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Design of e-Marketplace for Village-owned Small, Micro and Medium Enterprise using Rapid Application DevelopmentRachmadita Andreswari^{1*}, Nia Ambarsari², Alvi Syahrina³, Warih Puspitasari⁴, Atik Novianti⁵, Irfan Darmawan⁶^{1, 2, 3, 4, 5, 6} Information Systems, School of Industrial and System Engineering, Telkom University
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ABSTRACT

Village-Owned Enterprises (BUM Desa) Pakis Sabilulungan is a business entity that houses small, micro and medium-sized businesses located in Mekarsari Village, Pasirjambu, Bandung, Indonesia. At present, BUM Desa Pakis has begun to pioneer several businesses including the production of snacks, coffee, crafts, and clothing. However, there are obstacles where marketing is still limited to one sub-district and income tends to stagnate. Therefore, we need an internet-based technology that is able to help marketing more broadly and more easily than the current situation. The proposed technology in BUM Desa Pakis is a web-based e-marketplace, where all business owners can sell goods on the same platform. In its development, the rapid application development method was used. This is because BUM Desa needs a description of the application that will be used before further development. The results of the e-Marketplace development on BUM Desa show that the marketing process can be carried out faster, payments can be made through bank transfers and delivery can be done through expeditions. This is significantly able to expand product marketing from Mekarsari Village.

1. Introduction

BUM Desa is referred to Village-Owned Enterprises that aims to accommodate Small, Micro, and Medium Enterprises (MSMEs) in a village managed by the local government. In Mekarsari Village, several MSMEs in the village are under development and supervision of BUM Desa Pakis Sabilulungan. Mekarsari Village is a village located in Pasirjambu District with a location in the highlands and close to the Nusantara Plantation area VIII and the Gambung Tea and Cinchona Research Center (PPTK). PPTK is the largest tea and cinchona research center in Southeast Asia [1]. This geographical location supports the development of MSMEs based on existing natural environment, such as tea and coffee. At present, Mekarsari Village has several MSMEs, including Samsam Chips, Gamboeng Water Bottled [2], and Bah Dusyie coffee. BUM Desa is currently pioneering MSMEs that manages food, drink, craft and fashion sales. The development of this village-owned business led to the need for a better management and sales system. Management is still manual and need to be improved, especially for procurement, operations, shipping, marketing, and services. Therefore, BUM Desa Pakis needs a system that can help to manage business processes and product marketing more broadly. The development of this system uses the rapid application development method. The advantages of this method are able to provide an overview of the system that was made before the implementation. The development of an e-marketplace platform for MSMEs in a BUMDes is an effort to support the Indonesian government in advancing the people's economy, and driving the micro, small and medium sectors to increase marketing and sales potential.

This e-marketplace is the first platform specifically developed in Indonesia to assist BUMDes in marketing their products with a wider range. This system is expected to be able to assist BUM Desa in managing the MSMEs that is underneath and be able to increase village income in the future.

2. Related Works

2.1 Rapid Application Development Software Development

Rapid Application Development (RAD) is an object oriented approach to system development which includes development methods [3]. RAD has several advantages such as relatively fast application development time, a focus on value that can be added value for the quality of software that is tailored to the needs of the user and the coding is done so that it can be reused [4]. This method is based on prototyping and iterative development without special planning involved. The software writing process itself involves the planning needed to develop the product [5a].

Prototyping is a development approach that is widely used in software or system development. The prototyping approach defines a list of initial user requirements, builds models, and refines based on consumer feedback. Prototyping can encourage application development to be more efficient. The prototyping development approach can help build, and then improve the product to meet end-user or market expectations [5].

In this approach, the developer does not immediately get the full set of user specifications at the start and does not develop them all at once. The developers actually developed a smaller, comprehensive, and simpler version. There are two prototype forms, the first contains only the new system components that are most attractive to consumers, and the second is a small-scale working model of the whole system. The role of the user is very important for prototype development. Users provide feedback and suggestions based on their experience after testing the prototype. The developer then utilizes user feedback to review the prototype and make input for prototype development into a product the user wants.

The strengths of the prototyping development approach include helping to clarify user requirements, helping verify the feasibility of the design, increasing the participation of genuine users, improving working relationships between developers and users, overcoming unclear issues properly, and producing parts of the final system. Meanwhile, some deficiencies encountered in this approach include, can encourage inadequate analysis, impractical for large numbers of users, users do not submit prototypes when the final system is complete, can cause confusion about whether the system is complete and manageable, and systems that are built quickly are usually of low quality.

2.2 Small and Medium Enterprise (MSME)

The Micro-Small and Medium Enterprises (MSMEs) are small-scale business entities when viewed from the value of their investments. MSMEs contribute significantly to the economy of a country by providing employment to a large number of unskilled and semi-skilled people, contributing to exports, increasing production in the manufacturing sector and expanding support to larger industries by supplying raw materials, basic goods, finished parts and components and so on [6].

Globalization and free trade are a big challenge for MSME today. MSME must be able to overcome the onslaught of imported products to be able to compete in the market. The existence of the internet has changed the paradigm of consumer behavior in shopping. The existence of social media and e-marketplace makes the world borderless. This situation can be an opportunity and challenge for MSME.

MSME has great potential but has not utilized its innovative and creative capacity because they have not utilized technology, especially e-marketing that uses digital advertising mechanisms such as blogs, social media, podcasts, and e-marketplaces to reach consumers [7]. According to research [7] it is mentioned that social media and social networks can produce the best strategies for targeting target consumers in Germany. Some of these best practices include being a marketing tool that offers competitive advantages, spreading information through viral-marketing in real time, enabling users to publish or share, facilitating users to influence other users, considering the advantages and disadvantages that cause uncertainty.

The development of MSME has also been analyzed using a dynamic system to determine the role of viral marketing in increasing brand awareness [8]. In that study it was found that the presence of viral marketing had a positive effect on the integration of online communities. Whereas traditional marketing has a positive effect on brand awareness, but has a negative effect on the level of purchases and online communities. This shows the necessary role of technology in marketing online, one of which is viral marketing. In addition, [9] conducted an internet marketing survey with the result that MSME owners did not really know how to do internet marketing, but the presence of online marketing was the most suitable way of advertising for MSMEs. This is because online marketing is able to target specific marketing targets, quickly get a response, sustainable, easily adjusted and usually cheaper.

The use of online marketing technology innovations can help MSME survive in running its business. MSME can utilize the potential of social networking as part of online marketing; because online customers are bigger than regular offline customers. In addition, the effect of online marketing through social media is stronger and more diverse because of its ability to reach customers regardless of geographical location [10].

2.3 Indonesian E-Marketplace

Indonesia currently has many online markets that are growing and developing. One of the most popular is Tokopedia, which is currently the first rank in the marketplace in Indonesia [11]. The rapid development of e-marketplaces in Indonesia has been able to encourage SMEs and MSMEs to market their products. However, for the products produced by BUM Desa currently they are not yet optimally marketed online through a platform. Based on research [12] several factors that influence the use of e-commerce in SMEs in Indonesia are the perceived benefits, technological readiness, innovation owners, and the ability of IT owners and the experience of IT voters. It can be concluded that a detailed explanation is needed about the benefits of e-commerce, the ability of users and the existence of technology capable of driving the adoption of e-commerce in Indonesia. In addition, the use of social media with large users in e-commerce will provide a clear market view of sales and increase user confidence [13].

2.4 State of the Art

The following is some related research regarding the development of online buying and selling facilities in the form of e-commerce and e-marketplace conducted at MSME (Table 1)

Table 1 – State of the Art

No	Title	Year	Author	Result(s)
1	Value Co-Creation Process in Small and Medium Enterprise by Utilization of Viral Marketing as a Branding Tool: A System Dynamic Approach	2014	Aulia Fadil	Viral marketing had a positive effect on the integration of online communities while traditional marketing has a positive effect on brand awareness [8].
2	Relative Advantage and Competitive Pressure towards Implementation of E-commerce: Overview of Small and Medium Enterprises (SMEs)	2016	Kit Yeng Sin, Abdullah Osman, Shahrul Nizam Salahuddin, Safizal Abdullah, Yi Jin Lim, Choon Ling Sim	There is a relationship between relative advantage and e-commerce adoption in Malaysia SME, there is a relationship between competitive pressure and e-commerce adoption in Malaysia SME [14].
3	Online Marketplace for Indonesian Micro Small and Medium Enterprises Based on Social Media	2013	Ahmad Anshorimuslim Syuhada, Windy Gambetta	Design of a system that can facilitate MSMEs to expand the marketing through the use of technology and to increase confidence in making decisions for buyers doing the transaction. This draft focuses only on the use of technology and forms of interaction in the marketplace. [13]
4	Understanding platform business models: A mixed methods study of marketplaces	2018	Karl Tauscher, Sven M. Laudien	There are six types of business models that can be clearly distinguished and show that there is no one-size approach for all markets and platforms in general. Two of them are well aligned with the characteristics of the business model related to the sharing economy [15].
5	A survey of internet marketing by small and medium-sized enterprises for placing wine on the market	2018	Nebojša Denic, Dalibor Petkovic, Vuk Vujovic, Boban Spasic, Igor Vujicic	MSME owners are not entirely familiar with the advantages of internet marketing. This is due to poor internet connectivity, they cannot often use this comparative advantage, even though they are aware of it [16].

6	Success Factors for Business Process Improvement Projects in Small and Medium Sized Enterprises – Empirical Evidence	2017	Patrick Lückmann, Carsten Feldmann	The most important issues in the business improvement process include project integration, project control and stakeholder management followed by risk management, HR management and organizational culture. The factors identified provide initial insights about what makes it possible to achieve the success of BPM projects in SMEs that they can undertake [17].
7	An Overview of Technological Innovation on SME Survival: A Conceptual Paper	2016	Nurulhasanah Abdul Rahman, Zulnadi Yaacob, Rafisah Mat Radzi	Explain the potential of social networking as part of online marketing; because online customers are bigger than regular offline customers. Social networks, computerized records, and online marketing are the main variables found to be significant for the survival of SMEs but empirical data is needed to prove this connection [18].
8	Best practice in the use of social networks marketing strategy as in SMEs	2014	Germán Aníbal Narváez Vásquez, Edgar Montalvo Escamilla	The findings show that Mexico has technological gaps in the use of new communication technology, marketing technology and advertising. The use of social networking as an additional tool of traditional marketing can offer a greater competitive advantage. Another big advantage is that it helps create publicity among those involved in the marketing of products of interest, allows the savings of most market research, influences consumer behavior through information word of mouth dissemination [9].

Based on the description of the state of the art in Table 1, it can be concluded that in general MSME owners have realized the need to sell goods and services online through e-commerce platforms and e-marketplaces, they also recognize the need for internet marketing. The existence of internet marketing is one of the cheaper ways compared to traditional marketing. There are also several business models in the development of e-marketplaces, from which the business models can be adapted to the needs of MSMEs, so that an e-marketplace model that is suitable with the design and conditions of MSMEs.

3. Methodology

This research was conducted in three phases. The first phase is initial user requirements. In this phase, the requirements of the system are defined in detail. The customer and developer together define all needs, and an outline of the system to be made.

The second phase is the rapid application development phase. In this phase, the initial design is built based on initial requirements. Then the system prototype is made to see the system work by the user. After the user uses the prototype system, the user gives feedback to the developer. Then the developer updates the system and rebuilds the prototype based on user feedback. This second phase takes place in a cycle repeatedly until the prototype system has reached the desired performance of the user. The final phase is the implementation and maintenance phase. At this stage, the final

system was release after undergoing a performance test. To keep the system working optimally, the system needs to be maintained.

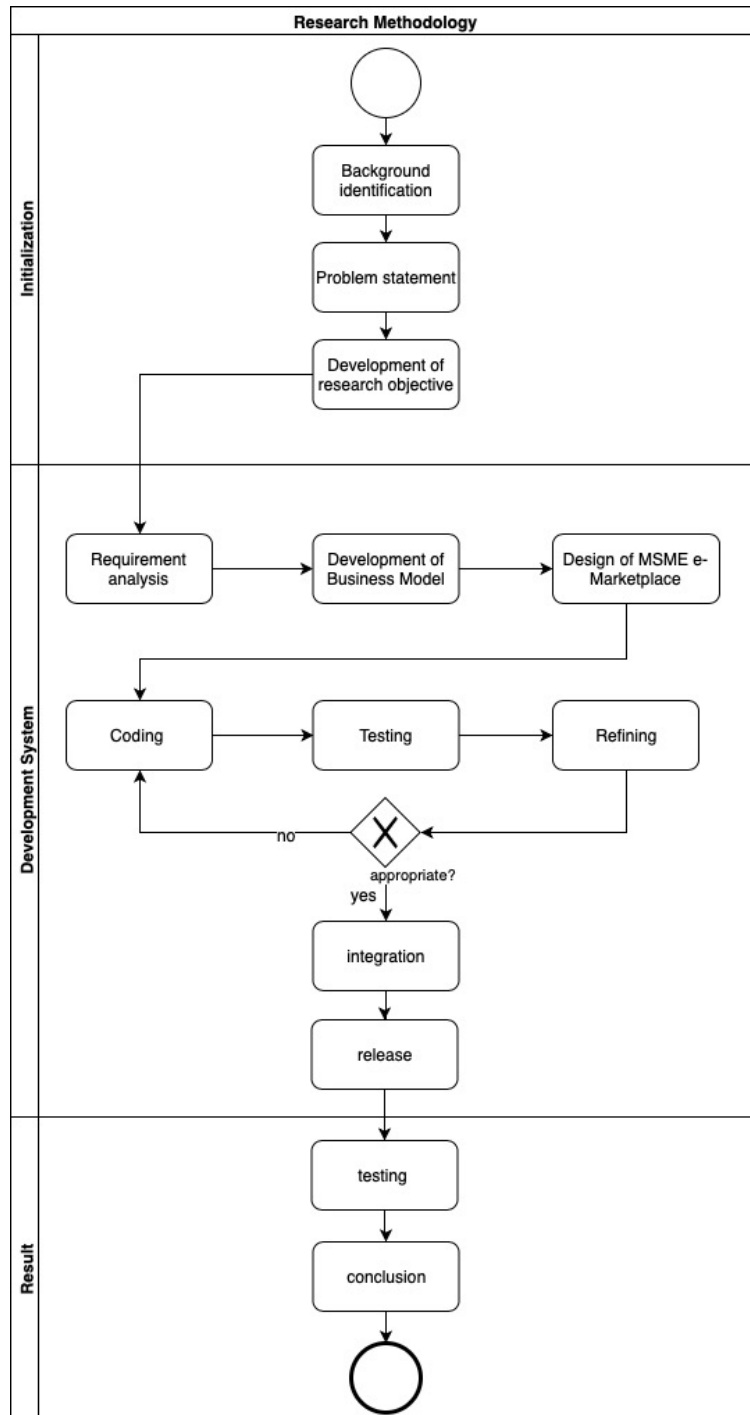


Fig. 1 – Research Methodology

4. Result and Discussion

4.1 Business Model Canvass of BUM Desa e-Marketplace

The results of this study are business models and website prototype designs that are able to handle the selling activities of MSME products. This e-marketplace is to market products from MSMEs in BUMDes based on research [15] are a type of business model product aficionados, where participants from e-marketplaces are B2C and C2C. In the business model the value proposition given is how to exchange information about certain unique products between

consumers in a community. Before an e-marketplace application is made to handle buying and selling in BUM Desa, a Business Model Canvass (BMC) design plan must first be made of the proposed application. BMC needs to be made as a design of a future business model in a structured way. The following is a BUM Desa e-marketplace business model based on the business model canvass:

- 1) Key Partner
 - Village MSMEs
 - Village Government
 - Expedition Company
 - Raw Material Supplier
- 2) Key Activity
 - Buying and selling through the website application.
 - Goods Shipping via expedition
 - Payment process from customer to BUM Desa and BUM Desa to MSME members
- 3) Value Proposition
 - Authentic goods from village MSME craftsmen
 - The goods are relatively cheaper because they originate directly from MSMEs, without going through distributors and other channels.
 - Can make purchases on a large scale
 - Can do to make purchases with special request (custom product)
- 4) Customer Relationship
 - Process standards in handling customer complaints
 - Ease of exchanging goods that have been purchased with certain terms.
- 5) Customer Segment
 - The consumer segment of this product is the public who need authentic products as souvenirs, for example coffee, tea chips and clothing / fashion.
- 6) Key Resource
 - Craftsmen from MSMEs BUM Desa
 - Management of BUM Desa
- 7) Distribution Chanel
 - Expedition
- 8) Cost Structure
 - Employee salary
 - Raw material
 - Packaging
 - Social media advertising
- 9) Revenue Stream
 - BUM Desa profit margin
 - MSMEs Registration

4.2 Use case Design of BUM Desa e-Marketplace

Furthermore, this website is designed for MSME owners to market their products online. The following is a use case design diagram for a built e-marketplace website.

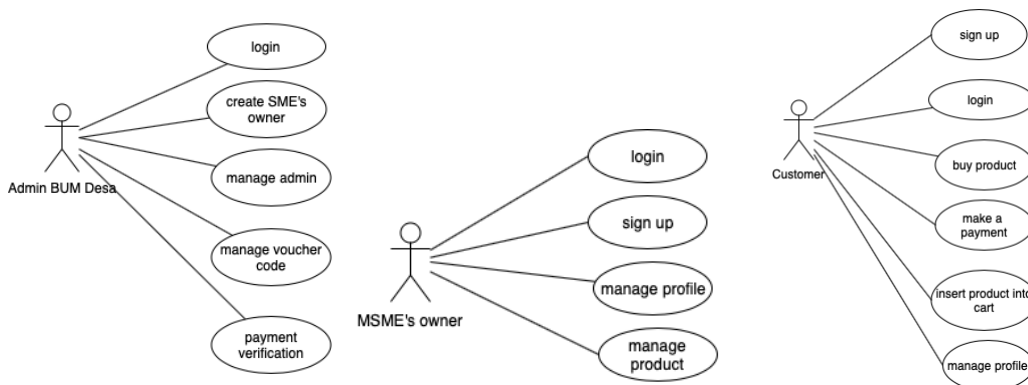


Fig. 2 - (a) Use case diagram for Admin BUM Desa; (b) Use case diagram for MSME owner; (c) Use case diagram for customer

In this e-marketplace application design there are three main actors namely website admin, MSME owner, and customer. Website Admin is the admin who is responsible for managing website operations. Web admin comes from BUM Desa employees. The authority owned by the website admin includes registering MSME owners, managing admins, managing vouchers and verifying transactions. MSME owners are users who have stores that sell goods on e-marketplace applications. The owner of MSME is under the management of BUM Desa. Their features are login, sign up, profile management and product management. Customer actors have features such as e-marketplaces in general such as login, sign up, buy products, payments, insert into carts, and manage profiles.

4.3 Prototype of BUM Desa e-Marketplace Website

The following are the prototype results from the BUM Desa online product e-marketplace website selling products. Figure 4-6 is an overview of some of the menus found in the gambungstore e-marketplace application. Figure 4 is the application user registration page, Figure 5 is the home page, and Figure 6 is a product detail sold by BUM Desa Pakis. The test results of the application are that the entire use case is able to run in accordance with the specified scenario. However, based on tests conducted on the research object, it was obtained feedback in the form of adding menus including, adding stock, adding categories, types of delivery and product description. Based on this feedback, the following are improvements made to the gambungstore e-marketplace application.

Fig. 3 – User registration

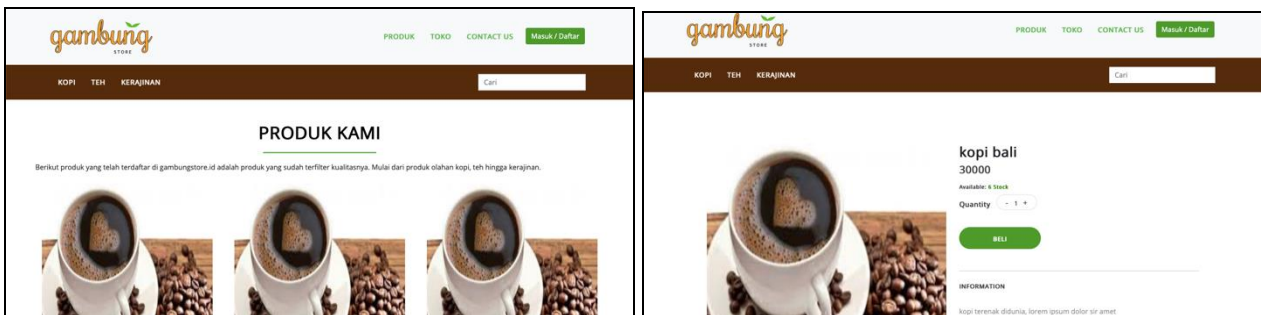


Fig. 4 - (a) BUM Desa product list page; (b) BUM Desa Product Details

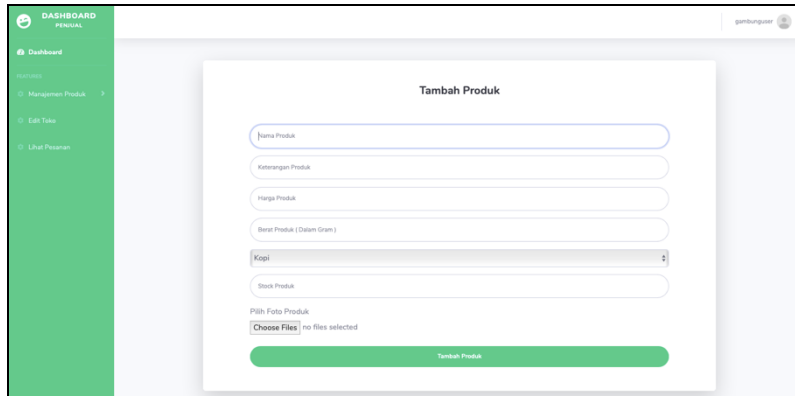


Fig. 5 - Product Added menu

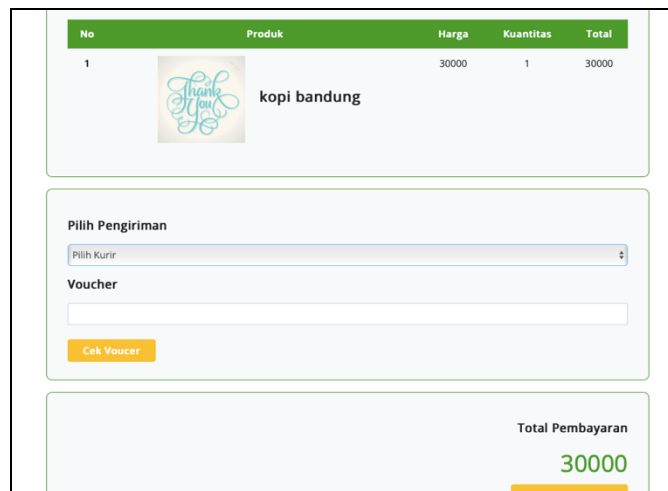


Fig. 7 – Select type of shipping menu

5. Conclusion

Based on the results of the application design based on the gambungstore e-marketplace website, it was found that the system was made capable of handling business-to-customer (B2C) buying and selling. The system bridges the business owners under the management of BUM Desa Pakis Sabilulungan with their buyers who come from various regions. The system developed using the prototyping method still needs to be developed with integration with social media. The integration is expected to increase the enthusiasm of BUM Desa product buyers. Further research of this study will be the development of mobile application and digital marketing strategy based on Search Engine Optimization (SEO). It is needed to provide user mobility in order to access application through mobile apps and find the website gambungstore on search engines fast and easily.

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