Original Research Paper

Kangean Island Marketplace Design and Development Using Hybrid Model

Andy Rachman[1*], Muchamad Kurniawan[1], Choirul Anam[2], Ricky Eka Putra[3], Ach. Khafid Salim[1], Sulistyowati[4], Nanang Fakhrur Rozi[1]

[1] *Teknik Informatika, Institut Teknologi Adhi Tama Surabaya. Surabaya, Indonesia.*

[2] *Desain Produk, Institut Teknologi Adhi Tama Surabaya. Surabaya, Indonesia.*

[3] *Teknik Informatika, Universitas Negeri Surabaya. Surabaya, Indonesia.*

[4] *Sistem Informasi, Institut Teknologi Adhi Tama Surabaya. Surabaya, Indonesia.*

Abstract: The use of the web as a promotional medium or as a media to help sales of a product is no longer a difficult thing. Currently the web is needed by anyone, from government offices, hospitals, schools, even to MSMEs in Indonesia. Marketplace is one form of application that can be used by users as a place for buying and selling community products or MSMEs. Kangean Marketplace is a place for buying and selling community products in Kangean, Madura, East Java, Indonesia. Palau Kangean is one of the islands in Sumenep Regency, Madura, East Java. Kangean Island itself is a small island that can be reached by boat transportation where the journey takes between 10 to 15 hours from Sumenep. Marketplace needs are needed by the Kangean community. The development of Kangean Marketplace utilizes the checklist method, Merapi Analysis Framework, and the Incremental Model. From the test results, it was found that the Kangean marketplace web application received an assessment of 80.08%, which means that the Kangean marketplace is suitable for use by the Kangean community.

Keywords: Kangean, Marketplace, Merapi Analysis Framework, UMKM, Web.

1. Introduction

Kangean Island is one of the islands in East Java, precisely in Sumenep Regency, Madura, East Java [1]. Kangean Island is an island with a high potential to be developed as a smart island, but the condition of Kangean Island is still in the development stage. The access to Kangean Island is still by the sea with a schedule unavailable daily. Technology is still low, and internet connection is still difficult for the public to obtain. Sumenep Regency has three sub-districts: Arjasa, Kangayan, and Sapeken [2] [3]. Arjasa District is a sub-district with better internet coverage than the other two sub-districts. In August 2022, in Arjasa District, Telkom was established as an Internet Service Provider (ISP) rather than First Media, Biznet, or MyRepublic.

The Kangean community has a consumptive lifestyle by utilizing information and communication technology where people carry out the buying and selling process online [4]. In 2018 the Kangean community entered a new phase where market participants, mostly millennial children, the buying and selling process no longer depended on traditional markets. However, they have started using various social media platforms such as Facebook or Instagram to market various products. Products marketed range from products for daily consumption to fashion and other needs. Marketing using Facebook so far has helped the process of selling various products in Kangean. But now, there have been a lot of complaints from the Kangean community about the Facebook platform, which sometimes can't display their products. It takes extra work so that the product can appear on the Facebook page. Of course, this problem must be immediately resolved so that trade in Kangean can continue to run well or even increase.

The Kangean island community's condition has inspired researchers to develop a marketplace called Kangean Marketplace. Existing data can be in the form of business information, product type, product price, and location of the business seller. The application can also store all customer transaction information and all current product purchase transaction information and focus more on the speed of delivery of goods.

2. Literature Review

2.1. Web Based Application

Web-based applications do not need to be installed or compiled on a device. This application can provide a new experience for users, such as running applications in a web browser [5]. The advantages of web-based applications include development that is not difficult and easy to access without being limited by space and time. The downside is that not all web browsers can be used optimally.

2.2. Marketplace

The marketplace is an internet-based (web-based) market as a place for business people to market their products online. Through this marketplace, consumers can easily find various kinds of goods they want from existing online stores [6].

2.3. Incremental

Incremental is one of the software development models. Incremental is a development model of the waterfall model. The incremental model consists of several of the same activities and is carried out repeatedly. Five activities are carried out repeatedly from the incremental model, namely Requirements (Requirements Engineering), Design (Design), Coding (Programming), Testing (Testing), and Implementation (Implementation) [7].

2.4. PHP

PHP is a script-type programming language. This script means that the PHP language must be run first in a browser to get the results. Hypertext Preprocessor is another word for PHP. PHP is server-side [8], PHP is added to the HTML language (Hypertext Markup Language) [9]. PHP is open-source software that users can use freely without fear of being charged [10].

2.5. MariaDB

Since the acquisition of MySQL by Oracle in September 2010, Program, as the initial author of the MySQL source code has separated itself from development and created a more independent version, namely MariaDB. MariaDB is an open and self-contained development version of MySQL [11]. MariaDB is an implementation of a relational database management system (RDBMS) which is distributed free of charge under the GPL (General Public License) [12].

2.6. Codeigniter
Codeigniter is an open-source web-based implementation in the form of a PHP framework using the model, view, controller (MVC) concept to create a website that moves forward using the PHP programming language. Codeigniter helps developers create web applications more easily and quickly than pre-built [13].

2.7 ISO 9126-3
ISO 9126 is one of the international standard frameworks used to test software quality, created by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). International standards can determine the quality of software products, conditions, models, and related metrics to test and determine the quality of software products [14]. In its development, ISO 9126 underwent four improvements, ISO 9126-1, ISO 9126-2, ISO 9126-3, and ISO 9126-4. In this study, the ISO 9126 used is ISO 9126-3. In ISO 9126-3, six factors are assessed, namely Functionality, Reliability, Usability, Efficiency, Maintainability, and Portability [7].

Figure 1. ISO 9126-3 Factor and Sub-Factor for Evaluation Software

2.8. Skala Likert
The Likert scale is a measurement scale that Likert successfully developed. The Likert scale has four or more questions combined to create a score/value that displays individual traits, for example, knowledge, attitudes, and behavior. A composite score, generally the sum or average, of all questions during the data analysis process can be used [15]. The Likert scale uses opinions, attitudes, and perceptions of events or social conditions; variables are translated into indicators and used as benchmarks for compiling statement items.

2.9. Cheklist
A checklist technique is a technique used to ensure whether a job has been done or not. Rodhotul Islamiah et al., in their research, used the checklist technique to assess child development at Raudhatul Athfal (RA) or early childhood education level. With this technique, researchers can discover the child's development and abilities daily [16]. Alawiyah et al. detected and checked the motor development of toddlers in Tangsi Agung Village, South Oku Regency. Researchers can use the checklist technique to identify and control toddler motors [17].

2.10. Merapi Analysis Framework
Merapi Analysis Framework (MAF) is a method to determine whether a research idea can be implemented or not. There are four activities in the Merapi Analysis Framework, namely Idea Generation (Idea Determination), Idea Validation (Idea Validation), Literature Study (Study Literature), and Survey (Survey). In their research, Andy Rachman and Siti Rochimah use the Merapi Analysis Framework to ensure whether application development can be implemented or not [18]. Andy Rachman et al. have also used the Merapi Analysis Framework to develop an application for the mathematics education game 'Momon Math Run.' In this study, researchers used the Merapi Analysis Framework to ascertain the application development idea and the waterfall model for application development.
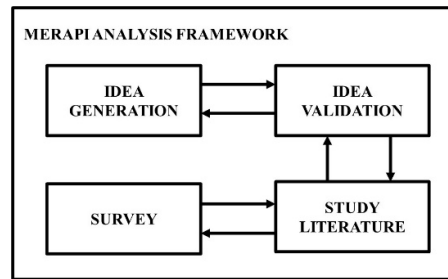
Figure 2. Merapi Analysis Framework For Ensure Research Plan

3. Research Method

In this study, researchers used a hybrid method to complete research activities. The hybrid method in question is the Checklist, Merapi Analysis Framework, and Incremental Model.
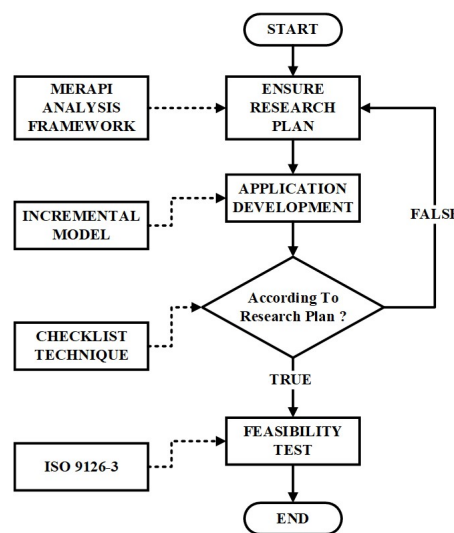

Figure 3. Research Methodogy for Kangean Marketplace

3.1. Ensure Research Plan

The first action taken by the researcher is to confirm the research plan. The researcher uses the Merapi Analysis Framework to ensure that the research plan can be implemented. To ensure this, the researchers planned a three-month study. Researchers carried out Idea Generation by conducting interviews with the team on Kangean Island. The team in Kangean told researchers about the conditions in Kangean, where it is very difficult to buy goods online, and even if there are very expensive shipping costs, they must be sent by sea.

Table 1. Instrumentation for Idea Validation

NO	QUESTIONS
Q1	Where is your region?
Q2	What are the conditions in your region?
Q3	What are the transportation conditions in your region?
Q4	Do people have smartphones
Q5	What's the signal condition there?
Q6	What mobile cards can be used on Kangean Island?

From the team's words on Kangean Island, the researchers determined the research topic was creating a marketplace for Kangean Island. The second step is Idea Validation, where the researcher continues the interview with the team on Kangean Island. The questions as shown in table 1.

The third step taken by the researcher was to conduct a literature study. The researcher read books, web news, and research related to Kangean Island. From this third step, the researchers received information that Kangean Island is a very difficult area because transportation conditions only use ships and ships docked not every day depending on sea conditions, but can still be reached by researchers. There is also very little research focused on Kangean. The fourth step is the Survey. In this section, the Survey is represented by a team in the Kangean area and conducts an online conference.

3.2. Application Development

In developing the application, the researcher uses the Incremental model. The author did the first incremental by focusing on developing features for customers where the customer feature has four features, namely browsing, changing profiles, transactions, and payment confirmations. In the second Incremental, researchers focused on developing the tread feature. The Sellers feature has five capabilities: changing profiles, managing products, managing orders, managing bank accounts, and managing finances. In the third incremental, the researcher focuses on administrator features. The administrator feature has nine functions: changing profile, managing administrator, managing customers, managing sellers, managing products, managing product categories, managing orders, managing bank accounts, and managing finances.
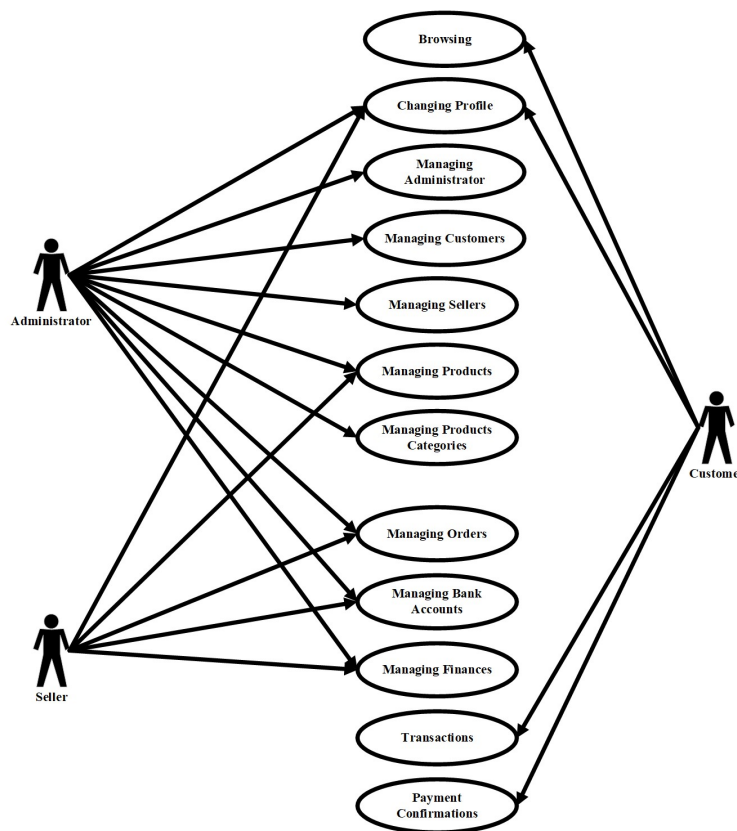

Figure 4. Kangean Marketplace App Features

3.3. Checklist Technique

The researcher's action after developing the application is to ensure that all work has been completed. To ensure this, the researcher used a checklist technique. The list of checklists in application development can be seen in Table 2.

Table 2. Instrumentation for Checklist Technique

NO	QUESTIONS	YES	NO
Q1	Has Merapi Analysis Framework been implemented?	☐	☐
Q2	Has the Site Survey been carried out?	☐	☐
Q3	Has the interview been conducted?	☐	☐
Q4	Has a literature study been carried out?	☐	☐
Q5	Has Requirements Engineering been implemented?	☐	☐
Q6	Has application Design been implemented?	☐	☐
Q7	Has the application program been made?	☐	☐
Q8	Has the Blackbox test been carried out?	☐	☐
Q9	Has the implementation of phase 1 been carried out?	☐	☐
Q10	Has the implementation of phase 2 been implemented?	☐	☐
Q11	Has the implementation of phase 3 been implemented?	☐	☐
Q12	Has the Application Feasibility Test Assessment Data been prepared?	☐	☐
Q13	Has the Application Feasibility Test been carried out?	☐	☐
Q14	Has Application Feasibility Analysis been carried out?	☐	☐

This technique helps the researcher determine the work to be carried out by the researcher and the team. If activities have not been carried out or the results have not been perfect, the researchers and the team will do rework or repairs.

3.4. Feasibility Test
Researchers carry out the application feasibility test after all application development activities are completed, and the application is implemented to the public. Researchers carry out the application feasibility test by surveying the head of the Seller, Customer, and Team of Experts (programmers). The feasibility test in question is that researchers use the Usability factor in ISO 9126-3 where this factor has five assessment attributes: understandability, learnability, operability, attractiveness, and usability compliance.

4. Result and Disccussion
The result of this research is creating a web-based Kangean Marketplace application. This application was developed using a combination of three methods: the Merapi Analysis Framework as a validation of research ideas, the Checklist Technique to ensure activities' implementation runs well and correctly, and the Incremental model as an application development model.

Figure 5. Kangean Marketplace Order Menu

Researchers carried out the application feasibility test by giving five questions from the usability factor of ISO 9126-3. The data for the question is shown in Table 3.

Table 3. Instrumentation for Feasibility Test Usability

NO	QUESTIONS	RESULT (%)
Q1	Is the system made easy for users to understand?	81.2%
Q2	Is the system created to make it easier for new users to interact with the system?	76.4%
Q3	Is the system made already operating properly?	78.4%
Q4	Is the calculation of the order made already operating properly?	76%
Q5	Is the system created useful for users?	88.4%
	AVERAGE=	80.08%

From the assessment results from Sellers, Customers, and the Expert Team, an average result of 80.08% is obtained, which means that the Kangean Marketplace is useful for the Kangean community and is worthy of being used as an online buying and selling medium.

5. Conclusion

Humans are social creatures who have short memories. Based on the research results, using the Merapi Analysis Framework as a validation for determining ideas can be very useful and can be implemented by other researchers. The Checklist technique used by the researcher turned out to be very helpful for researchers in ensuring the work that has been done and has not been done. The incremental model researchers could help researchers focus on developing applications. Using the Likert Scale as a quantitative data management tool is very helpful for researchers, and ISO 9126-3, especially the usability factor, is very certain to know the usefulness of the Kangean Marketplace application developed by the researcher.

Acknowledgement

References

[1] Alifah, "Kontribusi Data Baru Pulau-Pulau kecil Perairan Utara Jawa Dalam Arkeologi Prasejarah Indonesia," Jurnal Walennae, vol.18, no. 2, pp 65-72, November 202065–71, 2015.

[2] K. Indahsari and A. Farid, "Distribution Channel Patterns and the Actor welfare of Marine Fishery Supply Chain in Arjasa, Kangayan and Sapeken in Kangean Island," Jurnal Ekonomi Pembangunan, vol. 21, no. 1, 2020.

[3] Nurwidodo, A. Rahardjanto, Husamah, As'odo and A. Mufrihah, "Potensi, kendala dan strategi pengembangan budidaya rumput laut berbasis kolaborasi di Daerah Kepulauan Sapeken, Kabupaten Sumenep," 2021. [Online]. Available: https//research-report.umm.ac.id/index.php/ [Accessed: Feb. 3, 2022].

[4] J. Sadik, *Karakteristik Wilayah Kepulauan Kabupaten Sumenep*. Madura: CV. Diapora, 2012.

[5] D. Bourgeois and D. T. Bourgeois, "Information System for busisness and beyond", 2020. [Online]. Available: https://pressbooks.pub/bus206/chapter/chapter-3-information-systems-software/ [Accessed: Feb. 19, 2022].

[6] B. Lutkevich, "Tech Accelerator: E-Commerse", 2022. [Online]. Available: https://www.techtarget.com/ searchcio/definition/e-commerce. [Accessed: Feb. 6, 2022].

[7]   Anonymous, "A, Incremental Model, Java T Point," 2021. [Online]. Available: https://www.javatpoint.com /software-engineering-incremental-model. [Accessed: Jan. 28, 2022].

[8]   Anonymous, "A, PHP, quizlet.com," 2021. [Online]. Available: https://quizlet.com/578318674/php-flash-cards/. [Accessed: Feb. 3, 2022].

[9]   A. Khan, "Getting Started with PHP Programing," cloudways.com, December. 8, 2021 [Online] Available: https://www.cloudways.com/blog/how-to-start-with-php/. [Accessed: Feb. 3, 2022].

[10]   Anonymous, "A, PHP Vs JavaScript: When to Use" Code Institute.net," 2019. [Online]. Available: https://codeinstitute.net/global/blog/php-vs-javascript/. [Accessed: Feb. 3, 2022].

[11]   Anonymous, "A, The History and Future of MySQL, Matob.web.id," 2021. [Online]. Available: https://matob.web.id/random/programming/the-history-and-the-future-of-mysql/.   [Accessed: Feb. 11, 2022].

[12]   E. Herman, "About MariaDB Server," 2021. [Online]. Available: https://mariadb.org/about/, [Accessed: Feb. 11, 2022].

[13]   M. Fikri, "Codeigniter Tutorial for Beginner, July 31, 2018. [Online]. Available: https://mfikri.com/en/blog/codeigniter-tutorial. [Accessed: Feb. 17, 2022].

[14]   Anonymous, "A. ISO/IEC TR 9126-3: 2003," 2023. [Online]. Available: https://www.iso.org/standard/22891.html. [Accessed: Feb. 19, 2022].

[15]   S. Mcleod, "Likert ScaleDefinition, Examples an Analysis," Simply Psychology, 2021. [Online]: https://www.simplypsychology.org/likert-scale.html. [Accessed: Feb. 19, 2022].

[16]   Grafiati, "Early Childhood Education Programe (Kenya)," 2 February 2022. [Online]. Available: https://www.grafiati.com/en/literature-selections/early-childhood-education-programme-kenya/journal/. [Accessed: Feb. 19, 2022].

[17]   N. Alawiyah and N. Attamim, "The Development of fine Motor and Visual Motor Skills of Children 4-5 Yaers Old to Get Ready write, JECIES, vol. 1, no. 1, 2020.

[18]   A. Rachman and S. Rochimah, "Merapi Analysis Framework: Ideas Validation of Aplication Development in the Industrial Age 5.0," Novateur Publication, 2022. [Online]. Available: https://novateurpublication.com/index.php/np/catalog/download/49/37/646-1?inline=1. [Accessed: Feb. 19, 2022].