

Business Development Using the Implementation of the Bina System Application by Empowering Website-Based Waste Management

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Abstract– Waste management is an activity that has many benefits. One of them can make money if people are smart in managing and disposing of waste properly. Lack of concern for environmental cleanliness can have an impact on the increasing accumulation of waste which can result in environmental pollution and disease which has an impact on public health. Therefore, this research was carried out to provide alternative solutions for the community, so that people can easily manage and dispose of waste properly and instill the habit of sorting waste. This was achieved through designing and developing a web-based waste management application called Bina for residents around the Darunnajah Islamic boarding school. The research was carried out using data collection methods and system design based on existing systems. The application was successfully developed and resulted in a website-based application system that is easily accessible to the public. It is hoped that this application was developed to be able to develop a waste management empowering business, where the website is the supporting tool. Making this application is a solution to help residents manage and distribute waste that has been sorted according to its management group so that it is ready to be distributed or recycled.

Keywords: Business; Development; System; Waste Management, Website

1. INTRODUCTION

The current development of globalization influences people's consumption of solid materials which ultimately produces large amounts of solid waste and one of our efforts to overcome the waste problem is with a waste management empowerment program (Dharma et al. 2023).

This can be used as education for the public in processing waste wisely and to raise awareness among the public about waste, so that the amount of waste taken to the final waste collection site will decrease or be reduced (Nugroho et al., 2020). The most possible way is to utilize information technology in the form of a website application that can be accessed via smartphone (Sauda & Agustini, 2020).

This waste problem cannot be ignored because it can be a source of problems such as flooding, land pollution, air pollution, and can be a source of diseases such as dengue fever. Therefore, this waste management problem must really be addressed and improved (Rachman et al. 2020). The increasing population can affect the production of waste materials. The greater the population, the greater the waste produced, but the quantity of waste transported will not increase (Ariadi & Tashid., 2019).

With this information system, it will be easier to obtain information such as monitoring to provide capacity volume levels in trash cans, organic or non-organic waste that has been collected and can minimize the accumulation of waste which can cause unpleasant odors around the house (Anwar et al., 2020) . As part of the community whose participation is expected to support the Government in dealing with waste problems, the author came up with an idea to build a system that could help related parties in monitoring the condition of waste generation (Chandra et al. 2020).

Information technology is a technology that is currently developing rapidly (Panggabean et al., 2023). With advances in information technology, access to data or information can take place quickly, efficiently and accurately (Pamungkas et al., 2020). This system displays information regarding empowering waste management to the community using website media, which can help community members who collect waste in the surrounding environment by utilizing current technology (Budiarto & Dedi, 2020).

This web-based application can also be used by the public in cases of complaints about waste accumulation (Karisma et al. 2020). The results can be resold through the Bina system. So this system is expected to increase public awareness of the environment and improve the community's economy while strengthening relations between residents around Ulujami (Ramdhan et al., 2019).

Empowerment in waste management is realized as an initiative to foster interest in participation accompanied by reciprocity, where there will be reciprocal consequences (Nurdiansah et al., 2020).

This research aims to plan and develop a waste management application that can be accessed via a web platform (Prasetyo & Aji, 2023). Waste that has economic value is the initial key to changing people's perceptions about waste. The economic value of waste makes people care and realize the importance of dealing with waste problems (Fitriana et al., 2021).

Waste requires more serious management and handling to create a safe and healthy environment (Ginting et al., 2019). From the existing problems, the author created a website application system that can be used to solve existing problems (Wardhana et al., 2019).

Waste is the starting point for building public awareness to start sorting, recycling and utilizing waste, because waste has quite good selling value, so that environmentally sound waste management becomes a new Indonesian culture (Al Amin et al., 2020).

Utilizing web-based applications for waste infrastructure management can make it easier to calculate procurement, maintenance and repairs in waste management infrastructure management (Prasetyo et al., 2022). Apart from that, it also provides guidance to the community to sort, select and process existing waste into products that are useful and have sales value so that they can help improve the economy of local residents (Sansprayada & Mariskhana, 2020).

2. RESEARCH METHODOLOGY

In Business Development Using the Implementation of the Bina System Application with Website-Based Waste Management Empowerment, research was carried out consisting of several research stages as in Figure 1.

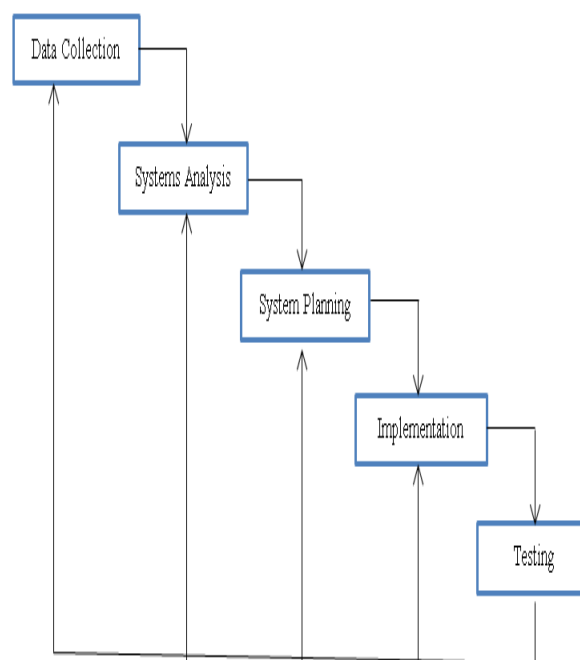


Figure 1. Research Stages

Figure 1 is the research flow used in Business Development Using the Implementation of the Bina System Application with Website-Based Waste Management Empowerment with the following details.

2.1 Data Collection

In this research process complete information or data is needed, the stages carried out are as follows:

a. Observation

Observations were carried out directly at the waste management empowerment location at the Darunnajah Islamic boarding school with the aim of obtaining clear data regarding the geographical location and surrounding conditions.

b. Interview

The method used included asking and answering directly to the head of waste management empowerment at the Darunnajah Islamic Boarding School.

2.2 Running System Analysis

This step includes activities to analyze existing problems and the system currently running in carrying out transactions (Irsa et al., 2020). The running system can be seen in Figure 2.

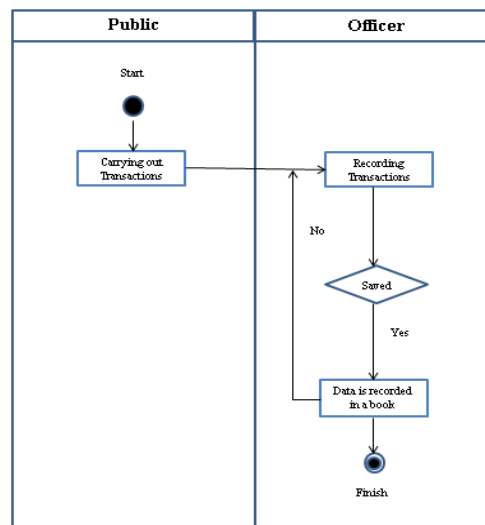


Figure 2. Running System Analysis

Figure 2 is the system currently used starting from carrying out transactions, recording transactions, storing them, data is recorded in books.

2.2 Proposed System

Needs analysis is a process carried out to obtain learning applications for recycling waste management. The information obtained will be analyzed to obtain functional requirements and non-functional requirements. A needs analysis was carried out so that the research objectives could be achieved, namely to make it easier for the public to sort and differentiate types of recyclable waste. In the research conducted, the application was built using an object oriented approach.

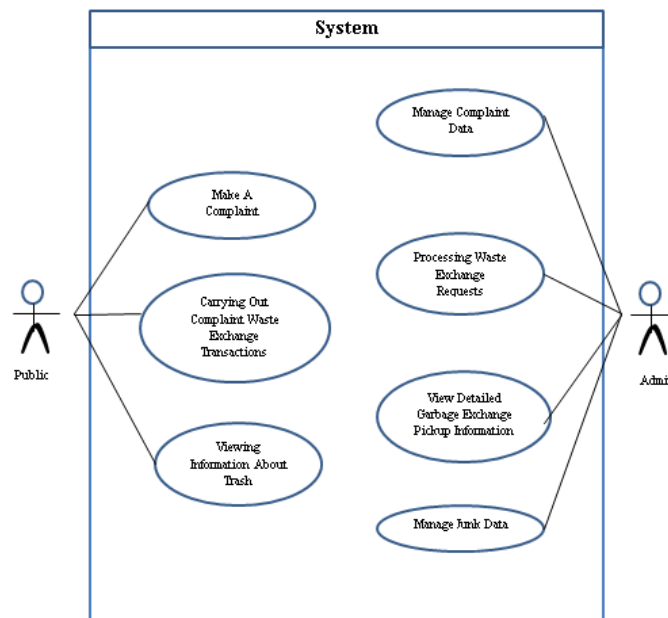


Figure 3. Use Case Diagram

Figure 3 is a use case diagram which depicts several actors such as public and admin who are involved in a number of processes in the system.

3. RESULTS AND DISCUSSION

From the research that has been carried out by developing systems that have been created, there are models that are used to visualize and develop models of software systems in the form of use case diagrams that are used to describe how users or actors interact with various system functionalities that will be developed. In a planned system, a use case diagram illustrates several actors, such as the community and admin, who are involved in a number of processes in the system.

3.1 System Implementation

Based on the running system previously explained, the system was developed from manual to a website-based system. In this application, users or the public can make transactions by accessing the exchange or complaint menu by inputting data according to the form. Next, the data sent will be received by the admin or officer via the web, then the data will be processed by the admin.

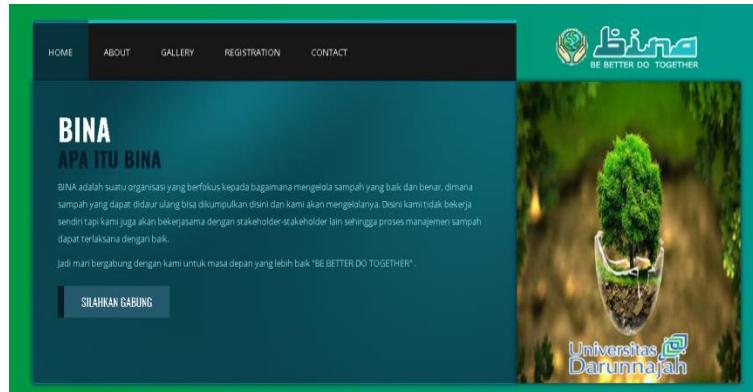


Figure 1. Appearance of Bina's Home Website

The main page or home user contains some information such as what bina is and please join as well as several menu buttons available to access other features. The display of the main or home user page is shown in Figure 1.

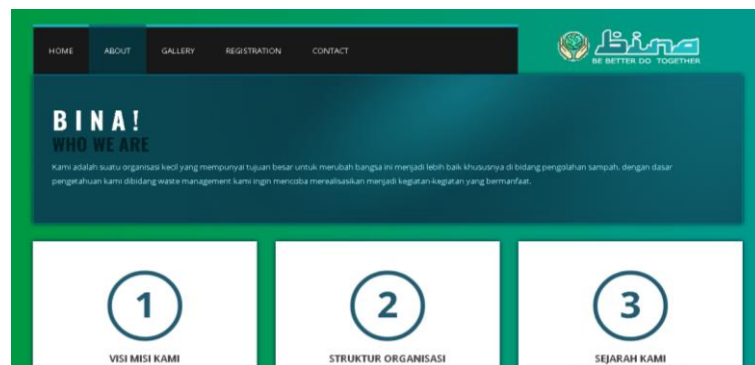


Figure 2. Appearance About The Bina Website

Next, when the user selects the about menu, several related information will appear regarding the development profile and vision and mission, organizational structure and history of the development itself. As shown in Figure 2

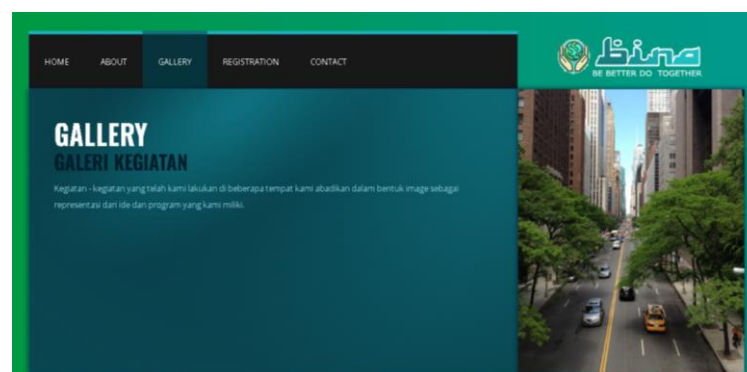


Figure 3. Bina Website Gallery View

Then, when the user selects the gallery menu, a form will appear showing the contents of the development team's activities in environmental care, waste management and cleaning roads or public areas. The gallery page display can be seen in Figure 3.

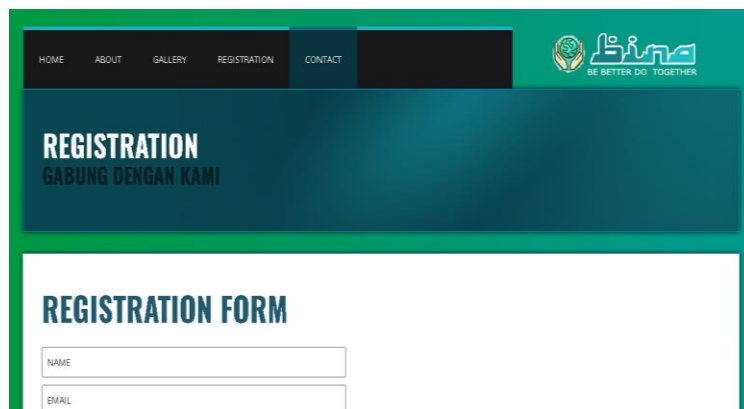


Figure 4. Bina Website Registration Display

Meanwhile, when the user selects the registration menu, a form will appear that the user can fill in to make an exchange, then click the send button if they want to make an exchange. The registration page display can be seen in Figure 4.

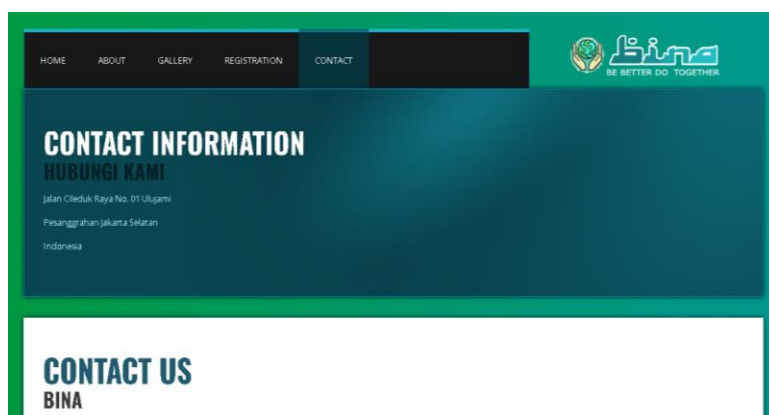


Figure 5. Bina Website Contact Display

When the user selects the contact menu, an address detail form will appear which can be visited to make an exchange. The exchange page display can be seen in Figure 5.

3.2 Testing

Testing aims to verify that the program created is as desired. The testing of this research was carried out using the black box testing method. Black box testing is used to determine all the functions of the system as well as validation testing. The test results can be seen in Table 1.

Table 1. Black Box Testing

Test Menu	Test Data Fields	Results
Home	Please Join	Valid
About	Bina's Profile	Valid
Gallery	Appears	Valid
	Activity	
Registration	Documentation	Valid
	Appears	
Contact	The Registration Form Appears	Valid
	The Bina Address Appears	

By referring to the results of the tests that have been carried out, test data is obtained based on the conclusion, there are 5 menus that have valid values with several data fields being tested. It can be concluded that this application has a high level of effectiveness and is suitable for use.

4. CONCLUSION

The development of a website-based waste management application has been successfully carried out by producing a system, namely a web for admin and the public, which is accessed by users and has succeeded in answering the problems behind this research. The application developed is able to connect the community and cleaning officers through complaints and exchange of waste which will later be picked up by officers. The design of this application provides an alternative solution for the community through the available features, so that the community can easily minimize the pile of rubbish and manage the waste by sorting waste which can make money. This research contributes to system development and helps improve the performance of waste management empowerment.

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REFERENCES

- Al Amin, A. A., Saputra, Yusti, E. Y. R., Al Hafiz, F., Azis, M. A., Solehudin, & Rifai, B. (2020). SISTEM INFORMASI BERBASISWEB APLIKASI E-TRASH BANK SAMPAH. *Reputasi: Jurnal Rekayasa Perangkat Lunak*, 1(2), 74–81.
- Anwar, S., Permana, A. G., & Darlis, D. (2020). Rancang Bangun Dan Implementasi Sistem Informasi Pengelolaan Sampah Dan Tempat Olah Sampah Setempat Terpadu Mandiri (Toss Tm) Dengan Kontrol Terpusat Berbasis Internet of Things. *Proceeding of Applied Science*, 6(1), 660–673.
- Ariadi, D., & Tashid. (2019). Prototipe Sistem Pengukur Ketinggian Permukaan Sampah Pada Tempat Pembuangan Sementara Menggunakan Arduino Dan Web Gis. *JOISIE (Journal Of Information Systems And Informatics Engineering)*, 2(1), 18. <https://doi.org/10.35145/joisie.v2i1.243>
- Budiarto, S. P., & Dedi, M. (2020). Desain Dan Perancangan Aplikasi Jemput Sampah Online Desa Rejosari Menggunakan Agile Development. *JATISI (Jurnal Teknik Informatika Dan Sistem Informasi)*, 7(3), 531–545. <https://doi.org/10.35957/jatisi.v7i3.529>
- Chandra, E., Sholva, Y., & Muhandi, H. (2020). Perancangan Sistem Pemantau Ketinggian Sampah Menggunakan Mikrokontroler Arduino dan Aplikasi Berbasis Web. *Jurnal Sistem Dan Teknologi Informasi (JUSTIN)*, 8(1), 33. <https://doi.org/10.26418/justin.v8i1.34607>
- Dharma, A. B., Susanti, D., & Marlinda, P. (2023). Implementasi Kebijakan Sistem Informasi Manajemen Bank Sampah Di Kota Dumai. *Sebatik*, 27(1), 145–154. <https://doi.org/10.46984/sebatik.v27i1.2098>
- Fitriana, G. F., Adhitama, R., Wijayanto, A., Burhanuddin, A., Pradana, R. P., Hanif, M., & Riyanto, R. B. (2021). Pengembangan Bisnis Pengelolaan Sampah Berbasis Website. *Jurnal Abdimas Mandiri*, 5(2), 122–127.
- Ginting, A. S., Brata, A. H., & Brata, K. C. (2019). Pengembangan Aplikasi Pembelajaran Pengelolaan Sampah Daur Ulang Dengan Menggunakan IBM Cognitive Service Dan Youtube Api Berbasis Android. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*, 3(3), 2937–2944. <http://j-ptiik.ub.ac.id>
- Irsa, R., Budiarni, R., & Budiman, A. (2020). Pemetaan tempat pembuangan sampah di kota payakumbuh menggunakan mobile gis. *Jurnal SIMTIKA*, 3(2), 13–20. <https://undhari.ac.id/jurnal/index.php/simtika/article/view/77>
- Karisma, Y., Muthi'ah, A., & Esabella, S. (2020). Rancang Bangun Aplikasi Pengolahan Data Sampah Pada Dinas Lingkungan Hidup Kabupaten Sumbawa Berbasis Web. *Jurnal Informatika, Teknologi Dan Sains*, 2(3), 182–189. <https://doi.org/10.51401/jinteks.v2i3.753>
- Nugroho, A. P., Arini, & Suseno, H. B. (2020). Keamanan Data Transaksi Nasabah Pada Aplikasi Bank Sampah Berbasis Web Menggunakan Algoritma AES. "QUERY: Jurnal Sistem Informasi Keamanan Data Transaksi Nasabah Pada Aplikasi Bank Sampah Berbasis Web Menggunakan Algoritma AES," 04(April), 9–17. <http://jurnal.uinsu.ac.id/index.php/query/article/view/8007/3720>
- Nurdiansah, T., Purnomo, E. P., & Kasiwi, A. (2020). IMPLEMENTASI PEMBANGKIT LISTRIK TENAGA SAMPAH (PLTsa) SEBAGAI SOLUSI PERMASALAHAN SAMPAH PERKOTAAN; STUDI KASUS di KOTA SURABAYA. *Jurnal Envirotek*, 12(1), 87–92. <https://doi.org/10.33005/envirotek.v12i1.47>
- Pamungkas, E. R., Susanti, D., & Resmanah, D. (2020). Aplikasi bank sampah berbasis web di desa teja. *Proceeding SENDIU 2020*, 978–979.
- Panggabean, S., Saputro, W. J., Zakiy, F. W., Lestari, T., & Rifqi, A. (2023). Darunnajah Vote System Application Design Using PHP Programming Language. *Inspiration: Jurnal Teknologi Informasi Dan Komunikasi*, 13(2), 25–38. <https://doi.org/10.35585/inspir.v13i2.61>
- Prasetyo, T., & Aji, A. S. (2023). Implementasi Rest Api Pada Aplikasi E-Bin Pengelolaan Sampah Berbasis Web Dan Mobile. *Jurnal TEKINKOM*, 6(2), 282–289. <https://doi.org/10.37600/tekinkom.v6i2.1020>
- Prasetyo, M. A., Prasetyo, A. B., & Rochim, A. F. (2022). Desain dan Implementasi Aplikasi Pengelolaan Infrastruktur Sampah Skala Kota Design and Implementation of City-Scale Waste Infrastructure Management Application. *Jurnal Teknik Komputer*, 1(1), 1–6. <https://doi.org/10.14710/jtk.v1i1.32679>
- Rachman, A. N., Ramdani, C. M. S., & Dewi, E. N. F. (2020). Implementasi Aplikasi Toko Online Ganger Untuk Pendaur Ulang Sampah Berbasis Web Di Tasikmalaya. *Journal of Appropriate Technology for Community Services*, 1(1), 6–13. <https://doi.org/10.20885/jattec.vol1.iss1.art2>
- Ramadhan, W., Yusda, R. A., Syafwan, H., & Pratiwi, D. E. (2019). Implementasi Metode Waterfall Pada Perancangan E-Recycle Bank Pada Dinas Lingkungan Hidup Kabupaten Asahan. *Prosiding Seminar Nasional Riset Information Science (SENARIS)*, 1(September), 1010. <https://doi.org/10.30645/senaris.v1i1.111>
- Sansprayada, A., & Mariskhana, K. (2020). Android Studi Kasus Perumahan Vila Dago. *Journal of Chemical Information and Modeling*, 24–34.

- Sauda, S., & Agustini, E. P. (2020). Implementasi Prototype Model dalam Pengembangan Aplikasi Smart Cleaning Sebagai Pendukung Aplikasi Smart City. *MATRIK: Jurnal Manajemen, Teknik Informatika Dan Rekayasa Komputer*, 20(1), 73–84. <https://doi.org/10.30812/matrik.v20i1.673>
- Wardhana, W. S., Tolle, H., & Kharisma, A. P. (2019). Pengembangan Aplikasi Mobile Transaksi Bank Sampah Online Berbasis Android (Studi Kasus: Bank Sampah Malang). *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*, 3(7), 6548–6555. <http://j-ptiik.ub.ac.id>