Developing e-market Information System 
Android Based in Minahasa Regency

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Abstract — In the midst of the COVID-19 pandemic which limits humans from interacting directly, the trade sector, in this case buying and selling in traditional markets, is hampered. Therefore, the researcher took the initiative to create an innovation, namely an Android-based E-Market Information System application that helps improve the community's economy during the COVID-19 pandemic, while providing an alternative to digital sales when entering the new normal period. In this study also tested the feasibility level of the software that has been made. This research method is Design and Build using the system development method with the Waterfall model. Software testing is done through black-box testing, McCall's Quality Factor as an indicator to determine the level of software feasibility with a measurement scale using a Likert Scale. Interviews and questionnaires are techniques used to collect data, while data analysis techniques use descriptive quantitative analysis. The mandatory output targeted for this research is developing an E-Market information system in Minahasa. In addition, the results of this study are to be published in an International Journal, namely the Journal of Mobile Computing and Multimedia Communications as an additional output.


I. INTRODUCTION
Modernization in this age is like an unstoppable locomotive. Modernization is not only in the scope of certain aspects of life, but all aspects undergo a change, such as modernization in the social, educational, legal, and so on. One aspect that has been eroded by the current of modernization is the traditional market. In modern life during the COVID-19 pandemic, innovation must be carried out on the market, activities continue to run smoothly. In addition, in the innovation process in traditional markets, technology is one aspect that is emphasized in market development or progress because the market is the lifeblood of the Indonesian economy where the rotation of the economy in a region occurs. In general, technology is a means to achieve goals for the survival and convenience of people's lives. In this case, it is necessary to digitize the market through the E-Market Information System. Information system is one of the most important things in the company. With the information system, organizations or companies can guarantee the quality of the information presented and can make decisions based on that information. Along with the development of information technology, the need for fast, precise and accurate information is indispensable. Technology is system to provide comfort and convenience for humans [1]. Based on the above conditions, it is necessary to develop an E-Market information system (online buying and selling activities) to be able to help the community to continue to meet their food and beverage needs and also make traders to keep running their business during the COVID-19 pandemic. Online market or e-market is an online market that brings together sellers and buyers without having to meet face-to-face or meet in person. One of the current learning innovations and can be done at any time. E-marketing is defined as achieving marketing goals through the application of digital technology, e-marketing is the use of electronic data and applications for planning and implementing the conception, distribution and pricing of ideas, goods and services. Services to create exchanges that satisfy individual and organizational goals. The advantages that can be provided by the use of E-marketing for companies according to are:
- Able to reach a wide range of consumers in an environment that has not been met by competitors.
- The target is consumers who have divided into groups and develop a continuous dialogue.
- Electronic and low-cost business transactions. E-mail and data files can be transferred to selected customers or all customers in seconds.
- Direct sales process path from producer to user without having to go through classic distribution channels.
- Can add products to market quickly and make changes to sales plans very quickly.
- Can track sales activities that have occurred.

An information system is a system that collects, enters, processes, stores data, manages, controls and reports information so that an organization can achieve its goals [2]. Information system is a system that uses information technology to capture, move, store, manipulate, or display the organization used in one or more business processes [2]. So it can be concluded that the information system is a set of elements that interact and are coordinated to transform data

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into precise and accurate information to certain parties so that it can be used to support decision making within a company. The objectives of information systems according to [2] are:

**Usefulness**
The system must produce timely and relevant information for decision making by management and operating personnel within the organization.

**Economical**
All component parts of the system must contribute at least as much value as the cost.

**Reliability**
The output of the system must have a high level of accuracy and the system itself must be able to operate effectively even when the human component is absent (absent) or when the machine component is not operating.

**Customer Service**
The system must provide good or friendly and efficient service to customers when dealing with company customers.

**Capacity (Capacity)**
The system must have sufficient capacity to handle periods of peak operation as well as periods of normal activity.

**Simplicity**
The system should be simple enough that its structure and operation can be easily understood and the procedures easy to follow.

**Flexibility**
The system must be flexible enough to accommodate changes and their importance.

The purpose of developing an e-market-based application is to provide an alternative to selling in the market, not only traditionally but through digital in the midst of the COVID-19 pandemic as it enters the new normal. In addition, consumers can buy online without having to go to the market so as to avoid direct contact with many people (social distancing). Furthermore, the government can monitor market prices and can exercise direct control. The next goal is that the monitoring carried out in the market with this application system can be based digitally through this online market application which will be updated.

The scope of work in online market application development includes:
1. Develop a platform in the form of an online market application to help improve the community's economy in the midst of the COVID-19 pandemic and entering a new normal period;
2. Coordinate with the Work Team in the development of platforms in the form of online market applications;
3. Coordinate with the Work Team in reading the process flow that has been made;
4. Develop a platform in the form of an online market application using technology-based PHP (Hypertext Processor) with a framework and mysql database;
5. Design a system or application that is easy to use (user-friendly);
6. Build a platform in the form of an online market application by taking into account the security level of the system and its database;
7. Create programming documentation that is scheduled and according to applicable standards and can be understood;
8. Make periodic work progress reports.

### II. METHOD

This research method uses the Research and Development (R & D) method using the Waterfall model. [4] This research model is a classical model that is systematic, sequential in building software. Waterfall Model consists of 5 stages for development. The following is an explanation of the stages carried out in this model according to Pressman:

1. **Definition of Needs**
   Before starting technical work, it is very necessary to communicate with customers in order to understand and achieve the goals to be achieved. The result of this communication is project initialization such as analyzing the problems encountered and collecting the necessary data, as well as helping to define the features and functions of the application. Additional data collection can also be taken from journals, articles, papers and the internet.

2. **System and Software Design**
   The requirements specifications from the previous stage will be studied in this phase and the system design is prepared. System Design helps in determining hardware and system requirements and also helps in defining the overall system architecture.

3. **Implementation**
   At this stage, the system is first developed in small programs called units, which are integrated in later stages. Each unit is developed and tested for functionality which is referred to as unit testing.

4. **Integration and Testing**
   All units developed in the implementation phase are integrated into the system after the tests carried out by each unit. After integration the whole system is tested to check for any failures or errors.

5. **Operation and Treatment**
Software that has been finished, run and carried out maintenance. Maintenance includes fixing errors not found in the previous step. Improvement of system unit implementation and system service improvement as new requirement.

The following table shows the Design of an Android-based E-Market Information System.[4]

<table>
<thead>
<tr>
<th>Research Stages</th>
<th>Detail Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition of Need</strong></td>
<td>The team held a meeting for needs analysis and data analysis by research member 1 for system development purposes.</td>
</tr>
<tr>
<td><strong>System and Software Design</strong></td>
<td>Researcher 1 member made a system prototype (interface design) to be used as a reference for determining hardware and system requirements as well as helping in defining the overall system architecture.</td>
</tr>
<tr>
<td><strong>Implementasi</strong></td>
<td>Programmers begin to create systems that have been designed in a structured manner (system development is carried out per unit). Furthermore, Research Member 1 carried out unit testing or function testing of the developed system.</td>
</tr>
<tr>
<td><strong>Integration and Testing</strong></td>
<td>The programmer integrates the system units that have been made into one unified system. Then Peleiti 1 Member again tested the system for each unit. After the system is fully integrated, the Research Member conducts a thorough test to check if there are any failures or errors in the system.</td>
</tr>
<tr>
<td><strong>Operation and Maintenance</strong></td>
<td>The system is ready to be operated for use while maintenance is carried out by officers according to a predetermined schedule.</td>
</tr>
</tbody>
</table>

III. RESULTS AND DISCUSSION

The research carried out refers to the research method written in the proposal, namely the Waterfall method. The Waterfall design model is the work of a system that is carried out sequentially or linearly. This design has 4 steps, namely: Analysis, Design, Code, and Test. In the analysis stage, the researcher analyzes the needs of the software that will be developed, such as the usability of the software, the limitations of the software. The information was obtained from interviews, surveys and discussions with parties related to the object of research. After that the information is analyzed so as to obtain complete data regarding the need for software to be developed. The next stage is Design. Design is done before the coding process begins. It aims to provide a complete picture of what has to be done and how the desired system looks like. So it helps to specify hardware and system requirements, also defines the system architecture that will be made as a whole. The third stage is writing code. At the design stage, it begins by making a research flow chart that describes what has been implemented and what will be done during the proposed time. The flow chart format can be a JPG/PNG file. The research chart is made in its entirety with clear stages, starting from the beginning how the process and its outputs are, and the targeted achievement indicators. This section must also fill in the duties of each member of the proposer according to the stages of the proposed research. Research Stages Details of small module activities which will be combined in the next stage. At this stage, a deeper examination will also be carried out on the modules that have been made, whether they have fulfilled the desired function or not. The fourth stage is testing. In this fourth stage, the previously created modules will be combined. After that, testing is carried out which aims to determine whether the software is in accordance with the desired design and whether there are still errors or not. The following is a display of the system that has been developed.

Figure 1. Login Page of e-Market

Figure 1 shows login page of e-market and registration form. To enter the system the user is asked to fill in the phone number and password. To enter the system, of course, the user must have an active account first and the account will be verified by the admin to be accepted or rejected. If you don't have it then you have to create an account like the following guide.
Figure 2 shows Buyer Menu Page. After activating the account and logging into the system, the user will be able to access the application. In this application the user can be a buyer and seller. Here is the view for buyers. In this menu there are market options according to the location of the user's residence. When they want to make a purchase transaction, the buyer can place an order via 'send a comment' or click 'contact seller', they will be directed to the seller's Whatsapp chat section as shown in the picture.

Figure 3 display Price Reference and User Menu. In the price reference menu, there are types of materials accompanied by reference prices used by buyers and sellers as price benchmarks so that buying and selling at high prices does not occur or vice versa. For this price reference menu, it is updated every day, so the price of ingredients is constantly updated to be used as a reference. Then on the user side, users can modify profile photos, phone no. and various other functions. The following is the display of the price and user reference menu.

Figure 4 explain if buyers who want to become sellers do not need to register to enter the system, just use the account that was registered at the beginning. To become a seller, the user must first create a shop by filling in some of the required data according to the instructions. To access the "Create a Store" menu, the user clicks on the section marked in the image.

After registering to create a new store, users are given time to wait a maximum of 1x24 hours to verify their account. If approved, the user can immediately carry out activities in the system and be directed to the 'Enter the Store' menu where the user must write down the registered NIK. After that the user can perform activities in the system, namely sales. In the sales list menu, the user must input his sales by clicking on the part marked in the picture. After that, the user is directed to the add sales menu, in this menu the user must provide an explanation of the material being sold, upload images, choose a market location and choose a payment method. As shows in figure 5.

Figure 5.
The display in figure 6 is an example if the user has posted sales materials on the system. In addition, users can also edit posts that have been sent by clicking the 'Change Sales' menu as shown on picture.

Early product development is the rough design of a product. The product must be as complete and perfect as possible. The initial draft or product developed by researchers in collaboration or asking for help from practitioners according to their expertise or often called expert validation. Trial or evaluation by experts is an estimate or assessment, based on analysis and logical considerations of researchers and experts. Field trials will obtain micro-feasibility, case by case to be concluded in general.

Table 2. Content validation results using a questionnaire.

<table>
<thead>
<tr>
<th>No</th>
<th>Score Aspect</th>
<th>Σ Score</th>
<th>Σ Score Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Usability</td>
<td>22</td>
<td>4.4</td>
<td>Very good</td>
</tr>
<tr>
<td>2</td>
<td>Information Quality</td>
<td>26</td>
<td>4.33</td>
<td>Very good</td>
</tr>
<tr>
<td>3</td>
<td>Interoperability</td>
<td>25</td>
<td>4.17</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>71</strong></td>
<td><strong>4.3</strong></td>
<td><strong>Very Good</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Content validation results using a questionnaire.

Table 3. Media Validation Results using a questionnaire.

<table>
<thead>
<tr>
<th>No</th>
<th>Score Aspect</th>
<th>Σ Score</th>
<th>Σ Score Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Usability</td>
<td>21.5</td>
<td>4.3</td>
<td>Very good</td>
</tr>
<tr>
<td>2</td>
<td>Design</td>
<td>22.5</td>
<td>4.5</td>
<td>Very good</td>
</tr>
<tr>
<td>3</td>
<td>Interoperability</td>
<td>42.5</td>
<td>4.25</td>
<td>Very good</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>86.5</strong></td>
<td><strong>4.35</strong></td>
<td><strong>Very good</strong></td>
<td></td>
</tr>
</tbody>
</table>

In short, the evaluation of system is successful because they give us good feedback on what users think about the e-market. Nonetheless, it provides a first overview of the usability of the system that has been created.

IV. CONCLUSION

Policies to prevent the spread of the covid-19 virus that really force people to reduce going out of the house, keep their distance and work from home are at least 25% or even 100%. Many consumers also avoid shopping directly in crowded places. The demand for data and internet needs during the pandemic has also increased drastically, this opportunity is automatically taken by new internet service provider companies, the increase jumped by 40% when government regulations were enacted to work and study from home online[6].

Based on this, it can be concluded that the e-commerce business sector can provide an important role that benefits the community and also the economic development in Indonesia during the COVID-19 pandemic. With this Android-based e-market application, it can benefit many parties, both business actors, consumers and the government. For business players, e-commerce is a solution to overcome the impact of covid-19, increase sales scale because many investors are interested in this field, increase marketing reach, and encourage business people to adapt to conditions during the pandemic and technology. E-commerce is also beneficial for consumers, because it can provide security and convenience in transactions, especially in the face of tight government regulations that limit the public by social distancing as a step to minimize the spread of the COVID-19 virus. Consumers also become more effective and efficient in terms of time.
Labor, and price selection compared to conventional transactions. With the development of the e-commerce sector, it also requires people to adapt to technological developments to fulfill their daily needs[7].

In the midst of the Covid19 pandemic, people must comply with government regulations to implement the 5M health protocol, wear masks, wash hands, maintain distance, limit mobility and maintain immunity in order to break the chain of the spread of the Covid-19 virus. These rules cause people to do more activities at home using the internet, whether it’s work, study, and shopping, all done online. Adaptation of new things in all sectors can be felt directly in the environment around us, in addition to e-commerce in online shopping, there are also other sectors that must also be started online, such as working at home (WFH).

Online learning, online meetings and many other things that require using internet technology, this is due to the impact of the covid-19 pandemic. Not only people in urban areas, people in remote areas can also enjoy online technology during the Covid19 pandemic to shop online, due to mobility restrictions so it is not possible to shop directly to big cities as usual. So the marketplace is the solution, internet facilities and the increasing numbers of expeditions are also a supporting factor for people to get used to moving with technology[8].

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REFERENCES