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Evaluating User Satisfaction and Educational Impact of the Sorghum Entrepreneur Marketplace: An Application of the Pieces Framework

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Abstract

This study explores the pivotal role of digital marketplaces in enhancing the competitiveness of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia, with a focus on the sorghum entrepreneur marketplace. Through a comprehensive methodological approach that includes interviews, observations, literature reviews, and system design analysis via use case diagrams, this research investigates the user satisfaction levels of the marketplace employing the Performance, Information, Economy, Control, Efficiency, and Service (PIECES) framework. The findings reveal an average satisfaction level of 4.41 across these indicators, indicating a high degree of user satisfaction with the marketplace. This study extends beyond traditional marketplace evaluation to consider the educational implications of digital platforms in promoting agricultural entrepreneurship. It highlights the marketplace's role not only as a commercial tool but also as an educational resource that enhances users' digital literacy, e-commerce understanding, and sustainable agricultural practices. This dual focus underscores the importance of integrating educational objectives into digital marketplace development, aiming to foster lifelong learning and professional growth among users.

Keywords

Marketplace, Entrepreneur Sorghum, PIECES Analysis, Application Service, Digital Literacy, Agricultural Entrepreneurship Education.

1. Introduction

In the digitalization era, the emergence of online marketplaces has revolutionized the landscape for Indonesia's Micro, Small, and Medium Enterprises (MSMEs), offering unprecedented opportunities for growth and income expansion amidst an internet user base projected to exceed 170 million by 2022. For MSMEs to navigate and thrive in this digital era, adapting to the fast-paced technological advancements is paramount. As significant contributors to the national economy, MSMEs require not only empowerment and legislative support but also educational interventions that align with the disruptive trends of the digital economy. The gap in the adaptation of information technology for business development, highlighted in existing laws and practices, underscores the urgent need for integrating educational frameworks that facilitate digital literacy and entrepreneurial skills (Saad et al., 2023; Skouloudis et al., 2023).

Enhancing the competitiveness of micro-enterprises is crucial for national economic growth, where the role of Micro, Small, and Medium Enterprises (MSMEs) is indispensable. The application of information technology is pivotal in transforming businesses, improving the accuracy and efficiency of information exchange, and expanding marketing networks. This transformation necessitates a robust educational foundation, where entrepreneurs are equipped with the knowledge and skills to leverage digital tools effectively (Juminawati et al., 2021; Reza et al., 2023). Marketplaces play a vital role in elevating MSME competitiveness, offering a platform to widen customer reach, streamline operations through logistical and payment processing services, and gain insights into consumer behavior. To fully exploit these advantages, educational programs focusing on digital marketing, e-commerce management, and consumer analytics are essential, enabling entrepreneurs to refine their products and services based on data driven insights (Lahallo & Aritonang, 2020; Kanigoro et al., 2021).

The transition from traditional offline marketing to digital platforms signifies a critical shift in MSME strategies. This transition, exemplified by the Sorghum Entrepreneur Unit (SEU) initiative by Universitas Wijaya Kusuma Surabaya (UWKS), reflects a strategic integration of educational support with practical entrepreneurial development. By facilitating online marketing opportunities for sorghum entrepreneurs, UWKS underscores the importance of educational institutions in fostering digital entrepreneurship among MSMEs. Acknowledging the significance of continuous customer service and satisfaction in sustaining and growing market share, this study emphasizes the need for ongoing education and training in customer relationship management and service quality improvement. The competitive landscape of online marketplaces demands not only technological adaptation but also an educational approach to developing strategies that ensure customer satisfaction and loyalty. Utilizing the Performance, Information, Economy, Control, Efficiency, and Service (PIECES) method for analyzing customer satisfaction, this article aims to delve into the levels of user satisfaction with the sorghum entrepreneur marketplace, highlighting the critical role of educational endeavors in enhancing MSME competitiveness in a digital economy.

2. Methods

The methodology of this study was meticulously designed to encapsulate the multifaceted nature of the marketplace, focusing on the sorghum industry's unique challenges and

opportunities. Through an integrative approach that combines both qualitative and quantitative research methods, this study aims to offer a nuanced understanding of the marketplace dynamics, the application of the Performance, Information, Economy, Control, Efficiency, and Service (PIECES) framework, and the development of a user-centric marketplace platform.

Structured interviews were conducted with multiple stakeholders within the Sorghum Entrepreneur Unit (SEU), including a diverse range of sorghum sellers. These interviews were aimed at uncovering the intricate details of the operational challenges, aspirations, and the overall ecosystem of the sorghum marketplace (Jamal & Sharifuddin, 2015; Hyrul et al., 2017). The dialogues were crafted to extract rich, qualitative data that could inform the development process of the marketplace platform, ensuring it aligns with the users' needs and preferences. This method is crucial for gathering firsthand insights that are not readily available in existing literature or through observational studies alone (Laukkanen, 2007).

Observational research provided a tangible lens into the operational workflows of sorghum entrepreneur Micro, Small, and Medium Enterprises (MSMEs). By engaging directly with the environment in which sorghum products are sold, the research team could identify inefficiencies in sales processes and data management practices. This method extended beyond mere observation; it involved engaging with the physical and operational context of sorghum sales, enabling a deeper understanding of the practical challenges faced by entrepreneurs in this sector (Pambudi & Hariandi, 2021).

The theoretical underpinning of this study was significantly bolstered through extensive library research. This approach was instrumental in framing the PIECES analysis within the context of the sorghum marketplace (Freshtiya et al., 2021; Sari et al., 2021). By exploring a wide range of academic sources, the research unearthed various theories and methodologies relevant to addressing the operational challenges identified. This extensive literature review laid the groundwork for applying the PIECES framework effectively, ensuring that the analysis was both comprehensive and grounded in established academic principles (Ula et al., 2021). Meanwhile, Unified Modelling Language (UML) used as the implementation tool. The Unified Modelling Language (UML) is an object-oriented paradigm modelling language for systems and applications (Ahmed et al., 2022). The PIECES framework is used to classify problems, opportunities, and directives in the scope definition, analysis, and system design sections. By using this method, new things can be generated that can be considered in system development. In PIECES, there are six variables used to analyze information systems, namely (Arakian et al., 2023; Muszynski & Tarapata, 2023).

This variable is used to determine the performance of a system, whether it is running well or not. This performance can be measured by the number of data findings generated and how fast data can be found. In a data finding, information will be displayed. This variable is used to analyze how much and how clear the Information will be generated for one search. For optimal system functioning, some control or monitoring must be maintained. This evaluation establishes how much attention is paid to supervising and controlling the system. It is necessary to hold control or supervision in a system so that it runs well. This analysis determines the extent to which supervision and control are carried out so that the system runs well. It is essential to analyze the performance and motivations behind a system to assess its efficiency and effectiveness. A system must provide an adequate response and aid when dealing with automation issues. This study is

performed to see if a system effectively produces a desirable output while receiving slightly skewed inputs. A service is nevertheless crucial and requires consideration when it comes to making use of a system. If excellent service is balanced into an installed system, the system will function smoothly and evenly. This study may better understand services and service-related issues (Yfanti et al., 2022; Nyoman et al., 2023).

The use case system design played a pivotal role in translating the research findings into a practical blueprint for the sorghum entrepreneur marketplace. This methodological step involved detailed mapping of the interactions between users and the proposed system, highlighting the functionalities required to meet the diverse needs of the marketplace stakeholders. By systematically defining these interactions, the research ensured that the development of the marketplace platform was user-centric and aligned with the operational realities of the sorghum industry.

The transition from theoretical analysis to practical implementation marked a critical phase in this research. The development of the sorghum entrepreneur marketplace was guided by the insights gained through interviews, observations, and library research, as well as the specifications outlined in the use case diagrams. This phase was crucial for testing the applicability of the PIECES framework in a real-world context, allowing the research team to iterate and refine the marketplace platform based on user feedback and operational performance data (Vergura et al., 2023). A key component of this study was the quantitative assessment of user satisfaction with the sorghum entrepreneur marketplace. Utilizing a satisfaction survey, the research aimed to measure the impact of the marketplace on its users, employing the formula:

$$RK = \frac{JSK}{JK}$$

Where:

RK = Average satisfaction

JSK = Total questionnaire score

JK = Number of questionnaires

The satisfaction levels were determined using the Kaplan and Norton model, with the following scale (Putri & Indriyanti, 2021):

1 – 1.79 = Very Dissatisfied

1.8 – 2.59 = Not Satisfied

2.6 – 3.39 = Doubtful

3.4 – 4.91 = Satisfied

4.92 – 5 = Very Satisfied

This metric was instrumental in evaluating the marketplace's effectiveness from the users' perspective, providing a quantifiable measure of the platform's impact on the sorghum industry. By integrating this satisfaction scale, the research not only assessed the current state of user satisfaction but also identified areas for improvement in future iterations of the marketplace.

3. Result

The development and deployment of the sorghum entrepreneur marketplace have unveiled a comprehensive system designed to streamline the operations of sorghum entrepreneurs. The proposed use case diagram, with its four actors and 19 use cases, serves as the backbone for a platform that supports a wide array of functionalities. These functionalities include viewing products, registering accounts, managing categories (adding, changing, deleting, and searching), adding customers, customer verification, product settings, transaction data management, transaction verification, category selection, product purchasing, transaction making, transaction verifying, and various reporting features (item data, customer data, and transaction reports) (Dellarocas, 2003).

The introduction of the sorghum entrepreneur marketplace not only facilitates operational efficiencies but also provides valuable educational insights for users. Through interactions with the platform, users gain practical knowledge in several key areas. First, digital literacy, users by exploring various functions such as viewing products, registering accounts, and making transactions, inherently increasing their digital literacy. The process of engaging with these platforms educates users about the nuances of digital commerce, from basic navigation to more complex operations such as transaction verification and reporting (Li & Wang, 2016). Secondly, data management skills, with features that allow adding, changing, deleting, and searching categories, as well as customer and transaction data management, users are unintentionally educated in effective data management practices. These skills are transferable and can enhance their capabilities in other areas of their business operations (Yilmaz et al., 2017). Third, analytical thinking, market reporting features-item data reports, customer data reports, and transaction reports-serve as tools for users to engage in analytical thinking. By reviewing these reports, users can make informed decisions about their inventory, customer engagement strategies, and overall sales tactics (Chen, 2013). Fourth, this platform acts as an educational tool that helps users understand market dynamics. Through view product display pages and the ability to compare prices and products, entrepreneurs can better understand competition and customer preferences, thereby assisting in strategic decision making (Yin et al., 2014). Fifth, characters and their educational implications in Figure 2 showing a product listing page, highlights how entrepreneurs can effectively present their products to potential buyers. This aspect of the market educates sellers about the importance of product presentation and its impact on buyers' decisions. In Figure 3, illustrate the buyer's interaction with the market, starting from product selection to looking at price and quantity. This interaction teaches buyers to make informed purchasing decisions based on product information and price comparisons. In figure 4, depicting an invoice or list of transactions, provides buyers and sellers with insight into the financial aspects of their operations. This educates users about the importance of maintaining clear and detailed transaction records for financial management and dispute resolution.

The educational components embedded within the sorghum entrepreneur marketplace extend beyond mere operational convenience. They contribute to the professional development of the marketplace's users, equipping them with skills and knowledge that are essential for navigating the complexities of the digital economy. As users interact with the platform, they are not only engaging in transactions but are also participating in a continuous learning process. This process

enhances their digital literacy, data management capabilities, analytical thinking, and market understanding, all of which are crucial for the success of modern entrepreneurs.

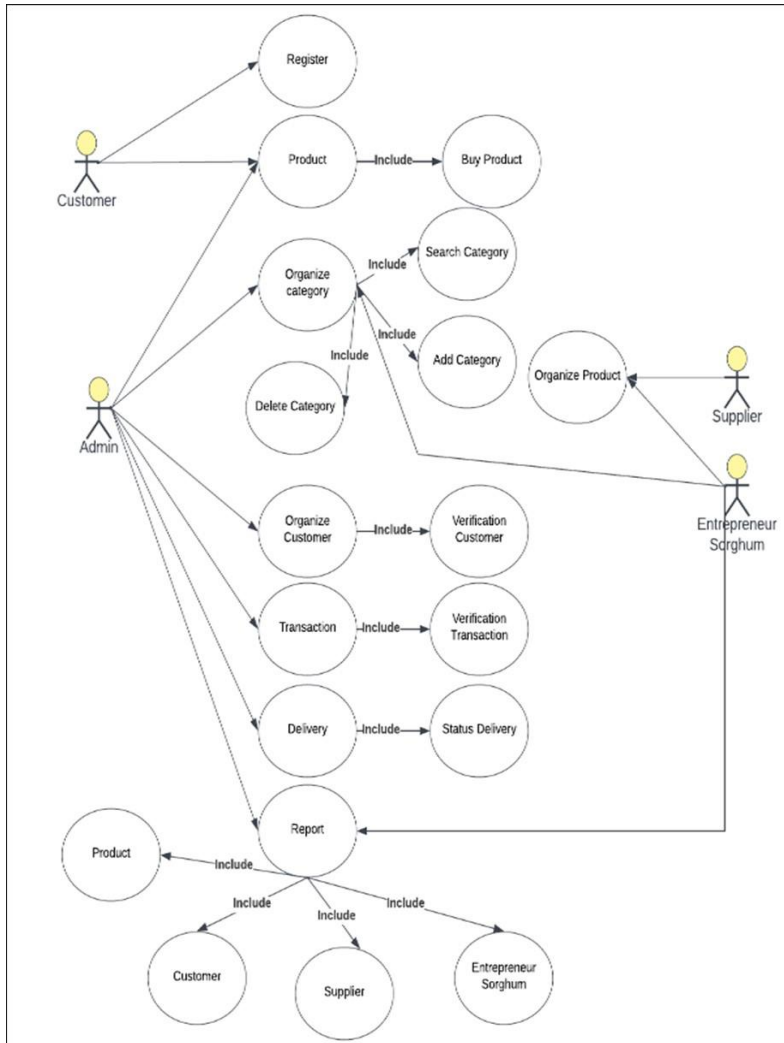


Figure 1. Marketplace Entrepreneur Sorghum

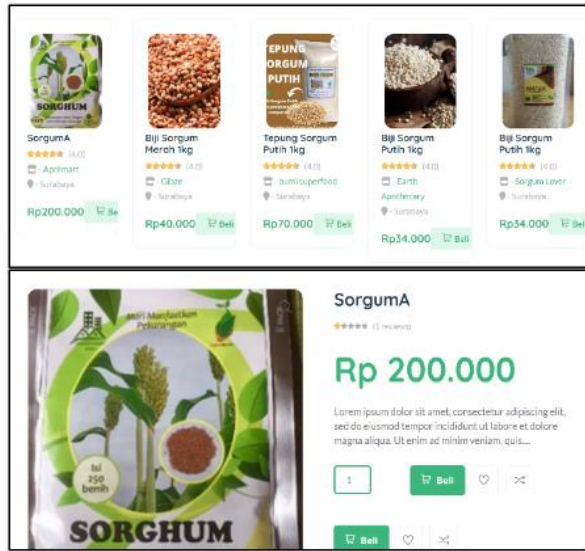


Figure 2. Product lists and Product purchasing

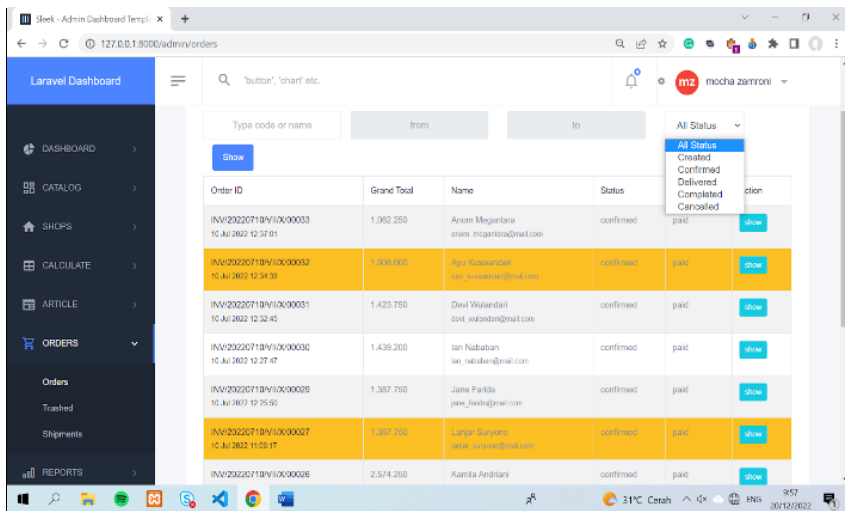


Figure 3. Payment List

The analysis of Performance, Information, Economy, Control, Efficiency, and Service (PIECES) in the context of the sorghum entrepreneur marketplace reveals critical insights into the satisfaction levels of its users. This section delves into the outcomes of a Likert-scale questionnaire assessment, focusing on PIECES indicators (Taherdoost, 2019). The educational component of this analysis lies in understanding how each of these indicators not only reflects user satisfaction but also offers insights into the areas of learning and improvement for both users and developers.

Table 1. Results of Processing Questionnaires for PIECES analysis of economic activity

survey data																							
P	P	P	P	I	I	I	I	E	E	E	E	C	C	C	C	EF	EF	EF	EF	S	S	S	S
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
4	5	4	5	4	5	4	4	5	4	5	5	5	5	4	5	4	4	3	5	4	5	4	5
5	5	4	4	5	5	4	4	5	4	5	5	4	5	4	5	4	4	3	3	4	5	4	5
5	5	4	5	5	5	4	4	4	4	4	5	5	4	5	4	4	5	4	3	4	5	4	5
5	5	4	4	4	4	4	4	4	4	4	5	5	4	4	4	5	4	3	4	3	5	4	5
4	5	5	5	4	4	4	4	4	4	4	4	5	5	4	5	4	4	4	4	4	4	5	5
4	4	5	4	4	5	4	3	4	4	5	5	4	5	4	5	4	4	4	4	4	4	5	5
4	4	5	5	5	5	5	3	4	5	5	4	5	5	4	5	4	3	5	4	4	4	5	5
4	4	5	5	5	4	5	5	3	5	5	4	4	5	5	4	3	5	4	4	4	5	4	5
5	4	4	5	5	5	5	3	5	4	4	4	5	5	5	5	3	5	4	5	5	4	5	4
5	3	4	4	4	5	5	4	4	5	4	4	5	5	5	5	3	5	5	5	5	4	5	4
4	4	4	4	4	5	5	4	4	5	4	4	5	5	5	5	4	5	5	5	5	4	5	5
3	4	5	4	4	5	4	4	5	4	4	5	4	3	5	4	4	5	4	5	4	5	4	5
3	5	5	4	4	5	5	4	4	5	5	3	5	4	4	5	4	5	3	5	5	4	4	5
3	5	4	5	4	5	4	4	5	5	5	3	4	4	4	4	5	3	5	3	5	4	3	4
4	5	5	5	4	4	4	4	5	5	5	4	4	4	4	4	5	4	3	5	4	3	4	5
4	4	4	5	5	4	4	4	5	5	5	4	4	4	4	4	5	3	4	4	4	4	3	4
4	4	5	5	5	4	4	4	4	4	4	4	5	5	4	5	4	4	4	4	4	5	4	4
5	5	4	5	5	5	5	4	4	4	4	4	5	5	4	5	4	4	4	4	4	5	4	4
5	5	5	4	4	5	5	5	4	4	4	4	4	5	5	4	4	5	3	5	3	5	5	4
4	5	5	4	4	5	5	5	3	4	4	4	4	5	5	5	4	5	3	5	3	4	5	5
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5	4	4	5	5	4	4	5	4	5	4	5	4	4	5	4	4	5	4	4	5	4	5	5
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5	5	4	5	5	4	4	5	4	5	4	5	5	5	5	5	5	4	5	4	3	4	5	4
4	5	3	4	4	4	4	5	4	5	4	5	5	5	5	5	4	5	5	4	3	4	5	4
4	4	4	4	4	4	5	5	5	5	5	4	5	5	5	5	3	5	5	4	4	4	5	4
4	4	4	4	4	4	5	5	5	4	5	4	5	5	5	5	3	5	4	5	4	4	5	4
3	4	4	4	4	4	5	5	5	4	5	4	5	4	5	4	3	4	4	5	4	4	5	4
4	5	3	4	4	4	5	5	5	4	5	4	4	4	5	4	4	4	4	5	4	3	4	4
5	5	4	5	5	4	5	5	5	4	5	4	4	4	5	4	4	4	5	5	5	3	4	3

The analysis of the performance indicator reveals an average satisfaction score of 4.4, categorizing the user sentiment within the satisfied range. This indicator reflects the users' approval of the application's operational efficiency and responsiveness. From an educational perspective, this highlights the importance of seamless functionality and fast response times in ensuring user satisfaction. For developers, it underscores the need for continuous optimization of the app's performance (Wang et al., 2023). With an average satisfaction level of 4.5 in the information domain, users have indicated a high level of contentment with the quality and relevance of information provided by the marketplace. This aspect educates users on the value of accurate and comprehensive product details in making informed purchasing decisions. For marketplace operators, it stresses the critical role of information management in user satisfaction and engagement.

The economy indicator, with an average satisfaction score of 4.3, reflects users' satisfaction with the economic aspects of the application, such as pricing and value for money. This outcome educates users on the importance of economic efficiency and cost-effectiveness in marketplace transactions. It also prompts developers to consider pricing strategies and economic value as pivotal factors in user retention and satisfaction (Yu & Ye, 2023). A satisfaction rating of 4.57 in the control domain indicates users' appreciation for the degree of control and customization options available within the application. This finding educates users on the significance of personalization and control in enhancing their online marketplace experience. It also guides developers to prioritize features that offer users control over their interactions with the application (Kephart et al., 2023).

The efficiency domain scored an average satisfaction level of 4.17, indicating satisfaction with the application's economic efficiency. This score educates users on the importance of time-saving and efficient processes within the marketplace. It highlights for developers the need to streamline transaction processes and enhance the overall efficiency of the marketplace (Yakymchuk et al., 2023). With an average satisfaction score of 4.4 in the services category, users have expressed satisfaction with the support and services provided by the marketplace. This outcome is educational for users, emphasizing the importance of reliable customer service and support. It also informs developers about the critical role of after-sales service in user satisfaction and loyalty (Zhao et al., 2023).

Table 2. Result of Indicator Recapitulation

Indicator	Mark
Performance	4.514285714
Information	4.514285714
Economy	4.3
Control	4.571428571
Efficiency	4.178571429
Service	4.4
Average	4.413095238

The average satisfaction level across all indicators stands at 4.41, placing user satisfaction within the satisfied category. This comprehensive analysis not only reflects the application's effectiveness in meeting users' expectations but also provides educational insights into the importance of performance, information quality, economic value, control, efficiency, and reliable services in digital marketplaces. For developers and operators of the sorghum entrepreneur marketplace, these insights are invaluable for guiding future improvements and for fostering an environment of continuous learning and adaptation. By understanding and acting on these indicators, the marketplace can enhance user satisfaction, encourage engagement, and support the educational growth of its users in digital commerce skills (Maniou, 2022).

4. Conclusion

This research enriches our understanding of digital market dynamics, especially in the context of agricultural entrepreneurship. This highlights the importance of continuous improvement and adaptation in digital platforms to effectively meet user expectations. The report emphasizes the role of these platforms in educating users both entrepreneurs and customers about efficient, economical, and satisfying ways to engage in digital commerce. However, beyond these practical considerations lies a deeper educational dimension. This study highlights the integral role of digital marketplaces like the sorghum entrepreneur marketplace in facilitating not only transactions, but also learning and skill development among users. By navigating the marketplace, both sorghum entrepreneurs and customers engage in a continuous learning process, increasing their digital literacy, understanding of e-commerce dynamics, and understanding of sustainable

farming practices. The sorghum entrepreneur marketplace has demonstrated significant potential in supporting sorghum entrepreneurs and providing a satisfying user experience. By focusing on areas that need improvement and continually seeking to understand and incorporate user feedback, marketplaces can evolve into more efficient, informative, and user-friendly platforms. This evolution will not only benefit users but also contribute to broader educational goals, namely increasing digital literacy and competence in the agricultural sector.

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