MSMEs Acceptability of iProSES: Inventory Processing System for Food Enterprise Sector Using Technology Acceptance Model

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ABSTRACT

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| The goal of this research is to evaluate the effectiveness and impact of iProSES (Inventory Processing System for the Food Enterprise Sector), a web-based Business Process Management application specifically designed for Micro, Small, and Medium Enterprises (MSMEs) to facilitate automation and transition away from paper-based systems. It aims to analyze the usability, acceptance, and impact of the system on the operational efficiency of the MSME, with a focus on resource-poor environments. This is a descriptive and developmental case study research in which system implementation, user evaluation, and results were analyzed qualitatively and quantitatively. The research focused on specific MSMEs within MIMAROPA, Philippines, during the 2021 -2022 period. Participants from MSMEs were chosen via purposive sampling. Information was gathered through surveys, system usage logs, and key informant interviews. Usability was assessed using the System Usability Scale (SUS), while adoption rates were calculated using descriptive statistics. Moreover, qualitative responses are thematically analyzed to derive insights from user suggestions. The adaption of iProSES is guided by the RAD model, an iterative process that incorporates user feedback throughout the design phase. The iProSES system excelled in various aspects, including functionality, reliability, utility, efficiency, maintainability, and portability. According to a survey conducted among system users, a high level of user satisfaction (4.68) was reported concerning usefulness (4.78) and ease of use (4.89). Moreover, it improved inventory management, rectified errors, and optimized operational efficiency. MSMEs responded positively to this because the iProSES system satisfied all the software development requirements. Effective inventory management practices significantly improve inventory control and operational efficiency. iProSES showcases remarkable promise as a digital tool for optimizing MSMEs by offering an economical and user-friendly platform for managing business processes. However, issues related to infrastructure and digital preparedness, as well as user preparedness, must be resolved for long-term adoption. More studies are needed to assess the impact of scaling in other regions and sectors. |

*Keywords: Integration, Inventory, MSMEs, System, Technology*

1. INTRODUCTION

The importance of micro, small, and medium enterprises (MSMEs) in developing countries is being recognized as a fundamental element in economic development (International Labor Organization, 2018). Economic growth in developing states is primarily driven by companies that account for more than 50% of GDP and over 80% of total employment, thereby addressing unemployment (World Bank, 2020). This enables MSMEs to create employment opportunities for themselves, especially in rural areas, which can instill entrepreneurial skills and business orientation where there were none before (United Nations Conference on Trade and Development, 2019). Furthermore, they are flexible and adaptable, thus providing benefits when it comes to product and service development. Such promptness allows for innovation while at the same time ensuring sustainability, as they respond quickly to changes in the external environment, leading to increased productivity (OECD, 2021).

These MSMEs present an opportunity for growth, as they are widely spread in rural areas, offer employment opportunities, and promote entrepreneurship and business skills among residents of underdeveloped regions (Tambunan, 2019). They often face various barriers, including outdated production equipment, inadequate management skills, and limited knowledge of how to enhance their operations (Tambunan, 2019). It implies that there is often a critical absence of vital connections between financiers who could support new companies with capital and the right markets or cutting-edge technology needed for production (World Bank, 2021).

The world is undergoing a major technological revolution in every sphere of life. One field that has been extensively employed to illustrate the application of technology is information technology (Dwivedi et al., 2021). The use of web-based technologies in developing countries has grown remarkably, making them an indispensable part of businesses (Dube & Mukhongo, 2021). It is essential to note that, despite many companies being categorized as micro, small, and medium-sized enterprises (MSMEs), their share of the GDP is only 61%. This implies that they are not productive enough due to factors such as a lack of funding, a shortage of educated personnel, or the absence of new technologies (Pedraza, 2021).

The evaluation of inventory management, which is an integral part of business, has become increasingly notable. Recent studies indicate that companies often hold vast amounts of stock, which is vital for operations, yet can lead to stockouts or even immobilization of funds due to excessive inventory (Gupta & Verma, 2020). These are common recurring issues with inventories in the business industry (Akbar & Tracogna, 2018). Properly maintaining stock levels within an organization requires a practical strategic approach to managing its inventories, both in terms of avoiding overstocking and understocking (Gupta & Verma, 2020).

In response to these challenges and to enable businesses to grow, the Small Enterprise Technology Upgrading Program (SETUP) was established by the Department of Science and Technology (DOST). The SETUP program employed a holistic approach, including conducting in-depth technology needs assessments and implementing adequate procedures for sourcing technology (Luna & Santos, 2022). This program enabled participating firms to analyze their technological requirements, identify solutions, locate technology sources, and manage procurement and installation. Despite initially covering only a few companies, the DOST has set aside more money for the purchase of technologies aimed at encouraging Micro, Small, and Medium Enterprises (MSMEs) to adopt authorized financing channels for their technological projects with an expectation that it will boost their production capacities (Luna & Santos, 2022).

Moreover, the Department of Science and Technology (DOST), in collaboration with Occidental Mindoro State College (OMSC), has developed a specialized inventory processing system for the MIMAROPA region, known as 'iProSES.' The introduction of this software was meant to enhance inventory management practices and operational efficiencies for local MSMEs (Rukhiran et al., 2022). By December 2022, the project had been completed and delivered to beneficiaries. To evaluate the suitability and effectiveness of the ISO 9126 standard for software development and the Technology Acceptance Model (TAM), this evaluation utilized these standards (Stylos et al., 2021).

Furthermore, this study examined the effectiveness of the system in systematically capturing significant thoughts and experiences, which were then shared with the beneficiaries of MSMEs (Alonso & Perea, 2023; Malik et al., 2022). OMSC's plans and strategies have been significantly influenced by these findings, as well as those of DOST. These ideas have enabled small businesses to address technology integration challenges related to their business operations, thereby improving efficiency and promoting sustainable practices (Alonso & Perea, 2023; Malik et al., 2022).

This research is based on the "iProSES" inventory processing system, a joint project of Occidental Mindoro State College (OMSC) and the Department of Science and Technology (DOST). The primary focus is to investigate how this system affects operational productivity and work efficiency in micro, small, and medium-sized enterprises (MSMEs) within the MIMAROPA region. According to the ISO 9126 standards for software development, the assessment aims to determine whether this system meets the requirements for its intended application (Tran et al., 2021). Correlation analysis was used to assess whether MSMEs are also ready to adopt it (Dwivedi et al., 2021).

Feedback from these stakeholders was also sought, as it may provide helpful information that can aid modern technology initiatives aimed at improving customer satisfaction and the performance of systems utilized by MSMEs. In other words, those who run them have the opportunity to establish relationships with their customers through feedback channels like email or telephone numbers, which can be obtained online at any time, from anywhere, without the need for physical travel. Additionally, there are many more advantages that help in terms of communication between sellers and website operators. Lastly, this study examined the concrete outcomes achieved by MSMEs following the adoption of the system, comparing them against the attributes specified within the correlation matrix developed earlier (Kilay et al., 2022; Mujianto et al., 2023).

2. methodOLOGY

**2.1 Research Paradigm**

The acceptability of the "iPROSES" inventory process system among MSMEs was evaluated using the Technology Acceptance Model (TAM), as shown in Figure 1. Here, perceived usefulness, ease of use, behavioral intention, and system usage were examined. MSMEs were assessed for perceived usefulness to determine if the system improved their food processing processes. MSMEs were asked if the system was easy to use, intuitive, and accessible. Behavioral intention assessed the prior intention of MSMEs to utilize the system, which was influenced by its usefulness and ease of use. Actual system utilization was anticipated to facilitate MSMEs' daily integration. MSMEs' assessments were collected through surveys, interviews, and observations to statistically analyze the system's acceptance.



**Fig. 1. Research Paradigm**

**2.2 Research Design**

A comprehensive mixed-methods approach was employed in this research, aiming to understand the iProSES Inventory Processing System and its impact on MSMEs. The survey design used in the quantitative part of the study employed a cross-sectional technique to assess the effectiveness of the system. This study aimed to verify whether the software conforms to ISO 9126 standards for software development (Mulyadi & Othman, 2022). The measures were drawn from Davis' (1986) Technology Acceptance Model (TAM) (Davis, 1986). For this survey, several aspects were explored, including functionality, dependability, user-friendliness, effectiveness/efficiency, and maintainability/portability – all components derived from the TAM model (Gupta & George, 2021). Concerning how well it met their needs and what they thought about the efficiency of the system, these are some of the findings that emerged as a result of using quantitative approaches during this study (Khan & Ullah, 2022; Mulyadi & Othman, 2022).

Recent research has highlighted the importance of qualitative methods, drawing attention to their critical role in evaluating technology. Gonzalez and Williams (2022) have emphasized that qualitative procedures, such as in-depth interviews and focus groups, are essential for exploring how new technologies are introduced into the user experience and the challenges they pose to individuals. The experts in this study used a comprehensive mixed-methods approach to understand the "iProSES" Inventory Processing System and its impacts on MSMEs. To obtain detailed insights into MSMEs' experiences with the system, the qualitative phase included interviews and focus group discussions. These interviews aimed to allow the persons being interviewed to impart what they had personally experienced, identify problems, and show possibilities for growth (Gonzalez & Williams, 2022). This research employed focus group discussions that fostered collaboration, recognition of common patterns and problems, and suggestions for improvements (Green & Browne, 2021). In this qualitative phase, organizational norms, user perceptions, and system-wide experiences were investigated as part of a comprehensive evaluation of the "iProSES" system. It also contributed to a comprehensive evaluation of the system's effectiveness by identifying areas that require improvement and highlighting technology initiatives for future reference (Green & Browne, 2021). Qualitative research was integrated with quantitative approaches, such as cross-sectional survey design, to provide a more nuanced view of how well the system catered to users' needs, thereby adhering to ISO 9126 software development standards.

**2.3 Data Sampling**

The study's quantitative component employed a stratified random sampling technique to cover a diverse range of MSME staff, DOST personnel, and IT experts from various sectors in the MIMAROPA region. On the contrary, during the qualitative stage, the researchers used purposive sampling to identify key informants and respondents who participated in individual interviews as well as focus group discussions (FGDs). This helped make it possible to select individuals and firms critically. The intentional recruitment technique employed in this study ensured that various perspectives were represented in the collected qualitative data, thereby leading to a more comprehensive scope for analysis, both in-depth and breadth. The study's participants predominantly included five micro, small, and medium enterprises (MSMEs) operating within the food manufacturing industry in the MIMAROPA 4B region. The aforementioned enterprises encompass Ritchblitz Sweets, located in San Jose, Occidental Mindoro; VCDC Farm, situated in Victoria, Oriental Mindoro; Three Sisters Banana Chips in Marinduque; Marlberg Trading in Marinduque; and Brilliant Juice Manufacturer, also operating in Marinduque.

**2.4 Data Collection**

In the quantitative phase, a properly constructed questionnaire was based on the ISO 9126 standards. The questionnaire functioned as the primary tool for gathering data, with a specific focus on representatives from micro, small, and medium enterprises (MSMEs). The primary objective of this study was to systematically gather data related to the evaluation of the system and assess participants' experiences with its usefulness and user-friendliness.

A carefully selected sample of MSME participants participated in in-depth interviews during the qualitative stage of the research. The interviews were a blend of online and face-to-face methods. Zoom and other technologies were utilized to facilitate these collaborative sessions. The participants spent their time freely sharing, during which comprehensive information was collected on how they interacted with the system. To ensure that participants engaged actively, the focus group discussions were well-organized. All of this dialogue served as a platform for open conversation among them as they shared personal experiences and expressed their views on how the system had affected them and the problems they faced.

**2.5 Data Analysis**

The quantitative part of the study involved systematic analysis of data from completed questionnaires using statistical software. Additionally, descriptive statistics were computed to provide a summary description of the collected data. Furthermore, inferential analyses, such as correlation, were performed to measure the extent to which the system complies with ISO 9126 criteria and its acceptability among the participants.

In the qualitative phase, transcripts of interviews and focus group discussions (FGDs) were analyzed with great care. They were initially transcribed as soon as they were received. A recurring theme was then identified through a systematic coding procedure, which helped shed light on some difficulties related to qualitative data and the opportunities that come with it. Then, a thematic analysis was conducted on the qualitative data to identify patterns and trends. This approach aimed at understanding feelings or thoughts shared by respondents during interviews. The qualitative and quantitative data were cross-referenced to ensure a comprehensive understanding of the research findings and to integrate both types of data for a more holistic perspective on the system's impact and user acceptability.

**2.6 Ethical Considerations**

Ethics were strictly followed throughout the research process. Survey participants, interviewees, and focus group participants provided informed consent. This ensured that study participants were willing and aware. To protect participants' sensitive data, data privacy, and confidentiality were given top priority. Following the ethical research criteria was crucial; thus, all necessary permissions and approvals were obtained to perform the study ethically and responsibly, respecting the rights and privacy of all participants.

3. results and discussion

**3.1 Evaluation of iProSES system using 9125 Framework**

Table 1 illustrates the assessment of the iProSES system utilizing the ISO 9126 software quality standard. The software standard outlines six different quality indicators, namely functionality, dependability, usability, efficiency, maintainability, and portability. Each characteristic is subsequently subdivided into sub-characteristics. The iProSES system has received an outstanding rating for all of its quality attributes. The average score for each quality is 4.80, representing the maximum attainable rating. The observed standard deviation suggests a limited degree of variability in the ratings.

The iProSES system demonstrates outstanding performance in various aspects of software quality, as evidenced by its excellent scores across multiple categories. In terms of functionality, it receives a 4.82 score, indicating its effectiveness in ensuring user satisfaction by providing the necessary features and functions. The score of 4.76 indicates that the information under consideration is trustworthy and performs consistently over time, making it highly reliable. As a result, users believe that the system is fairly "usable," with an average rating of 4.95 out of 5 points (the closer to 5, the better). This mark implies that it takes less time to learn about the system and carry out operations compared to other systems. Moreover, the system exhibits remarkable efficiency, with a score of 4.83, indicating its ability to maximize resource utilization while minimizing inefficient consumption. The high rating of 4.78 for maintainability underscores the software's ability to adapt and be easily modified in order to meet changing requirements. The iProSES system is recognized for its high level of portability, as evidenced by its score of 4.85. This score indicates that the system is capable of smoothly adapting to many situations and devices. The aforementioned ratings jointly highlight the outstanding capabilities of the iProSES system and its effectiveness in fulfilling user expectations. The ISO 25010 standard emphasizes a system's ability to adapt to changes in its environment, devices, and user interfaces. It supports the claim that a system can smoothly adapt to various situations and devices.

The iProSES system performs exceptionally well across various software quality aspects, with mean ratings ranging from 4.60 to 5.00. Standard deviations are relatively low, indicating high agreement among evaluators. The overall interpretation for each criterion is "Excellent," indicating that the system excels in terms of functionality, reliability, usability, efficiency, maintainability, portability, and compliance with standards. This assessment indicates that the iProSES system meets or exceeds expectations in these critical aspects of software performance.

In summary, the findings reveal that the "iProSES" inventory processing system aligns well with ISO 9126 software development requirements. The observed suitable alignment may improve the operating efficiency and productivity of MIMAROPA MSMEs. However, continuing evaluation and continuous improvement are necessary to maintain and improve the system's compliance with these criteria.

**Table 1. Evaluation of the iProSES system using the 9126 Framework**

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria** | **Mean** | **Standard Deviation** | **Interpretation** |
| Functionality | 4.82 | 0.213437 | Excellent |
|  Suitability | 4.93 | 0.249443 | Excellent |
|  Accurateness | 4.73 | 0.442216 | Excellent |
|  Interoperability | 4.87 | 0.339934 | Excellent |
|  Security | 4.73 | 0.442216 | Excellent |
| Reliability | 4.76 | 0.226623 | Excellent |
|  Maturity | 4.80 | 0.4 | Excellent |
|  Fault Tolerance | 4.67 | 0.471404 | Excellent |
|  Recoverability | 4.80 | 0.4 | Excellent |
| Usability | 4.95 | 0.1 | Excellent |
|  Understandability | 5.00 | 0 | Excellent |
|  Learnability | 4.93 | 0.249443 | Excellent |
|  Operability | 5.00 | 0 | Excellent |
|  Attractiveness | 4.87 | 0.339934 | Excellent |
| Efficiency | 4.83 | 0.235702 | Excellent |
|  Time Behavior | 4.93 | 0.249443 | Excellent |
|  Resource Utilization | 4.73 | 0.442216 | Excellent |
| Maintainability | 4.78 | 0.201384 | Excellent |
|  Analyzability | 4.80 | 0.4 | Excellent |
|  Changeability | 4.87 | 0.339934 | Excellent |
|  Stability | 4.60 | 0.489897 | Excellent |
|  Testability | 4.87 | 0.339934 | Excellent |
| Portability | 4.85 | 0.219848 | Excellent |
|  Adaptability | 4.87 | 0.339934 | Excellent |
|  Instability | 4.73 | 0.442216 | Excellent |
|  Conformance | 4.87 | 0.339934 | Excellent |
|  Replaceability | 4.93 | 0.249443 | Excellent |
|  |  |  |  |

**3.2 Level of Acceptance of iProSES system**

Table 2 data reveals significant levels of perceived usefulness among MSME users, as seen by the high average score of 4.78. This suggests that the "iProSES" system is considered by many to help facilitate day-to-day business operations. This aligns with the goal of improving operational efficiency and productivity, as users believe it plays a supportive role in this regard. The mean score for perceived ease of use (4.89) suggests that MSME users perceive the system as having user-friendly features, making it easy to navigate. Removing barriers to adoption and encouraging further use are two primary reasons why people would approve a user interface.

The integration of high perceived usefulness and low ease of use indicates that iProSES provides an attractive user experience for micro, small, and medium enterprises (MSMEs). Such a pleasing encounter can increase customer satisfaction and foster ongoing engagement with the technology. This survey has revealed that MSMEs can enhance their productivity by improving the perceived usefulness of their systems and increasing their ease of use. Many expected that customers had integrated it into their routine activities, leading to improved stock control processes and positive business outcomes.

However, it is necessary to consider comments or suggestions for improvement from individual users, as most of the results are in favor. This input from users may improve the readability and acceptability of the system as a whole. This study found that the "iProSES" inventory processing system is generally acceptable among micro, small, and medium enterprises (MSMEs) in MIMAROPA. User-perceived usefulness and ease of use reveal that the system has tangible benefits for their enterprises. Such a well-disposed response from its users plays a significant role in ensuring that it is adequately incorporated into this business process, thus ensuring continued profitability. Sustainable user feedback, as well as support, are critical in enhancing the system's performance over time and addressing the ever-increasing needs of micro, small, and medium enterprises (MSMEs).

**Table 2. Level of Acceptance of iProSES system**

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria** | **Mean** | **Standard Deviation** | **Interpretation** |
| Usefulness | 4.78 | 0.201384 | Highly Acceptable |
| Ease of Use | 4.80 | 0.4 | Highly Acceptable |
| **Mean** | **4.79** | **0.231241** | **Highly Acceptable** |

**3.3 Satisfaction Level of MSMEs in iProSES System**

However, as shown in Table 3, this data provides a detailed analysis of the satisfaction levels of micro, small, and medium enterprises (MSMEs) with iProSES (Inventory Processing System). The assessment encompasses a broad range of important variables. For instance, under the functionality component, which assesses how well the system's features meet users' expectations, there is an average score of 4.68, indicating that MSMEs are highly satisfied with the system's performance in meeting their business requirements. Reliability is one such attribute that quantifies its ability to work without errors continuously, and it has been highly valued with a mean score of 4.62. The rating above reflects what MSMEs believe about the trustworthiness of the system. An excellent average score of 4.73 on usability indicates that it is very user-friendly and straightforward to operate for micro, small, and medium enterprises (MSMEs). Thus, there appears to be a favorable perception among these stakeholders regarding the ease and efficiency of the system. Another outstanding rating comes from the efficiency category, which evaluates the execution of operations in a lean and responsive mode, receiving an average score of 4.83.

The implicit average of changeability is 4.72, which measures the ease of making changes to the system in terms of flexibility and manageability. This implies that MSMEs consider it flexible and controllable. The other score, known as portability, has an average value of 4.80. It, therefore, means that these SMEs view the system as relaxed when it comes to transferring it from one platform to another. In terms of compliance with industry or regulatory standards, this indicates a relatively high level of satisfaction among MSMEs regarding the system's ability to meet compliance needs (mean = 4.80).

For all variables included, the overall average satisfaction was approximately 4.74, with an extremely low standard deviation of 0.13188. As such, this means there is substantial consensus among micro, small, and medium enterprises (MSMEs). There are strong beliefs in favorable attitudes and significant levels of contentment regarding the iProSES system across all assessed variables in this regard.

In summary, the results obtained a "Very Satisfied" rating across all items and a high overall mean score, which are clear indicators that the MSMEs examined in this research have much knowledge about the iProSES system. The pooled findings indicate that the system works very well for them and helps them significantly improve their operations in the food processing industry.

**Table 3. Satisfaction Level of MSMEs in the iProSES system**

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria** | **Mean** | **Standard Deviation** | **Interpretation** |
| Functionality | 4.68 | 0.334995 | Very Satisfied |
| Reliability | 4.62 | 0.362433 | Very Satisfied |
| Usability | 4.73 | 0.442216 | Very Satisfied |
| Efficiency | 4.83 | 0.235702 | Very Satisfied |
| Maintainability | 4.72 | 0.271825 | Very Satisfied |
| Portability | 4.80 | 0.305505 | Very Satisfied |
| Compliance | 4.80 | 0.4 | Very Satisfied |
| **Mean** | **4.74** | **0.13188** | **Very Satisfied** |

**3.4 Outcomes in the Implementation of the iProSES System**

MSMEs have significantly improved their inventory management. They claimed that the approach helped them track stock and product movement, preventing overstocking and stockouts. Many MSMEs claimed higher efficiency from "iProSES." Automated inventory operations saved up time and resources for marketing and servicing clients. MSMEs valued the system's data analytics, which helped them make purchasing, restocking, and price decisions. Real-time data increased their company approach. Users reported that the technology reduced inventory management errors and increased the accuracy of inventory discrepancies.

Table 4 explains the process of iProSES deployment in MSMEs. This correlation matrix illustrates how system components interact with one another and affect user satisfaction. As expected, functionality is organically associated with itself with a diagonal value of 1. Functionality is key to user satisfaction, as it assesses how well the system meets user needs. Its near-zero correlation with functionality (-0.0097) suggests a weak relationship between reliability and functionality. This suggests that reliability is primarily unaffected by functionality, which is crucial. Even with many features, a system may still run smoothly. Usability has a moderate correlation with functionality (r = 0.1301) and reliability (r =-0.2649). Usability is influenced both positively and negatively by functionality and reliability and also independently affects user satisfaction. Usability is stronger (-0.3303), while functionality is poorer (-0.3939). This emphasizes balance, noting that while efficiency affects usability and functionality, overly complicated or resource-intensive features can be detrimental. Its connections with usability (-0.1713), dependability (0.0942), and efficiency (-0.1414) are subtle. This suggests that usability, dependability, and efficiency influence perceptions of system maintenance and updates, but not completely. Portability is slightly positively correlated with usability (r = 0.1789) but negatively correlated with functionality (r =-0.1806) and dependability (r = 0.0757). This indicates that MSMEs prioritize adaptability over complexity. Compliance is positively correlated with usability (r = 0.1017), efficiency (r = 0.1936), maintainability (r = 0.2921), and portability (r = 0.3910). This suggests that industry or governmental standards improve usability, efficiency, maintainability, and portability, which boosts satisfaction.

**Table 4. Correlation Matrix for the Implementation of iProSES system**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  **Criteria** | **Functionality** | **Reliability** | **Usability** | **Efficiency** | **Maintainability** | **Portability** | **Compliance** |
| Functionality | 1 |  |  |  |  |  |  |
| Reliability | -0.009719738 | 1 |  |  |  |  |  |
| Usability | 0.130107262 | -0.264865231 | 1 |  |  |  |  |
| Efficiency | -0.393919299 | 0.111034982 | -0.33028913 | 1 |  |  |  |
| Maintainability | 0.081705949 | 0.094216306 | -0.171269768 | -0.141421356 | 1 |  |  |
| Portability | 0.178949272 | 0.028022701 | -0.180607822 | 0.07571317 | -0.035691531 | 1 |  |
| Compliance | 0.101709526 | -0.095563697 | -0.213200716 | 0.193649167 | 0.292118697 | 0.390981127 | 1 |

**3.5 User’s Feedback**

As part of the qualitative portion of the study, participants took part in individual interviews and focus group discussions (FGDs) to gain an understanding of their experiences and perceptions of the iProSES system. Each interview and focus group was transcribed directly after collection. A methodical coding technique was employed, allowing for the mapping of recurring themes and patterns. Thematic analysis was also performed, utilizing sentiments expressed by MSME users, particularly their challenges and perceived opportunities, which were crucial in guiding the analysis of feelings. Analysis of qualitative data highlighted three principal themes; these include:

Ease of Use and System Accessibility

Several respondents noted that the iProSES system was user-friendly, even for those who are not technically inclined. Most participants valued the layout and the flow of the menus as they were easy to follow. "Even if we are not tech-savvy, we were able to use the system after one training," a user stated. Despite the numerous advantages technology offers, some users noted that an unreliable Internet connection was a barrier, especially in remote areas.

Operational Efficiency and Process Improvement

Users reported improvements in automation for manual activities, including inventory control, documentation, and reporting. The accuracy improvements achieved due to the adoption of electronic documentation were remarkable. The accuracy gained by users adopting electronic forms of documentation was pronounced. Improved systems facilitated better organization and retrieval of records. One user commented, “Our previous method of record keeping was handwriting everything. Now, we have systems that improve our records far beyond anything we could do manually.”

Barriers to Sustainability and System Adoption

Despite the system’s benefits, some users expressed concern about long-term adoption, given the system’s advantages. Primary concerns were the expenditure associated with ongoing maintenance of hosting and domain services as well as the absence of technical support within the organization. As one user noted, “The system is helpful, but we worry about the cost if we continue using it without assistance.”

To enhance the reliability of these conclusions, qualitative feedback was validated against quantitative metrics (e.g., SUS scores and system usage levels). For example, users who gave high usability ratings often had positive feedback about the system during interviews. Similarly, users with lower engagement reported internet access as a primary barrier, alongside inadequate training.

4. Conclusion

In conclusion, the "iProSES" inventory processing system meets software development requirements, MSMEs appreciate it, and users are satisfied. The positive actual outcomes and highlighted improvement opportunities underscore the importance of user-centered technological solutions and ongoing improvement. The technology may aid MSMEs in the MIMAROPA region in increasing their performance and achieving success, and it may also provide future technological initiatives to empower small businesses.

The ISO 9126 framework has evaluated the iProSES system, which demonstrated outstanding performance in six quality indicators: functionality, reliability, usability, efficiency, maintainability, and portability, with an average score of 4.8. It is worth noting that this outstanding system has a usability score of 4.95 and an efficiency rating of 4.83, indicating its ability to meet user needs. On the other hand, its maintainability score was found to be 4.78, while that for portability was 4.85, indicating its adaptability to different environments and devices. In all, this iProSES system meets or exceeds the basic software performance measures for improved inventory processing operations in Micro, Small, and Medium-Sized Enterprises (MSMEs) compared to expectations.

High acceptance and positive attitudes towards MSMEs "iProSES." These usefulness ratings, measured at 4.78 and 4.89, indicate how useful iProSES is in enabling operational efficiencies daily and even making it easy to adopt and continue using it.

The surveyed Micro, Small, and Medium-sized Enterprises (MSMEs) rated the iProSES Inventory Processing System highly across various primary attributes. It is essential to them that the system performs as required, is dependable, can be used easily by all users, is practical, maintainable, portable, and conforms to the industry norms of MSMEs. A mean score of 4.68 highlights its ability to meet customer expectations in the food processing industry, leading to improvements in various operations. Besides this, adaptability stands at an average of 4.72; manageability also receives commendation with an average rating of 4.80; while mobility has an average score of 4.72; therefore, the iProSES Inventory Processing System can easily be adopted by a large number of people who are engaged in various businesses especially those operating in different locations throughout a country such as Nigeria or Kenya due to its ease portability nature.

These relationships reflect intricate and diverse elements that influence user satisfaction with the iProSES system among micro, small, and medium-sized enterprises (MSMEs). It has been observed that functionality can also obstruct or facilitate usability requirements, leading to other attributes of non-compliance concerning their compatibility. Striving for an optimal balance between them is a crucial condition to ensure that the right system meets user needs and that satisfaction levels increase accordingly.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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