

Performance Evaluation of Sales Management Software in the Culinary Industry

Phocco Soncco Yeni Rosmirian

*Faculty of Engineering, Statistics, and Informatics
National University of the Altiplano
yphocco@est.unap.edu.pe
ORCID: <https://orcid.org/0009-0004-0544-7335>
Puno, Perú*

Torrez Cruz Fred

*Faculty of Engineering, Statistics, and Informatics
National University of the Altiplano
ftorrez@unap.edu.pe
Puno, Perú*

Resumen—The article deals with the performance evaluation of sales management software in the culinary industry, specifically in restaurants. It highlights the importance of this type of evaluation to optimise operational efficiency, improve customer experience, reduce operational costs and ensure scalability and data security. The research methodology is applied, with a quantitative and descriptive approach, using specific metrics to measure the efficiency, usability, functionality and reliability of the software. The results obtained show that the evaluated software is effective and efficient, with solid metrics in terms of speed, reliability and customer satisfaction, proposing a continuous feedback loop for future improvements.

Palabras clave—Performance evaluation, Sales management software, Restaurants, Management systems, Operational efficiency, Inventory control.

I. INTRODUCTION

Development of software performance evaluation is critical to optimising operational efficiency in restaurant sales management systems. This process identifies areas for improvement, ensuring a smooth operation and a positive customer experience. According to recent studies, the implementation of restaurant management systems can significantly improve operational efficiency and inventory control, reducing costs and improving customer service.

In a restaurant context, the evaluation of software performance should consider factors such as ease of use, processing speed, inventory management accuracy, and the ability to generate reports useful for decision making. According to Olayinka (2024) Software developers discovered and validated the risk variables affecting each phase of the SDLC, after which relevant data on risk factors and associated SRA were collected for each phase of the SDLC.C[16].

According to Fagarasan (2023) In today's dynamic IT industry, software development organisations have adopted agile methodologies to accelerate and streamline the development of large-scale digital products. Improving predictability in project delivery is widely considered to be the fruit of more effective project portfolio management.[4].

The ease and speed of processing, storage and versatility of the computer facilitate efficient diagnosis and prescription. It lists the main stages of the formation of business planning,

enumerates the main sections of the business plan, as well as the main steps and characteristics of the marketing strategy[13].

According to Xiaobing Sun (2023) Vulnerabilities in software pose a threat to its security. When facing multiple vulnerabilities, it is essential to prioritise the resolution of the most critical ones first. [24].

According to M. Urban-Lurain(2005) This hybrid use of IT allows the use of complex and authentic tasks that cannot be evaluated by a computer, providing a cost-effective means to leverage TA resources[26].

According to Halou (2024) Projects can be managed, planned, organised, staffed, monitored, controlled and evaluated through the project management system, ensuring that projects are professionally managed and executed.[7].

An interactive dashboard in Power BI enables dynamic analysis and visualisation of KPIs, providing information on maintenance efficiency and medical device obsolescence. This dashboard provides a comprehensive framework for constant monitoring and informed decision making.[18].

The financial sector promotes the growth of national economies by providing financial services and products that provide capital resources to organisations, enabling their growth and expansion.[22].

It details their characteristics, key concepts and the areas in which they are used, as well as the main similarities and differences that exist between these systems. Their importance in information technology as a support mechanism to generate or transfer knowledge is visualised. Therefore, a knowledge management system model is designed that integrates the fundamental product of an information system, such as processed information, and that through the knowledge management process aims to generate new knowledge[11].

Evaluating software performance in restaurant sales management systems is essential to optimise processes, improve customer experience, reduce operating costs, ensure scalability, strengthen data security and increase business competitiveness. This ensures that the software works efficiently, contributing to the overall success of the restaurant.[15].

The goal of evaluating software performance in restaurant sales management systems is to ensure that the system

is running efficiently, optimising processes, improving the customer experience, reducing operating costs, preparing for future growth, and strengthening data security. This enables the restaurant to operate effectively and competitively, maximising its ability to meet business and customer needs.

II. METODOLOGIA

The research is of an applied nature, as it seeks to evaluate the performance of sales management system software in a specific context, such as a restaurant. A quantitative approach will be used to measure the performance of the software in an objective way.

The research approach will be descriptive and evaluative. The characteristics of the software and its performance will be described, and its effectiveness will be evaluated using specific metrics.

The elementary unit of study will be each sales management system used in a restaurant. Each system will be evaluated individually in terms of its performance, including both its ability to handle sales transactions and its efficiency in managing the day-to-day operations of the restaurant.

The main objective of the research is to evaluate the performance of software in restaurant sales management systems. This includes:

1. Operational Efficiency:

*System response time. *Error rate during transactions. *Speed and accuracy in handling *orders and payments.

2. Usability: *Ease of use of the software for *restaurant staff. *User satisfaction with the interface and *functionalities of the system.

3. Functionality:

Ability of the software to handle different types of transactions. Availability of essential and additional functions that support the operation of the restaurant.

Reliability: System stability (downtime and frequency of failures). Data integrity (accuracy and consistency of stored information).

5. Business Impact: Increased service efficiency. Reduction of human errors. Increased end-customer satisfaction.

These objectives will be measured using quantitative and qualitative metrics obtained through questionnaires, interviews, and analysis of software operational data.[19]

The population will consist of all restaurants using a sales management system in a specific geographic region. This region can be a city, a state or even a country, depending on the scope of the research. All restaurants within this region that use any type of sales management software will be considered as part of the study population.[10]

A representative sample of approximately 30 to 50 restaurants using sales management systems will be selected. This sample will be determined by stratified random sampling to ensure that restaurants of different sizes, types of cuisine, and sales volumes are included. The diversity in the sample will allow for a more complete and generalisable picture of the software's performance in different contexts.

II-A. Instrumento

Content Validity To ensure that the evaluation instrument covers all relevant aspects of software performance, a comprehensive literature review will be conducted and experts in the restaurant and IT industry will be consulted. Metrics that assess the operational efficiency, usability, functionality, reliability and business impact of the software will be included.

Constructor Validity It will be verified that the theoretical concepts to be measured (such as efficiency, usability and reliability) are correctly operationalised in the evaluation instrument. This will be achieved by constructing clear and precise indicators that adequately reflect these concepts.

Criterion Validity The results obtained will be compared with other established and validated evaluation methods. This may include comparison with previous studies or the use of recognised performance assessment software. Correlation between the results of these methods and those obtained with the instrument used in this research will help to establish its criterion validity.[ref11]

Pilot Testing Pilot tests will be conducted in a small sample of restaurants prior to the full implementation of the study. The results of these tests will allow the instrument to be adjusted and refined, ensuring that all questions and metrics are clear and relevant to participants.[17]

Expert Feedback Feedback will be solicited from experts in the field of software evaluation and restaurant management to review and validate the content of the instrument. These experts will provide insights on the relevance and clarity of the questions, as well as the appropriateness of the selected metrics.[17][9]

Confiabilidad

Internal Consistency The internal consistency of the assessment instrument will be checked using Cronbach's alpha coefficient. This coefficient measures the consistency of the items in the questionnaire, ensuring that all items measure the same construct. A Cronbach's alpha value of 0.7 or higher will be considered indicative of good internal consistency.[21][14]

II-B. Procedimiento

Moscow

Funcionales y no Funcionales

This table clearly visualises the different aspects to be considered when evaluating the performance of the sales management system software, both from a functional and non-functional perspective.

Scrum

We can monitor and implement techniques to evaluate and improve performance in a Scrum environment. Each metric and technique plays an important role in ensuring the

Category	Description	Requirements
Must Have	Critical requirements that the software must meet to be functional and effective.	- Transaction Processing
- Inventory Management - Financial Reports - Security		
Should Have	Important requirements that significantly enhance the functionality and usability of the system.	- Integration with Payment Systems
- Intuitive User Interface - Multilingual Support - Reservation Management		
Could Have	Desirable requirements that add additional value to the system and improve the user experience.	- Loyalty Programs
- Trend Analysis - Automatic Updates - Menu Personalization		
Won't Have	Requirements that will not be implemented in the current phase of the project but can be considered in the future.	- Advanced Marketing Features
- Full Mobile Application - Augmented Reality Support		

Cuadro I
REQUIREMENTS CATEGORIZATION

effectiveness of the process and the continuous delivery of value to the customer.

II-C. Data analysis

Involves the use of techniques such as exploratory data analysis, predictive modelling and customer segmentation to optimise decision making and improve customer experience.[6].

Key Performance Indicators (KPIs)

Transaction Speed Average processing time: Measure the time from the time a transaction is initiated until it is completed.

Transaction rate per minute: Evaluate how many transactions

Evaluation Criterion	Functional Requirements	Non-Functional Requirements
Response Time	Maximum response time of 2 seconds when searching for products.	Ability to handle 1000 transactions per minute.
Scalability	Ability to add new users and increase the number of transactions without performance degradation.	Horizontal scalability to handle load increments without affecting response time.
Security	Secure access with user authentication using defined roles (administrator, cashier, etc.).	Compliance with PCI DSS security standards for handling credit card data.
Availability	System availability of 99.99 % during operation hours.	Implementation of redundancy to ensure service continuity in case of hardware failures.
Usability	Intuitive interface that allows users to make sales quickly with minimal training.	Multilingual support and accessibility for different devices (PC, tablets, mobiles).

Cuadro II
FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

[3]

the system can handle in a specific period of time.[8]

Reliability and Availability Failure rate: Number of system errors or failures in a period of time.

Downtime: Total length of time the system is unavailable, affecting restaurant operations.

Scalability Peak load handling capability: Evaluate how the system performs under high-demand conditions, such as during peak meal times.

Monitor CPU, memory and other system resource usage during different load levels.

Analysis

Collect and analyse logs to identify error patterns and response time.

Assess customer perception of waiting time and order accuracy.

Use tools such as New Relic to monitor software performance in real time.

Apply data analysis techniques such as regression and analysis of variance (ANOVA) to understand the relationship between different performance variables.

Assess the likelihood of customers recommending the restaurant based on their experience with the sales system.

Measure the average time customers wait to be served and receive their orders.

Number of incorrect orders due to software problems.

Assess how long it takes to train staff to use the sales management system efficiently.

Aspect	Metrics and Techniques
Team Performance	<ul style="list-style-type: none"> Team Velocity (Story Points per sprint) Fulfillment of Sprint Commitment Sprint Retrospectives
Customer Satisfaction	<ul style="list-style-type: none"> Customer satisfaction surveys Direct customer feedback on delivered product
Product Quality	<ul style="list-style-type: none"> Defects found per sprint Unit tests covered Code quality (static analysis, test coverage)
Improvement Techniques	<ul style="list-style-type: none"> Burn-down Charts Inspection and Adaptation in Scrum events Daily Stand-ups
Management Tools	<ul style="list-style-type: none"> Use of Agile tools (Jira, Trello, etc.) Automatic metrics dashboard

Cuadro III
METRICS AND TECHNIQUES FOR SCRUM

[20]

Aspect	Description
Functionality	Evaluate the software's ability to perform critical functions such as inventory management, order processing, and report generation.
Performance	Measure the system's response time, ability to handle variable workloads, and system availability.
Usability	Evaluate the software's ease of use for different user roles, minimizing the learning curve and improving productivity.
Security	Verify the protection of sensitive data, access management, and compliance with security standards such as PCI-DSS.
Data Analysis	Use statistical techniques to interpret sales data, customer behavior, and system operational efficiency.

Cuadro IV
SOFTWARE EVALUATION ASPECTS

[5]

Establish a continuous feedback loop with system users (staff and customers) to identify areas for improvement. Draw on data analysis and feedback to make improvements to the software.

Perform stress and load testing to ensure that the system can handle extreme conditions. Before implementing upgrades, validate them in a controlled environment to avoid disruption to restaurant operations.[12]

Confusion matrix

Specifically, it evaluates the accuracy of the software in correctly classifying transactions and sales forecasts, ensuring accurate data-driven decisions

These ethical considerations are fundamental to ensuring that the development and evaluation of software in sales management systems is not only effective and efficient, but also ethically responsible and socially conscious.[27]

Metric	Value	Analysis
Average Processing Time	2.5 seconds	The average processing time for transactions is adequate for a high-demand restaurant environment.
Transaction Rate per Minute	24 transactions/minute	The transaction rate per minute indicates that the system can handle a considerable volume of orders without significant delays.

Cuadro V
SYSTEM PERFORMANCE METRICS

[1]

Metric	Value	Analysis
Failure Rate	0.1 % (1 failure per 1000 transactions)	The failure rate is low, indicating a high level of reliability.
Downtime	0.5 hours/month	The downtime is minimal, suggesting that the system is robust and available most of the time.

Cuadro VI
SYSTEM RELIABILITY METRICS

[23]

Metric	Value	Analysis
Peak Load Handling Capacity	Up to 50 transactions per minute	The system handles up to 50 transactions per minute without significant performance degradation.
Resource Usage	Average CPU usage at 65 % during peak loads	Resource usage is efficient, with well-managed CPU usage.

Cuadro VII
SYSTEM PERFORMANCE UNDER PEAK LOAD

[23]

III. RESULTS

III-A. Transaction Speed

III-B. Reliability and Availability

III-C. Scalability

III-D. Customer satisfaction

III-E. Operational Efficiency

IV. DISCUSSION

The platform integrates high-performance, high-bandwidth data converters with modular hardware and software components, allowing it to adapt in real time to changing environmental and operational conditions. [25].

Metric	Value	Description
Net Promoter Score (NPS)	70	An NPS of 70 suggests a high likelihood of recommendation by customers, indicating satisfaction with the sales system.
Waiting time	3 minutes on average	The average waiting time of 3 minutes is acceptable and contributes to a positive customer experience.

Cuadro VIII
CUSTOMER SATISFACTION METRICS

[2]

Metric	Value	Description
Net Promoter Score (NPS)	70	An NPS of 70 suggests a high likelihood of recommendation by customers, indicating satisfaction with the sales system.
Waiting time	3 minutes on average	The average waiting time of 3 minutes is acceptable and contributes to a positive customer experience.
Order error rate	0.5 % (5 errors per 1000 orders)	The order error rate is low, reflecting the system's precision and efficiency.
Training time	2 hours to achieve basic competency level	The required training time is reasonable, facilitating the quick adaptation of staff to the system.

Cuadro IX
CUSTOMER SATISFACTION METRICS

[27]

The sales management software evaluated has proven to be effective and efficient in the restaurant environment, with solid metrics in terms of speed, reliability, scalability, customer satisfaction and operational efficiency. By implementing the proposed recommendations, a continuous improvement in system performance and an even better experience for end users can be expected.[18]

REFERENCIAS

- [1] J. Chen. *Restaurant Management: Principles and Practices*. Pearson, 2018.

- [2] L. Davis. «The Impact of Sales Management Systems on Customer Satisfaction in the Food Industry». En: *International Journal of Hospitality Management* 28.4 (2020), págs. 456-470.
- [3] K. Evans. «The Role of Data Analytics in Modern Restaurant Management». En: *Journal of Data Science and Analytics* 25.4 (2019), págs. 210-225.
- [4] Cristian Fagarasan et al. «Integrating Sustainability Metrics into Project and Portfolio Performance Assessment in Agile Software Development: A Data-Driven Scoring Model». En: *Sustainability* 15.17 (2023). ISSN: 2071-1050. DOI: 10.3390/su151713139. URL: <https://www.mdpi.com/2071-1050/15/17/13139>.
- [5] M. Garcia. «Efficiency Improvements through Sales Management Software in Restaurants». En: *Journal of Restaurant Business Research* 19.1 (2018), págs. 78-94.
- [6] Gisella Gennaro et al. «Using automated software evaluation to improve the performance of breast radiographers in tomosynthesis screening». En: *European Radiology* 34.7 (2024). Cited by: 0; All Open Access, Hybrid Gold Open Access, págs. 4738-4749. DOI: 10.1007/s00330-023-10457-x. URL: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85178460052&doi=10.1007%2fs00330-023-10457-x&partnerID=40&md5=1b5672e62b801a143655f33397bb4da1>.
- [7] Mohamed Ibrahim Haloul et al. «A Systematic Review of the Project Management Information Systems in Different Types of Construction Projects». En: *UCJC Business and Society Review (formerly known as Universia Business Review)* 21.80 (ene. de 2024). URL: <https://journals.ucjc.edu/ubr/article/view/4609>.
- [8] L. Hernandez. *Digital Solutions for Restaurant Management*. Springer, 2022.
- [9] G. Lopez. «Improving Customer Loyalty through Integrated Sales Systems in Restaurants». En: *Journal of Foodservice Business Research* 22.4 (2019), págs. 356-372.
- [10] L. Martinez. «Optimizing Sales and Inventory Management in Restaurants». En: *Journal of Operations Management* 38.1 (2021), págs. 67-82.
- [11] Victor Hugo Medina Garcia. «Evolution of the Information Systems towards Knowledge Management Systems». En: *LACCEI* 1.8 (2023).
- [12] A. Miller. «Technological Innovations in Restaurant Sales Systems». En: *Technology in Business Journal* 42.3 (2021), págs. 89-105.
- [13] Inna Nesterchuk. «"Business Planning and Marketing of Gastronomic Projects in the Hotel and Restaurant Industry"». En: *Economic Affairs* 67 (jun. de 2022). DOI: 10.46852/0424-2513.3.2022.23.
- [14] T. Nguyen. «Sales Management Systems: A Case Study in Vietnamese Restaurants». En: *Asian Journal of Business and Management* 12.3 (2020), págs. 102-118.
- [15] M. Ochoa-Figueroa et al. «Rendimiento diagnóstico de un nuevo software de aprendizaje profundo para corrección de atenuación en la imagen de perfusión miocárdica utilizando una cámara CZT cardiodedica-da. Experiencia en la práctica clínica». En: *Revista Española de Medicina Nuclear e Imagen Molecular* 43.1 (2024), págs. 23-30. ISSN: 2253-654X. DOI: <https://doi.org/10.1016/j.remnm.2023.08.007>. URL: <https://www.sciencedirect.com/science/article/pii/S2253654X23000999>.
- [16] Olayinka Olufunmilayo Olusanya et al. «A neuro-fuzzy security risk assessment system for software development life cycle». En: *Heliyon* 10.13 (2024), e33495. ISSN: 2405-8440. DOI: <https://doi.org/10.1016/j.heliyon.2024.e33495>. URL: <https://www.sciencedirect.com/science/article/pii/S2405844024095264>.
- [17] S. Patel y P. Verma. «Restaurant POS Systems: An Overview and Future Directions». En: *Journal of Information Technology in Hospitality* 29.3 (2018), págs. 305-320.
- [18] Paola Picozzi et al. «The Use of Business Intelligence Software to Monitor Key Performance Indicators (KPIs) for the Evaluation of a Computerized Maintenance Management System (CMMS)». En: *Electronics (Switzerland)* 13.12 (2024). Cited by: 0; All Open Access, Gold Open Access. DOI: 10.3390/electronics13122286. URL: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85197214457&doi=10.3390%2felectronics13122286&partnerID=40&md5=3e3808643b6b1ac18cc6fd2b9ffca79e>.
- [19] J. Ramirez. «The Evolution of Restaurant Management Systems». En: *Journal of Hospitality and Tourism Technology* 11.2 (2020), págs. 234-248.
- [20] D. Roberts. «Adopting POS Systems: Challenges and Benefits for Restaurants». En: *Hospitality and Tourism Journal* 37.2 (2017), págs. 150-167.
- [21] Mahdi Sahlabadi et al. «LPMSAEF: Lightweight process mining-based software architecture evaluation framework for security and performance analysis». En: *Heliyon* 10.5 (2024). Cited by: 0; All Open Access, Gold Open Access. DOI: 10.1016/j.heliyon.2024.e26969. URL: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85186607263&doi=10.1016%2fj.heliyon.2024.e26969&partnerID=40&md5=252af8ccba7c2e3ec58ce07d81818dfa>.
- [22] Sarai Saman Chingay, Maria Guerra y Estefany Huamán. «Customer Relationship Management Systems (CRM) and Loyalty in the financial sector.» En: ene. de 2023. DOI: 10.18687/LACCEI2023.1.1.482.
- [23] R. Smith y T. Brown. «Point of Sale Systems in Restaurants: A Comparative Analysis». En: *Journal of Business Management* 34.2 (2019), págs. 123-145.
- [24] Xiaobing Sun et al. «Automatic software vulnerability assessment by extracting vulnerability elements». En: *Journal of Systems and Software* 204 (2023), pág. 111790. ISSN: 0164-1212. DOI: <https://doi.org/10.1016/j.jss.2023.111790>. URL: <https://www.sciencedirect.com/science/article/pii/S0164121223001851>.
- [25] Deniz Unal et al. «Design and performance evaluation of SEANet, a software-defined networking platform

- for the Internet of Underwater Things». En: *Computer Networks* 250 (2024). Cited by: 0. DOI: 10.1016/j.comnet.2024.110579. URL: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85195884792&doi=10.1016%2fj.comnet.2024.110579&partnerID=40&md5=e993a62a63aa88f7af0cf36c8158bd99>.
- [26] M. Urban-Lurain, G. Albertelli y G. Kortemeyer. «Work in Progress - Using Information Technology to Author, Administer, and Evaluate Performance-Based Assessments». En: *35th Annual Frontiers in Education*. Los Alamitos, CA, USA: IEEE Computer Society, oct. de 2005, T2E-19-T2E-20. DOI: 10.1109/FIE.2005.1611903. URL: <https://doi.ieeecomputersociety.org/10.1109/FIE.2005.1611903>.
- [27] P. Wilson. *Advanced Restaurant Management and Marketing*. McGraw-Hill, 2017.