and Sprint specified in the format. The 5 Sprint format includes the Sprint number, start date, end date, task number, description, and priority.

3.1. Verification and control of purchase status with the generation of reports on best-selling products

The training of the ARIMA Algorithm, as shown in Figure 1, determines the visualization of the best-selling products, reflecting the amount of data to prevent stock increase, showing the products with the highest total sales. Figure 1 presents a useful chart for identifying the most popular products; in this context, it can also be used to analyze and compare the sales of different products, which can help the company make strategic decisions about its product offerings and focus its marketing efforts.

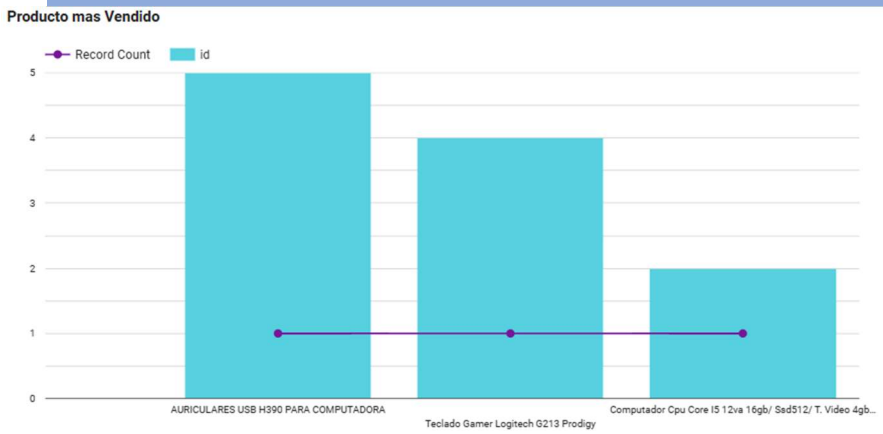


Figure 1. Distribution of best-selling products by Selectronic.

The above graph, showing the distribution of best-selling products by Selectronic, describes the "Record Count" as the representation on the vertical axis, displaying the number of units sold, while the horizontal axis lists the different products. The information is presented clearly and visually, allowing for a quick identification of the best-selling product (USB headphones) and those with fewer sales over a specific period. Therefore, an advanced search filter can be applied by dates to show which product, or products, were the best sellers in the chosen period.

On the other hand, a general overview can be provided through a vertical bar chart representing the different products sold by Selectronic. Each bar corresponds to a different product, and the height of each bar indicates the "Record Count" or number of units sold for that product.

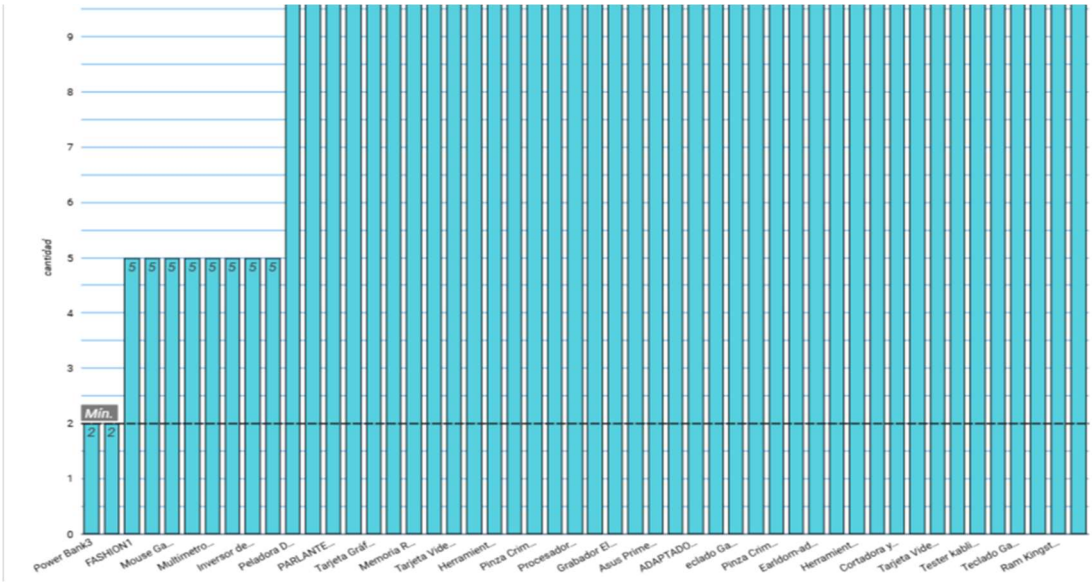


Figure 2. Distribution of products in stock for Selectronic.

Figure 2 highlights products with stock levels below 10 units (low-stock products), allowing for prioritization of restocking. Some of the best-selling products appear to be "Power Bank," "RASHOW," "Canvas Backpack," and "Pendrive 64GB," among others. Meanwhile, products such as the "Logitech G213 Prodigy Gaming Keyboard" and "CPU Computer Core i5 10th Gen/SSD512 T. Video" had fewer sales. This visualization and comparison of the sales of different products help the company make strategic decisions about its product offerings and focus its marketing efforts. On the other hand, this tool allows for the visualization of metrics related to the provinces of Ecuador with the highest sales volume per unit, useful for adjusting distribution or marketing strategies (Figure 3).

Figure 3. Geographical distribution of sales volume by provinces of Ecuador.

The percentage distribution of websites associated with cities in the provinces of Ecuador that receive the most orders provides useful information for making strategic decisions about resource distribution and operational focus. Each section shown in Figure 3 displays an associated percentage, indicating the contribution of that website to the total number of orders. For example, the provinces with the highest participation are Ibarra and Quito, both with 8.33%. Other cities with significant online purchases include Guayaquil, Puyo, Portoviejo, Quevedo, Santo Domingo, Tena, Riobamba, Esmeraldas, Loja, Manta, Nueva Loja, San José, Salinas, Santa Elena, and Cuenca, all with shares ranging from 4.1% to 4.17%. Finally, some cities or websites have lower shares, such as Cayambe, Latacunga, Babahoyo, and Ambato.

3.2. Required Codes for the Order Process

This section displays the code used for each of the statistical graphs showing the order statuses (Figure 4).

index.php

... > admin > administracion > index.php

```
<script src="https://cdn.jsdelivr.net/npm/chart.js"></script>

<script>
    // chart 2

    var ctx = document.getElementById("reportePedidos").getContext('2d');

    var gradientStroke1 = ctx.createLinearGradient(0, 0, 0, 300);
    gradientStroke1.addColorStop(0, '#fc4a1a');
    gradientStroke1.addColorStop(1, '#f7b733');

    var gradientStroke2 = ctx.createLinearGradient(0, 0, 0, 300);
    gradientStroke2.addColorStop(0, '#4776e6');
    gradientStroke2.addColorStop(1, '#8e54e9');


    var gradientStroke3 = ctx.createLinearGradient(0, 0, 0, 300);

    gradientStroke3.addColorStop(0, '#42e695');
    gradientStroke3.addColorStop(1, '#3bb2b8');

    var myChart = new Chart(ctx, {
        type: 'doughnut',
        data: {
            labels: ["Pendientes", "Proceso", "Finalizados"],
            datasets: [{
                backgroundColor: [
                    gradientStroke1,
                    gradientStroke2,
                    gradientStroke3
                ],
                hoverBackgroundColor: [
                    gradientStroke1,
                    gradientStroke2,
                    gradientStroke3
                ],
                data: [<?php echo $data['pendientes']['total']; ?>,
                    <?php echo $data['procesos']['total']; ?>,
                    <?php echo $data['finalizados']['total']; ?>
                ],
                borderWidth: [1, 1, 1]
            }]
        },
        options: {
            maintainAspectRatio: false,
            cutoutPercentage: 75,
            legend: {
                position: 'bottom',
                display: false,
                labels: {
                    boxWidth: 8
                }
            },
            tooltips: {
                displayColors: false,
            }
        }
    });
</script>
```

Figure 4. Scheduling the routine to define order processes.

Figure 4 shows the source code of a PHP file called "index.php." It is a code file that contains the logic and structure of a webpage. The defined variables, such as "ctx," "gradientStroke1," "gradientStroke2," "gradientStroke3," and "myChart," are related to the generation of charts or visualizations. In a broader context, the referred source code allows offering a graphical interface for the E-commerce tool (Figure 5).

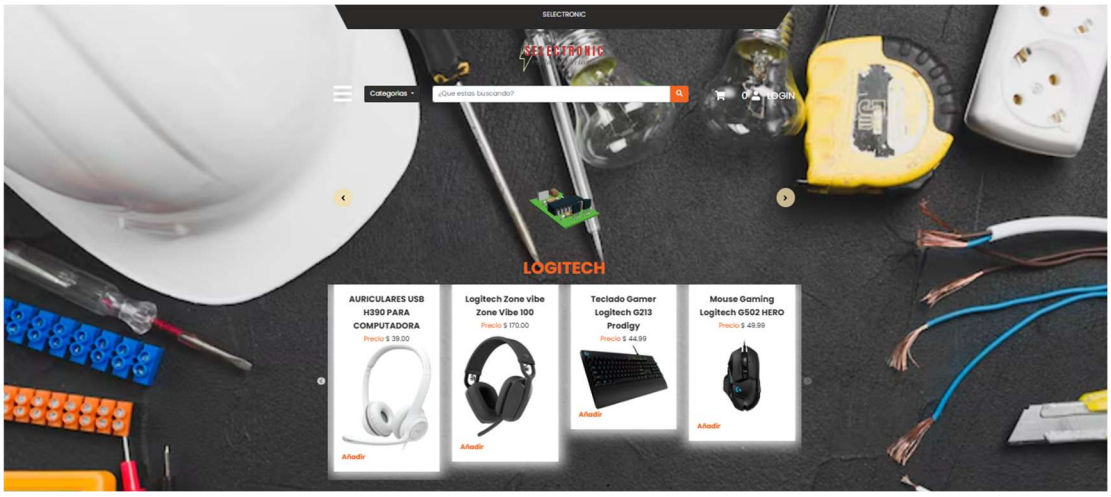


Figure 5. Main interface of the E-commerce.

3.3. Dashboards for analysis, monitoring, and decision-making.

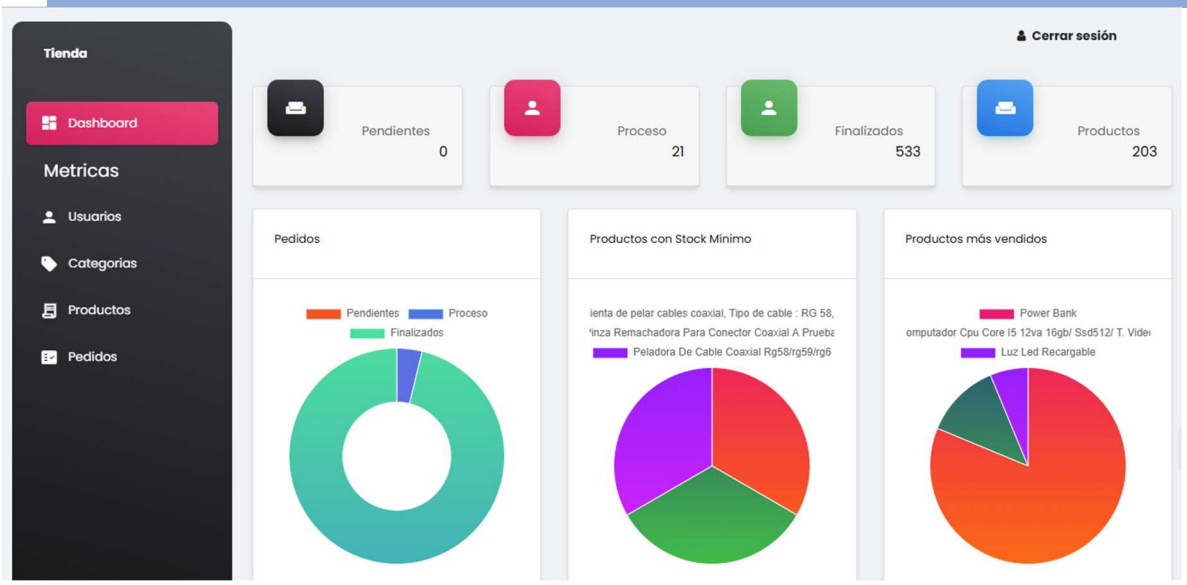
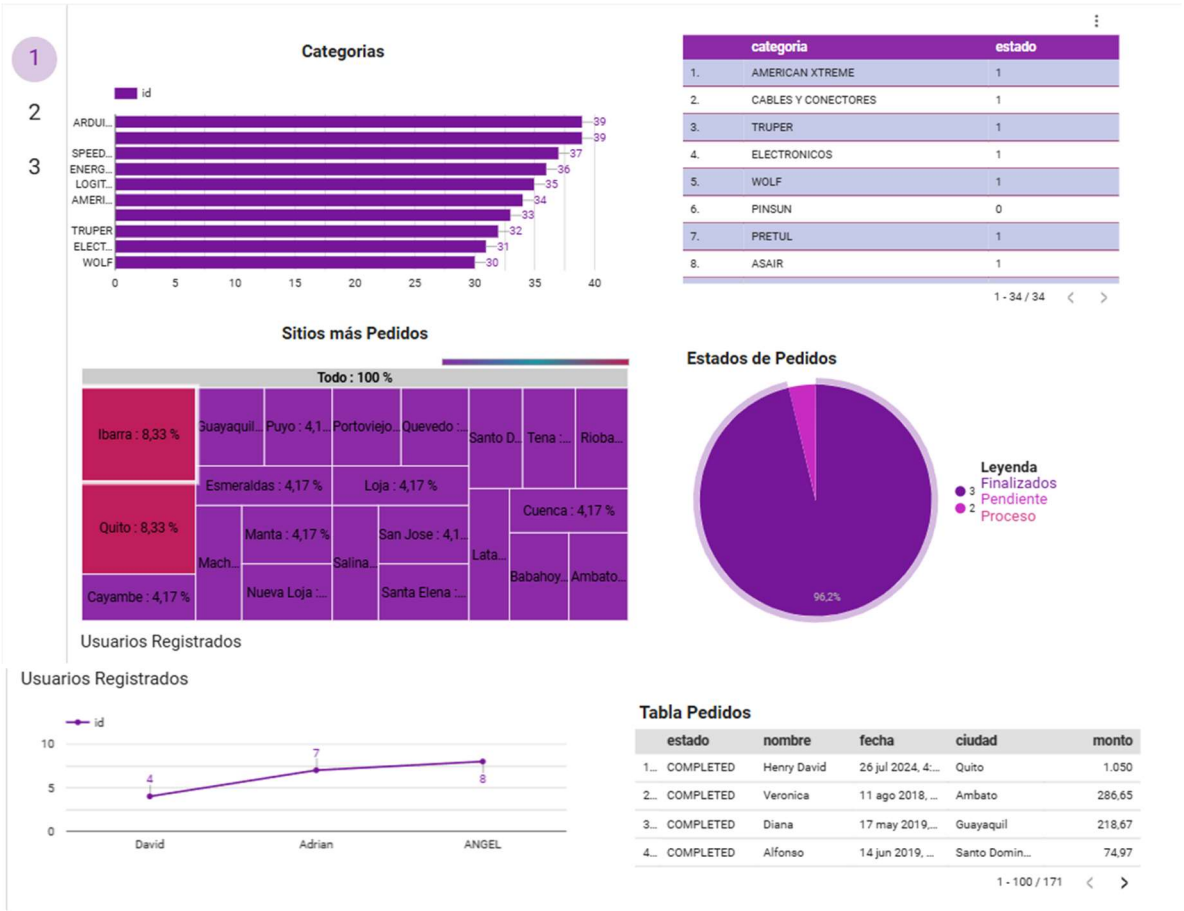


Figure 6. Main Dashboard.

Figure 6 shows the control panel or dashboard of the online store for Selectronic. It contains several key sections that provide information about the store's status. The metrics provided focus on pending, in-progress, and completed orders. This information allows the store administrator to have an overview of the current status of operations, orders, and the most relevant products.



	categoria	estado
1.	AMERICAN XTREME	1
2.	CABLES Y CONECTORES	1
3.	TRUPER	1
4.	ELECTRONICOS	1
5.	WOLF	1
6.	PINSUN	0
7.	PRETUL	1
8.	ASAIR	1

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Figure 7. Metrics.

Figure 7 presents an analysis of the order distribution by product categories, websites, and order statuses. A bar chart shows the websites receiving the most orders, such as Ibarra, Guayaquil, Puyo, and Portoviejo. A pie chart displays the distribution of order statuses, with 96.2% marked as "Completed." The image also shows information about registered users and an order table, along with a line chart illustrating the evolution of registered users. The data provides an overview of user registration and orders in a business context.

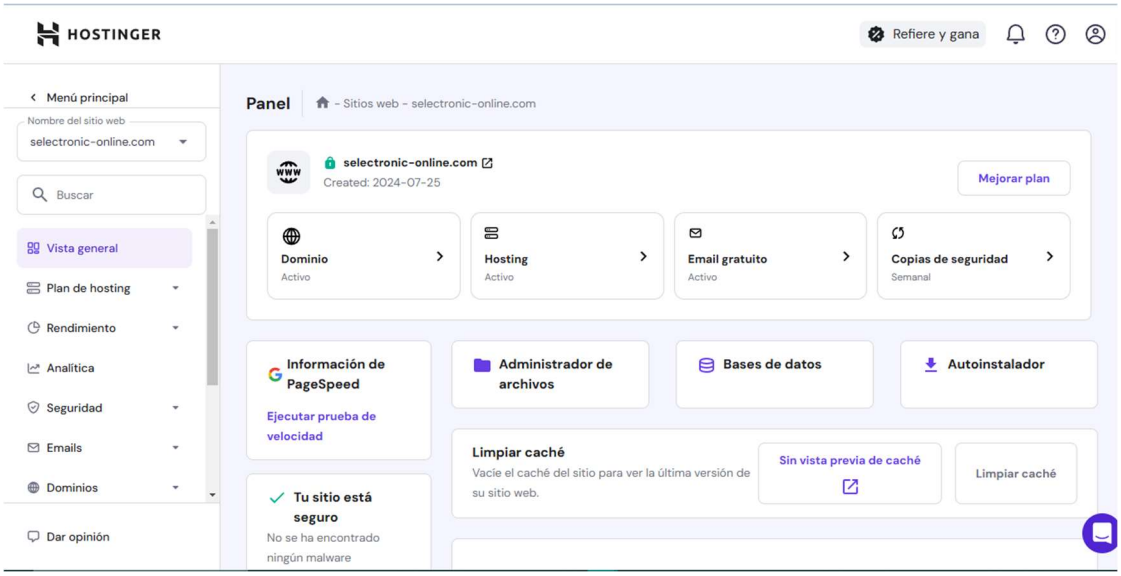

Figure 8. Hosting Tool.

Figure 8 shows the Hostinger control panel, which allows users to manage and configure various aspects of their website, including domain, hosting, email, security, and development tools. This tool includes key elements such as website information, domain settings, free email, backup options, auto-installer, PageSpeed information, file manager, databases, cache cleaning, and security information.

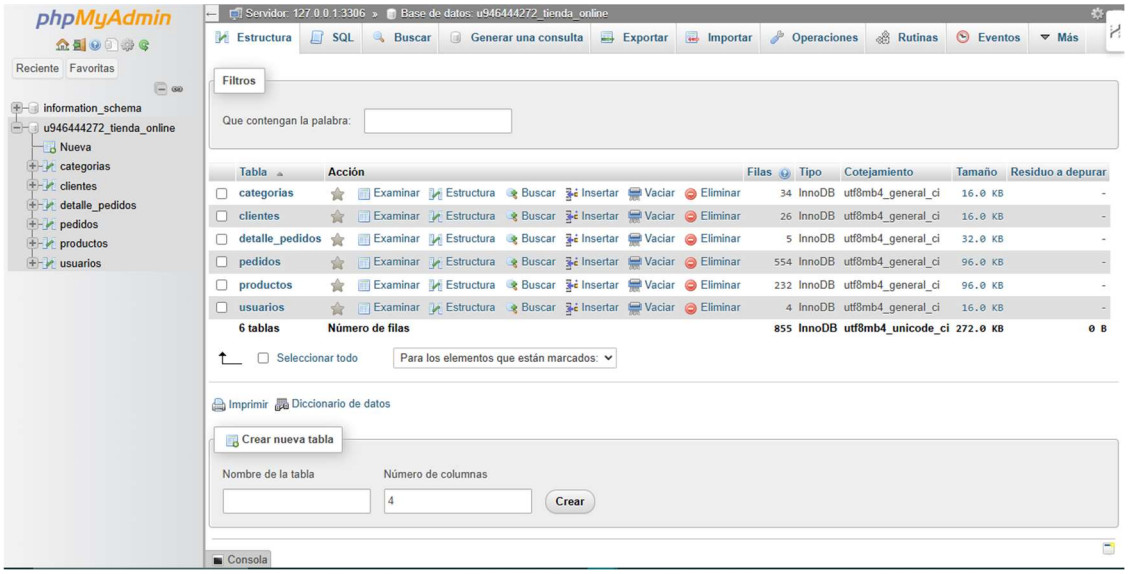

Figure 9. phpMyAdmin DB.

Figure 9 shows the phpMyAdmin interface, a web tool used to manage MySQL databases. It features a navigation menu, filters, a content table, table details, and a section for creating a new table. The tool also allows data import and export and the generation of SQL queries. It is widely used by developers and administrators for efficient database management. The interface is designed to be user-friendly and efficient.

3.1. Employee Satisfaction Perception

The Selectronic e-commerce system was evaluated by key employees to gather feedback on its functionality and design. The survey results showed a high level of satisfaction with the application, with 89.64% of users being satisfied or very satisfied. 29.55% of respondents were neutral, suggesting they have not experienced a significant impact or need more time to assess their experience. No users reported being dissatisfied or very dissatisfied, indicating that they did not perceive any issues or negative aspects. The willingness to recommend the application was also notably positive, with 91.43% of respondents expressing a tendency to recommend it. A small percentage of users, around 8.57%, were categorically "Neutral," suggesting room for improvement or a lack of conviction in certain aspects of the user experience. The results show a predominance of favorable opinions, highlighting the overall acceptance of the application.

Table 1. Perceptions about the application.

Questions	Categories	Frequency
How satisfied are you with the overall experience of the application?	Dissatisfied	0
	Very dissatisfied	0
	Neutral	65
	Satisfied	133
	Very satisfied	100
Would you recommend the application to other users?	Definitely not	0
	Probably not	5
	Neutral	27
	Probably yes	97
	Definitely yes	96
Do you think the application is easy to use?	Definitely not	1
	Probably not	3
	Neutral	20
	Probably yes	102
	Definitely yes	99
Does the application meet your expectations?	Definitely not	2
	Probably not	7
	Neutral	30
	Probably yes	90
	Definitely yes	96
Do you find the main functionality of the application useful?	Definitely not	0
	Probably not	2
	Neutral	18
	Probably yes	110
	Definitely yes	95

4 Discussion

The integration of an e-commerce platform with internal systems will improve inventory management and logistics, reducing errors and promoting a more organized work environment (Zennaro et al., 2022). It will also offer personalized shopping experiences, increasing customer loyalty and efficiency. The platform will provide detailed data analytics for strategic decision-making, fostering collaboration between the community and the business (Cano et al., 2023). Additionally, it will allow for continuous adjustments, ensuring high standards of quality and satisfaction. The

modernization of operations will strengthen Selectronic's digital market positioning, promoting innovation and continuous improvement (Ntumba et al., 2023). The platform will also provide convenience and accessibility for customers, enhancing satisfaction and loyalty.

5. Conclusions

By implementing a customized e-commerce platform, Selectronic is able to modernize its digital presence and improve operational efficiency. The platform will provide a seamless, user-centered online shopping experience, enabling strategic decisions to optimize operations and promote sustainability. Integrating the platform with Selectronic's inventory and logistics management systems will achieve effective coordination in the supply chain and stock management. This approach will reduce costs and allow for a quick market response, ensuring a more efficient and competitive operation. Recommendations include continuous training, thorough testing, careful integration with internal inventory and logistics systems, open communication, and strategic collaborations to manage resistance to change and promote long-term sustainability.

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