

Development of “Trashmart” Application for Used Materials Marketplace Based on Android

Raoul Vendreo Achdiyat^{1}, Dewa Ayu Defina Audrey Nathania^{2†}, and Brilly Andro Makalew^{1‡}*

¹Mobile Application & Technology Program, Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11480

²Computer Science Department, BINUS Graduate Program - Master of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11480

Abstract. The goal of this research is to design an Android-based application to facilitate the sale and purchase of secondhand construction materials. This thesis' research methodology consists of two components: data collection and design. Using questionnaire evaluation, the literature review procedure, and analysis of similar apps, data was obtained. The design was modified using the waterfall methodology, and the Unified Modeling Language (UML) diagram was implemented. The evaluation is conducted in two ways: questionnaire evaluations and comparisons with similar applications. Those in search of used materials that correspond to their measurements and application preferences can benefit from the results that can be obtained.

1 Introduction

Due to the rapid growth of technology over the past ten years, the evolution of smartphones is accelerating. The emergence of smartphones is typically associated with giving users the potential to increase productivity through innovation [1]. The trade sector is one of the business industries that has witnessed this evolutionary acceleration. In recent years, online commerce, or e-commerce, has risen fast, and smartphones have become one of the most important components in purchasing and selling items, offering services, etc. More than one-third of all B2C (business-to-consumer) e-commerce transactions are conducted through smartphone applications [2].

In the world of trade, all products—including used ones—must have a unique selling proposition. As an illustration, use pine wood waste. The used pine that is now being wasted has a low selling value and is challenging to market. Yet, creative artists are interested in using this garbage to generate new interior design materials[3]. Regrettably, SMEs that are having trouble in the market lack the medium to sell.

The challenges of the need for used materials and the capabilities of e-commerce that are readily available on smartphones can be solved by combining them in the form of an Android-based e-commerce application that specializes in selling used materials[4]. This can surely make it easier for enthusiasts of used materials to locate objects for reuse as well as for owners of used materials to prevent waste.

The objective of developing this application is to provide a venue for buyers to locate the needed used items and a method for sellers to market their own used goods. The TrashMart application can also facilitate the transaction process between sellers and purchasers. As the number of online transactions for used products increases, it is anticipated that fewer used goods will be discarded, thereby contributing to environmental protection. The sellers interested in making this program a platform for selling their items submit images of the used goods they wish to sell along with the commodities themselves so that potential purchasers may view them. On the other hand, the application's users can search for the used products they wish to purchase and select the item up until the checkout step. If the application is successfully implemented, the surrounding environment will benefit. as well as lowering environmental contamination by minimizing the waste of used items and promoting the recycling of used goods.

2 Method

This topic mentioned the waterfall process model, a method that operates progressively and systematically, as its study methodology. This approach includes numerous components, such as the requirements collection and analysis segment, whose purpose is to distribute and evaluate comparable applications. The purpose of these exercises was to identify the challenges encountered and the community's requirements for the application to be created. Next is the system design

* Corresponding author: raoul.achdiyat@binus.ac.id

† Corresponding author : dewa.nathania@binus.ac.id

‡ Corresponding author : bmakalew@binus.edu

section, which consists of designing applications using a variety of diagrams, including use case diagrams, activity diagrams, sequence diagrams, and class diagrams. In addition, there is an implementation process, which entails the creation of applications based on the outcomes of application design work.

3 Data Collection

3.1 Data Collection

The author distributes questionnaires for data collection in order to determine the interest of the public in this application. The results of this survey will also be utilized as a guide for the development of the TrashMart application. 52 respondents have provided the following responses:

Table 1. Result of the Survey

Description	Number of People	Percentage
Total	52	100%
Age		
<17	3	5,8%
17 – 25	31	59,6%
26 – 32	15	28,8%
33 – 45	1	1,9%
>45	2	3,8%
Operation System		
Android	44	84,6%
iOS	8	15,4%
Bought building materials		
Yes	49	94,2%
No	3	5,8%
Leaving some materials		
Yes	42	80,8%
No	10	19,2%
Unused materials still usable		
Yes	41	78,8%
No	11	21,2%
Interested in profiting unused materials		
Yes	50	96,2%
No	2	3,8%
Wanted to buy materials in small quantities		
Yes	40	76,9%
No	12	23,1%
Use e-commerce		
Yes	40	76,9%
No	12	23,1%

Based on the 52 survey responses as seen in Table 1, 59,6% of the total users of the most popular application are between the ages of 17 and 25, followed by the age bracket of 26–32 years with 28,8% and the age bracket

of 17 years with 5,8%. It may be concluded that young males and adults use this application the most (17–25 years old). With 84,6% of all users, Android was the most popular operating system, followed by iOS with 15,5%. From the acquired data, it can be determined that it is preferable to design applications for the Android operating system; however, in light of the success of TrashMart, an IOS design will be created. The majority of households, 94,2%, have purchased building supplies in their daily lives, whereas 5,8% have never done so. The TrashMart program can use this information to provide potential buyers and sellers with purchasing and selling options for construction materials. The majority of those who possess materials do not use them up. Eighty-eight percent of all poll respondents responded in the affirmative, and 19,2 percent acknowledged consuming all of the materials they purchased. According to the data gathered, individuals frequently purchase products from houses with surplus. Seventy-eight percent of poll respondents believe that the discarded materials still have economic value, whereas twenty-one percent believe that these resources cannot be reused. The above-mentioned survey results indicate there is an opportunity to facilitate the resale of these surplus materials. The majority of people would rather resell their resources or used things than dispose of them. The 96,2% survey response rate demonstrates this. As a result of the data, the author is aware that there are potential sellers who can be persuaded to utilize the TrashMart application. 76% were interested in purchasing these items in small quantities, whereas 23% were not. Based on the collected data, it may be determined that a market exists for trading these used resources. 78% of consumers have utilized e-commerce applications, whereas 21,2% have never done so. According to the aforementioned data, e-commerce users have substantial experience.

3.2 Main Question

The purpose of this question is to determine if there is any interest in people utilizing e-commerce applications to sell used products, which will subsequently be implemented in the TrashMart program.

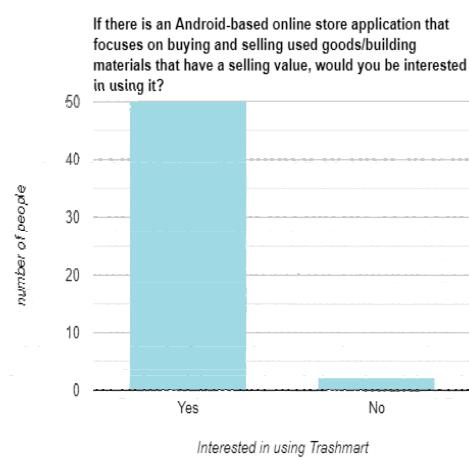


Fig. 1. Number of potential Trashmart customers.

Table 2. Number of Potential Trashmart Customers

Interest in using Trashmart	Number of People	Percentage
Yes	50	96,2%
No	2	3,8%

Based on the table 2. majority of poll respondents, 96.2%, are interested in trying an application similar to TrashMart, while 3.8% are not. Based on the aforementioned information, it is possible to deduce that the TrashMart program might be used to purchase and sell used goods through e-commerce.

Table 3. Most Interesting Application Features

Features	Number of People	Percentage
Application loading speed	42	29,8%
Easy to use	49	34,8%
Use small storage space	38	27,0%
Attractive interface design	7	5,0%
Use small memory	1	0,7%
Item reliability	2	1,4%
Lots pf promos	2	1,4%

The majority of the 52 respondents who voted believed that the program possessed three primary characteristics: ease of use, application loading speed, and little storage space usage. The author knows that the TrashMart program has the potential to be used to purchase and sell used goods via e-commerce by implementing the three primary characteristics described above.

4 Result and Discussion

4.1 Proposed Feature

TrashMart is a marketplace application for wasted or leftover construction materials. TrashMart makes it easier for owners of discarded or surplus building materials to generate revenue from these goods. Also, TrashMart makes it easier for potential purchasers to locate the desired excess material. Accounts registered as sellers can submit items and descriptions of items they wish to sell and will receive a notification when their goods are purchased. If the transaction has been confirmed by the admin account, the seller's account can also update the order status to finish the order process.

Accounts registered as purchasers can explore and add things to their carts before uploading proof of payment using the application to finalize the transaction. Also, buyers will be informed of the order status of the things they purchased via the application.

Developers utilize the admin account as a manager account to configure and monitor the application's functioning, from monitoring items and orders to user accounts, so that the application continues to function as expected.

4.2 System Design

4.2.1 Use Case Diagram

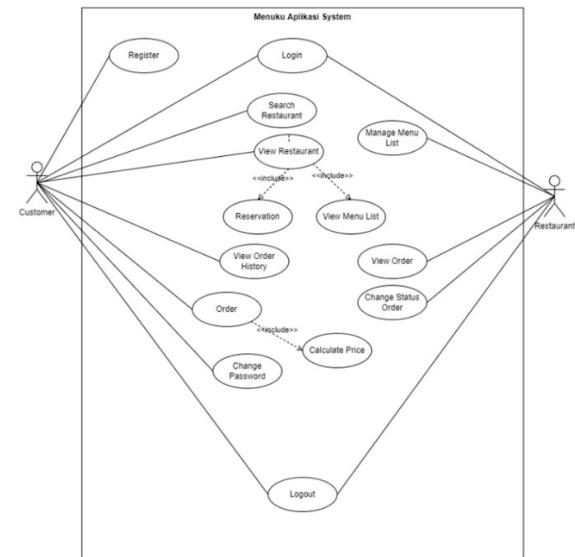


Fig. 2. Use Case Diagram

To use TrashMart further, users log in after completing the registration process to create an account. Users can alter their bio data, which includes their profile photo, name, phone number, and home address, in the edit profile section. By typing the desired item's name into the search area, users can find it. They then add the item to their shopping cart and confirm their purchase and payment on the search and filter pages. The user can then upload evidence of a transfer to confirm payment for the ordered products. Users can add, delete, and modify information about products that are being advertised on the Manage Product menu. After completing their use of the application, the user can log out.

4.2.2 Activity Diagram Purchase Product (Buyer Only)

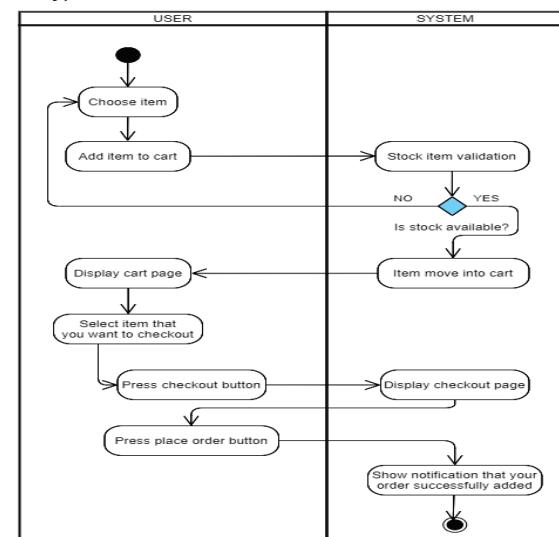


Fig. 3. Activity Diagram Purchase Product (Buyer Only)

4.2.3 Activity Diagram Manage Product (Seller Only)

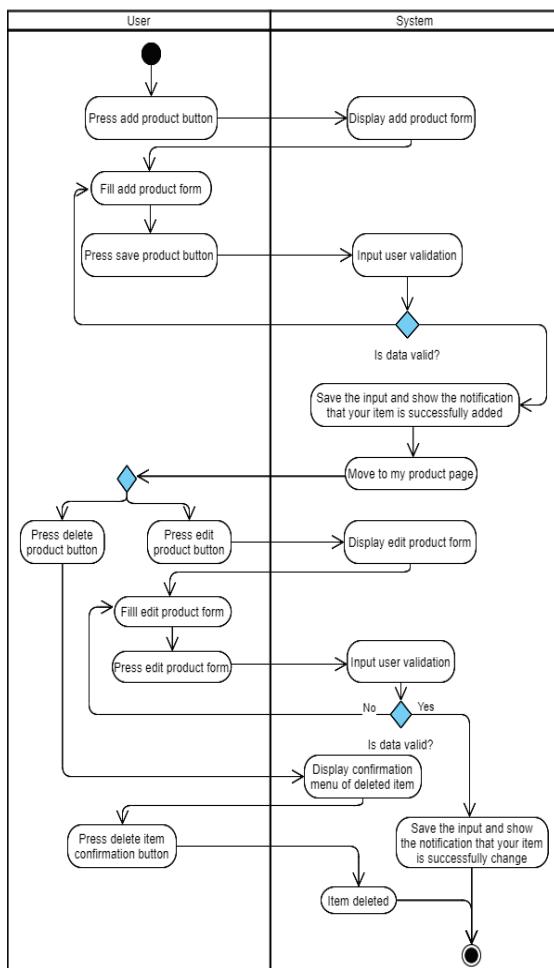


Fig. 4. Activity Diagram Manage Product (Seller Only)

4.2.4 Activity Diagram Manage Sale Order (Seller Only)

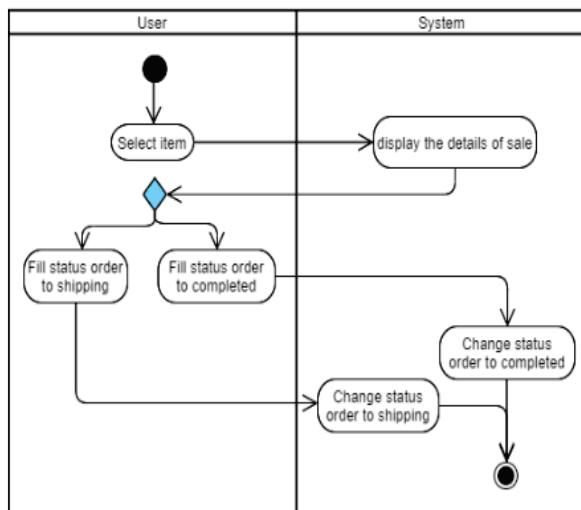


Fig. 5. Activity Diagram Manage Sale Order (Seller Only)

5 Conclusion

Smartphones have become one of the most important variables for purchasing and selling items, delivering services, conducting transactions, and other activities in recent years. Even the goods of the U.S. defender must have a monetary value in the global marketplace. Sadly, SMEs operating in this area do not have the media to sell.

According to the questionnaires that have been conducted, there are several individuals who have purchased building supplies that have not been utilized, and the remainder of these building materials still have resale value. Several responders are also interested in making a profit from their leftover building materials. They are interested in e-commerce platforms that offer second-hand goods, notably used building supplies. In order to address the respondents' issues, the author proposed the design of the TrashMart application, an e-commerce application that concentrates on the sale of discarded building materials. TrashMart has three advantages: it is simple to use, apps load quickly, and it requires little storage space.

References

- [1] M. Coccia, "Functionality development of product innovation: An empirical analysis of the technological trajectories of smartphone," *Journal of Economics Library*, vol. 5, no. 3, pp. 241-258, 2018.
- [2] "Mobile Commerce at its Tipping Point: Criteo Research Reveals Mobile Dominates Path to Purchase Through Holidays and Beyond," Criteo, 2016. [Online]. Available: <https://www.criteo.com/insights/mobile-commerce-tipping-point/>.
- [3] M. Putri, A. Santosa, and JF, "Perancangan Modular Panel dengan Memanfaatkan Limbah Kayu Pinus Bekas," *Jurnal Intra*, vol. 6, no.2, pp. 116-125,2018.
- [4] A. Capponi, et al., "A survey on mobile crowdsensing systems: Challenges, solutions, and opportunities," *IEEE Communications Surveys & Tutorials*, vol. 21, no. 3, pp. 2419-2465, 2019.