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DESIGNING WHATSAPP BROADCAST USING VBA EXCEL AND JS NODES FOR MARKETING STRATEGY IN THE DIAN COLLECTION STORE

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ABSTRACT
This research aims to develop an automated WhatsApp Broadcast system for enhancing marketing efficiency in small retail businesses. The system was designed using Microsoft Excel as the user interface and Node.js as the backend for processing message delivery through WhatsApp Web. Excel is used to input customer data and promotional content, while Node.js enables the system to automatically read and send messages without manual intervention. The development process follows the waterfall model, which includes analysis, design, implementation, testing, and deployment. Testing was conducted using black-box testing to ensure the functionality of each component. The implementation at Dian Collection, a small shoe and sandal retail business, demonstrated that the system could successfully deliver messages to over 100 customers with a 95% success rate. The solution helps reduce human error, saves time, and provides message consistency in marketing communication. In addition, the use of familiar tools makes it easy to operate by non-technical users, especially in small and medium enterprises. This system presents a practical and low-cost alternative for businesses to adopt digital marketing strategies without relying on expensive third-party platforms. It also creates an opportunity for small businesses to transform their promotional activities into more structured, automated, and customer-oriented approaches.
***Keywords**: Whatsapp Broadcast, VBA Excell, Node.js, Marketing Strategy, Dian Collection Shop, SME, Message automation. .*

INTRODUCTION
The development of communication and information technology in the digital era has changed the way business actors market products and reach customers (Khairi et al., 2025). Marketing strategies are now no longer dependent on conventional media, but are starting to shift to faster, cheaper, and more efficient digital platforms. One of the most widely used digital communication media in Indonesia is WhatsApp, an instant messaging application that allows direct and personal interaction between sellers and consumers.

WhatsApp has a broadcast message feature that allows sending bulk messages to multiple contacts simultaneously without having to create groups, making it perfect for product promotion needs (Alindri et al., 2025). However, manual broadcast delivery has some limitations, such as long time, potential delivery errors, and power limitations. Toko Dian Collection as one of the MSMEs engaged in footwear retail also faces similar obstacles in conducting marketing campaigns directly to its customers.

The use of marketing automation applications is a solution to overcome these challenges. Excel with VBA (Visual Basic for Applications) offers the convenience of managing customer data and designing promotional message content (Azizah, 2024). Meanwhile, Node.js as a backend platform is able to connect Excel with WhatsApp Web through the whatsapp-web.js library, allowing the messaging system to be automated and structured (Zany et al., 2024). The combination of these two technologies provides a cost-effective, flexible, and easy-to-use solution for MSME players without the need for high technical expertise or expensive infrastructure.

Previous research has extensively discussed the use of WhatsApp to improve marketing strategies(Budiningrum et al., 2022). However, not many have studied the integration between VBA Excel and Node.js practically to create an automated broadcast system that can be operated by SMEs.

Therefore, this research has a novelty value because it offers a simple but effective integrative model that can be adapted by small to medium-scale business actors.

The aim of this study is to design an automated WhatsApp Broadcast system by integrating Excel VBA and Node.js for marketing purposes. This system is expected to improve message delivery efficiency, reduce human error, and enhance customer engagement, particularly in small retail businesses like Dian Collection. The novelty of this research lies in the practical integration of common tools into a robust yet affordable digital marketing solution for SMEs.

METHOD

In this study, the system development method used is the Waterfall method. Waterfall is a classic software development model that is linear and systematic, where each stage is carried out sequentially, from needs analysis to system maintenance (Wahid, 2020). This method was chosen because it is suitable for projects whose scope and needs have been clearly defined from the beginning.

This research was conducted at Toko Dian Collection, an MSME engaged in footwear retail. The subjects of the study are the owners and staff of the store who carry out promotional activities as well as manage customer data. This research aims to build a WhatsApp Broadcast system that is integrated between Microsoft Excel (using VBA) and Node.js.

Waterfall Stages

The stages in the Waterfall method are as follows:

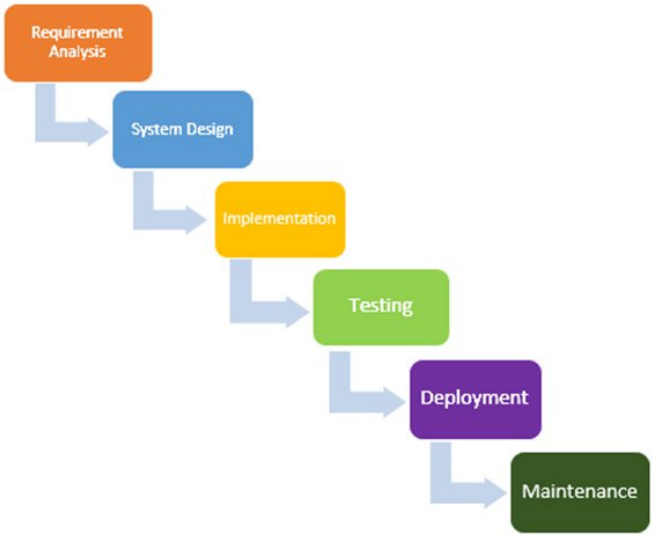


Figure 1. Waterfall Diagram

1. Requirement Analysis

   The collection of needs was carried out through interviews and observations of promotional activities at the Dian Collection Shop. The focus is on identifying problems and the need for a messaging automation system.
2. System Design

   At this stage, a system structure design is carried out which includes the Excel interface, the logical flow of message delivery, and the format of customer data. The design includes interactions between Excel and Node.js backend scripts connected to WhatsApp Web.
3. Implementation

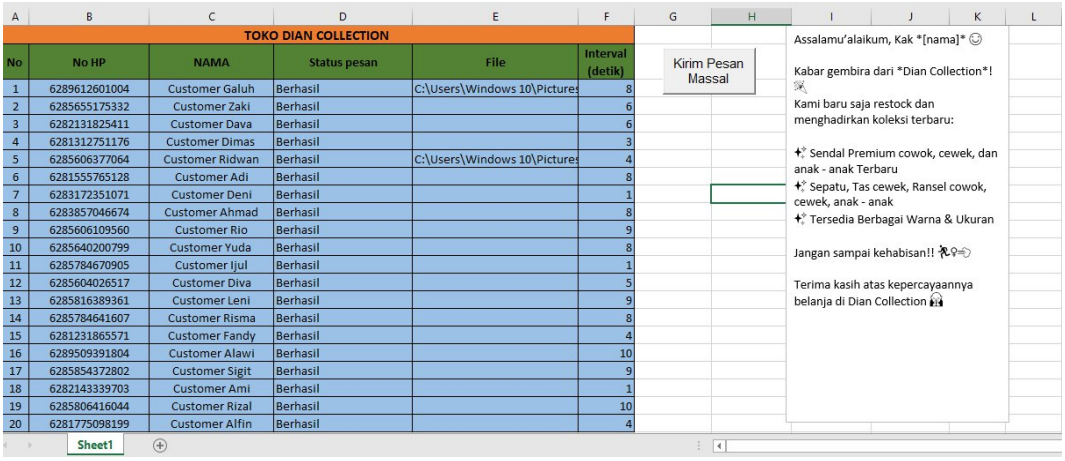
   The system was developed using VBA to create automation buttons in Excel, and Node.js to read customer data and run the process of broadcasting messages through whatsapp-web.js library.
4. Testing

   The test is done using the black-box testing method to ensure the system works according to the user's needs, without the need to look at the source code directly. Testing includes input validation, delivery process, and delivery status.
5. Deployment and Maintenance

After successful testing, the system is implemented in the store's work environment and evaluation and light maintenance is carried out if problems are found or requests for additional feature development are found.

RESULT AND DISCUSSION

After the WhatsApp Broadcast system is designed and implemented using VBA Excel and Node.js integration, functional testing is carried out through the black-box testing method. The results of the implementation showed that the system was able to send messages to more than 100 customer contacts automatically, with a success rate of 95%. The system is also capable of processing picture messages and personalized text messages according to the customer's name.



TOKO DIAN COLLECTION

No	No HP	NAMA	Status pesan	File	Interval (detik)
1	6289612601004	Customer Galuh	Berhasil	C:\Users\Windows 10\Pictures	8
2	6285655175332	Customer Zaki	Berhasil		6
3	6282131825411	Customer Dava	Berhasil		6
4	62813127751176	Customer Dimas	Berhasil		3
5	6285606377064	Customer Ridwan	Berhasil	C:\Users\Windows 10\Pictures	4
6	6281555765128	Customer Adi	Berhasil		8
7	6283172351071	Customer Deni	Berhasil		1
8	6283857046674	Customer Ahmad	Berhasil		8
9	6285606109560	Customer Rio	Berhasil		9
10	6285640200799	Customer Yuda	Berhasil		8
11	6285784670905	Customer Ijul	Berhasil		1
12	6285604026517	Customer Diva	Berhasil		5
13	6285816389361	Customer Leni	Berhasil		9
14	6285784641607	Customer Risma	Berhasil		8
15	6281231865571	Customer Fandy	Berhasil		4
16	6289509391804	Customer Alawi	Berhasil		10
17	6285854372802	Customer Sigit	Berhasil		9
18	6282143339703	Customer Ami	Berhasil		1
19	6285806416044	Customer Rizal	Berhasil		10
20	6281775098199	Customer Alfin	Berhasil		4

Picture 2. Interface Implementation Results

The system interface consists of a table of customer data, a message body field, and a 'Send Bulk Message' button. The system reads the data from Excel and sends the message through the browser to WhatsApp Web. The success status is displayed in Excel.

Table 1 Test Results

Case ID	Testing Description	Test Data	Expected Results	Status
TC-01	Read customer data	Excel (name & number)	Data reads correctly	Pass
TC-02	Blank numbers	Blank columns	The system does not send & give warning messages	Pass
TC-03	Invalid number format	'ABC123'	Reject & notify system	Pass
TC-04	Display messaging	Contents of the "File" field	Images sent with text	Pass
TC-05	Delivery to more than 100 contacts	Large datasets	All messages are sent with delays	Pass

The system implementation also pays attention to the time interval between submissions (delay) to avoid violating WhatsApp's spam policy. In addition, personalizing messages through the use of variables (e.g.: *[name]*) successfully increases a positive response from the recipient.

CONCLUSIONS

This research was conducted with the aim of building an automation system for sending promotional messages through WhatsApp using the integration of VBA, Excel and Node.js as a solution for MSMEs in facing digital marketing challenges. Based on the results of the implementation and tests that have been carried out, it can be concluded that the system designed is not only able to replace the manual process that has been used in the Dian Collection Shop, but also provides significant efficiency in terms of time, effort, and message consistency.

This system succeeds in realizing the expectations as outlined in the introduction, which is to create a digital marketing strategy that is effective, cost-effective, and easy to operate by non-technical users. The use of Excel as an interface and Node.js as a backend processor is proven to result in a reliable and responsive broadcast system, with a delivery success rate of up to 95%. This finding is in line with the need for MSMEs for simple but high-impact technology in supporting promotional activities.

One of the novelties of this research is in the integrative model it offers—combining popular and open tools such as Microsoft Excel and whatsapp-web.js libraries to create a technology-based local solution. Thus, this research not only makes a practical contribution in the business world, but also enriches the treasure of the development of simple automation-based information systems.

However, this system has limitations, including still relying on the stability of the internet connection and being vulnerable to spam policies from WhatsApp because it does not yet use the official API. Therefore, further development is highly recommended, such as the addition of message scheduling features, statistical reporting, integration with CRM, as well as the use of WhatsApp Business APIs to support long-term scalability.

The system designed in this study offers a realistic and low-cost alternative for small businesses to adopt digital marketing. It not only meets operational needs but also opens up new opportunities for the implementation of practical automation tools in local business environments.

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