

DEVELOPING DIGITAL ECOSYSTEM AND DIGITAL MARKETING ON HAJJ WEB APPLICATION USING THE EXTREME PROGRAMMING METHOD

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Abstract

The internet is a repository for all information and knowledge that can be accessed by all humans using certain devices. With the internet, ways of learning become easier and can produce broad insights. But sometimes to find the information people want to find takes a long time, and also have to compare from one article and another article so that the information generated can be maximized. Lots of information that we can get from the internet, be it information about academics, automotive, vacation tips, and worship. One of them is about Hajj. Indonesia is one of the most migrant pilgrimage countries in the world. Hajj always increases every year. So information about the hajj is important for those who perform hajj or just want to learn it. Lack of preparation can cause difficulties when performing Hajj, therefore a source of information is needed that can answer questions about Hajj. With a website-based application that has many supporting features about Hajj, it can support the spread of information about Hajj and also provides other features that can also be used as a reference when performing Hajj. The method used in this research is to use one of the System Development Life Cycle (SDLC) models, namely Expert Programming. Stages of the method used in accordance with what was done by the author. The stages themselves are Planning, Designing, Encoding, Testing, Listening. All stages are also in accordance with the product to be developed, namely the website application around the pilgrimage where this application will be used by the community. The expected outcome of this research is the development of a digital ecosystem based on a marketing perspective on hajj that is functioning properly and can be used by the public to find information about hajj. And the expected result is that applications that have been made can be further developed by researchers so that the digital ecosystem based on marketing of Hajj can continue to be useful and continue to be developed for the community.

Key Word : Digital Ecosystem, Marketing, Hajj, Umrah, SDLC, Extreme Programming.

1. Preliminary

Hajj is one of fifth pillars in Islam, and every Moslem who has reached the age of puberty and financially able to do the Hajj is obligated to perform the Hajj. The time to perform the Hajj pilgrimage has been determined namely during the month of Dhul-Hijjah. At the time of performing the Hajj pilgrimage, the pilgrims will visit certain places and will do some worship or practice that must be done such as tawaf, sa`i, wukuf, mazbits at Muzdalifah, throwing jumroh, and mabit in Mina. The length of time needed to perform the pilgrimage is approximately 40 days.

Table 1 Number of Pilgrims in Ten Years [1]

Number of Pilgrims	Years
2,789,399	2010
2,927,717	2011
3,161,573	2012
1,980,249	2013
2,085,238	2014
1,952,817	2015
1,862,909	2016
2,352,122	2017
2,371,675	2018
2,489,406	2019

Based on table 1, the number of pilgrims had increased in 2012 to touch the number of 3 million pilgrims carrying out the pilgrimage. And the following year, namely 2013, has decreased, but each year continues to increase until at the end of last year, namely 2019, the number of pilgrims touched nearly 2.5 million pilgrims. And Indonesia is one of the countries that has the most Hajj participants in the world each year. According to Director General Decision on Hajj and Umrah No 124 in 2019, there are 17,000 people that performing the Hajj. The 17,000 people is allocated by 15,663 for Hajj congregation. And 1,337 for Hajj special officer.

With the increasing number of Hajj congregation in Indonesia, it can lead to increase the risk for Indonesian Hajj

congregation. Because with the huge amount of people, it means become harder to monitor by the Hajj special officer. And one of the things that can support the reduction in the risk that can be obtained is through the provision of information that has been brought by the pilgrims before leaving for the holy land of Mecca. Because with the information held by the Hajj congregation, the congregation knows what is permissible and not done when in a place of worship. And also what should be done when worshipping.

The number of pilgrims indicates the variety of ways they get information or knowledge about the pilgrimage itself. There are those who already know because they are taught from institutions, some have been prepared by the Hajj travels, and there are those who are self-taught through information sources such as books or from the internet. Getting information from the internet or books is the last option, because this option can be done anywhere and certainly more effective and in accordance with what is needed by the pilgrims. But sometimes pilgrims have to find information that they want to get many times until they can finally get the information they want.

This can be caused by several things, The problem of the difficulty of the search for information related to Hajj can be seen in table 2.

Table 2 Problem of Searching Hajj Information

No	The Problem	Description
1	Keyword Problem	Difficult to find information that matches with the user wants to find because sometimes the keywords provided do not match with the content displayed.
2	Completeness of Information	Content available from several websites is incomplete regarding Hajj's information, only discussing a few pieces of information that related to Hajj.
3	Time Spent	Users must spend enough time to find appropriate information.

Based on table 2, it can be concluded that the Hajj pilgrim needs an application that can cover all information related to Hajj to facilitate users in learning the Hajj. So, it can facilitate the pilgrims in finding information related to Hajj to be used for the preparation of the Hajj.

With the Digital ecosystem where users can use many features such as frequently asked questions to chatbots about Hajj, news about Hajj, Review of Umrah, Hajj travel information nearby, and so on. Just visit the Hajj application website and users can directly use the application as needed. The ecosystem developed in the Hajj application aims to enable users to use many features in one application. So, users do not need to go in and out of the website to get information, but instead use an application that has many features.

With the Hajji web application, users can obtain information in accordance with the wishes of users and can increase their effectiveness in learning about Hajj. Users can also use this application anywhere and anytime because the Hajj expert system application is a web-based application that can be accessed anywhere and anytime.

In the digital ecosystem design of the hajj website application, the author requires an appropriate research method, so that the process and time used can be in accordance with the target of research completion. In this study, the authors chose one of the methods in Agile namely Extreme Programming. The use of the Extreme Programming method is done in 5 phases, namely Planning, Designing, Coding, Testing, Listening. The author uses this method so that the flow of the design of this application is clear and does not interfere in other phases.

2. Theoretical Basis

2.1 Digital Ecosystem

A self-organizing, scalable and sustainable system composed of heterogeneous digital entities and their interrelations to increase system utility, cooperation, and innovation [2]. The digital ecosystem is basically the same as the ecosystem in general which is a combination of systems that then involves reciprocal interactions both from one system to another and also from the system to the user of the application.

2.2 Digital Marketing

Digital marketing is one type of marketing being widely used to promote products or services and to reach consumers using digital channels. Digital marketing extends beyond internet marketing including channels that do not require the use of the Internet. It includes mobile phones (both SMS and MMS), social media marketing, display advertising, search engine marketing and many other forms of digital media [3].

With the development of the digital world, marketing methods need to be adapted to the current circumstances. Digital marketing is a marketing method in general, using creative and unique bidding methods to bring in customers or users. But in Digital marketing, the media used are different from marketing in general. Digital marketing uses digital technology to reach customers.

2.3 Hajj

Hajj is one of the fifth pillars of Islam. And it is an obligation to every Moslem who has reached the age of puberty and of course and financially able to do the Hajj. As a technical term in Shari'ah (Islamic Law), Hajj is

the name of those acts which are performed. After entering into the state of Ihram with the Niyyah (intention) of Hajj. They comprise Fard (necessary duty), Tawaf circumambulation of Kaaba), Wuquf (stay) at Arafat and some Wajibat (obligatory actions) which are performed in a given order at appointed times [4].

2.4 Webb Application Framework

According to Mathias Schwarz's research about “Design Analysis of Web Application Frameworks”, Web application frameworks fall into two major categories: server-based frameworks concerned with programming the server-side of web applications and client-based frameworks concerned with programming browsers. The client-based frameworks enable the programmer to write applications with rich highly interactive user interface, and the server-based frameworks allow the application to run on a machine that is controlled by the application provider [5]. And it makes the programmers easy to develop the web application because it possible to implement the programming language and just adjust to the framework feature.

3. Discussion

3.1 Use Case Diagram Hajj Web Application

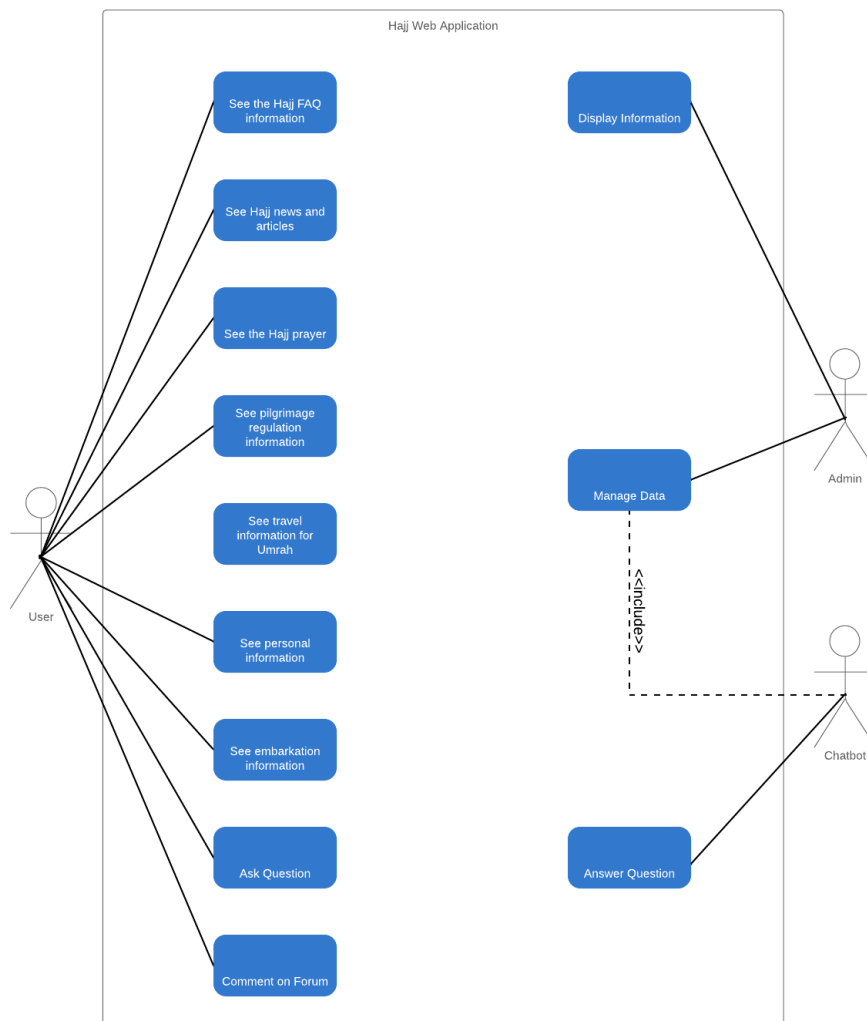


Figure 1 Use Case Diagram

The figure above explains a case, which is a system of delivering information related to Hajj and Umrah. The process starts when the admin manages data by searching for accurate information to be stored on the hajj website application, then when the information has been stored in the application, users can access and also search for information related to hajj and also the pilgrimage that has been provided by the admin.

3.2 Business Rules

The business rules referred to in the final project work are defining something related to the activities of the application. The following is the definition of words on the Hajj website application:

1. Chatbot is a feature of conversations conducted by users against the bot itself to get an answer to a question that is raised.
2. Embarkation is the place of departure for the pilgrimage set by the government. This placement is done so that the ease of mobilization of pilgrims in each region. Each region has its own set of quotas and prices where each region can have different quota amounts and also prices.
3. Hajj application is a website-based application that aims to be a provider of information about the Hajj and also Umrah where users can access this application online and use it as needed.
4. Umrah Travel is a provider of Umrah services from departure, food, and also a place to stay when undergoing Umrah. Usually Umrah travel offers several packages in the form of facilities obtained and prices on certain packages.
5. The ministry of religion or *kementerian agama* is the ministry within the Government of Indonesia in charge of religious affairs. Many of the main tasks of the ministry of religion, one of which is the implementation of technical activities on a national and international scale.
6. Hajj regulation is a rule that involves all the affairs that govern various series of activities in carrying out the pilgrimage. Hajj regulation is a policy carried out by the government so that the pilgrimage runs safely and easily accommodated.

4. System Development

4.1 Marketing Implementation

Marketing implementation is carried out so that the existence of the Hajj website application can be better known by the Indonesian people. Besides being used for promotion, marketing implementation is done so that users can still use the application and keep in touch with the application through other media, one of which is email. The following is a marketing implementation on the Hajj website application:

1. Email Marketing: Email marketing in Hajj website application starts from a pop-up subscription for users, where if a user does a subscription, the user will get information related to the hajj website application. This information can be in the form of breaking news, the latest articles, or other offers via email. With this email marketing, users will still get information and can bring back old users who have not used the Hajj website application.
2. Google Analytics: Google Analytics implementation in the Hajj website application used to see the number of visitors and also the activity of visitors who use the Hajj website application. There are many features that can be used one of the features is where the author can see the behavior of application users, one of which is the device used. It can be seen from the picture above that the majority of device users to access the Hajj website application are using a personal computer or PC. And another example is the existence of users by country.

4.2 Application implementation

Implementation of the application is done so that the purpose of the development of this application can be realized. Making this digital ecosystem is done by adjusting to the needs and availability of data related to the Hajj and Umrah pilgrimage. The following is an application implementation of the Hajj website application:

1. Chatbot: The chatbot functions for question and answer between the chatbot itself and the user. Users can ask a question related to Hajj and also Umrah, and chatbot will answer questions in accordance with the data that has been provided.
2. News & Articles: Users can choose news or articles from the list provided. The list is displayed on the Hajj website application homepage. The content of news and articles is content related to Hajj.
3. Comment Forum: To provide comments the user must first log in, the options for logging in are quite diverse, including logging in through a Disqus account, Facebook, Twitter, and Google. When the user has successfully logged in, the user can leave a comment and can also comment on the comments of other users.
4. Regulation: In the regulation section, it is divided into two namely constitutional regulation and also a presidential decree. The regulation is a regulation that has been set by the government related to the pilgrimage in Indonesia.
5. Prayers: The prayer is a choice of prayer that has been adjusted to the needs of the application, which is related to the pilgrimage. Users can choose the prayer tab on the homepage so they can access the prayer list.
6. Umrah Travel Info: In the Umrah travel information section, only three cities are available namely Bandung, Jakarta and Surabaya. Umrah travel was chosen based on recommendations from several websites. And at each Umrah travel has information in the form of price range, the address of the Umrah travel, and also the contacts of the Umrah travel.
7. Personal Information: In the personal information section, there are 4 pieces of information that users

can use namely information related to Hajj registration, glossary, self equipment, and finally the estimated Hajj departure. In this personal information section, the author focuses information for users related to personal interests.

8. Embarkation: In the embarkation section, users can choose various information including the price of each embarkation, quota, and zoning. Embarkation is a decree from the government so that each region has a good amount of quota, price, zoning area respectively. Because each region has different needs.

5. Analysis

5.1 Analysis of black box testing

Black box testing is defined as a testing technique in the functionality of the Application Under Test (AUT) is tested without looking at the internal code structure, implementation details and knowledge of internal paths of the software. This type of testing is based entirely on software requirements and specifications [6]. In all of the features that tested by the tester, there were 10 features that were successfully carried out namely Chatbot features, Articles, Comment on Articles, News, Comment on News, Search Box in Glossary, Search Box in Umrah Travel Info, Sorting data in Glossary, Sorting data in Umrah Travel Info, and Maps in Umrah Travel Info. And the feature that doesn't work is the language change feature.

6. Conclusions

Based on research conducted in the development of digital education ecosystem on Hajj website applications, the conclusions are as follows:

1. Hajj website application is a digital education ecosystem that aims to be a provider of information related to Hajj and Umrah for Indonesian people.
2. Hajj website applications develop digital marketing by implementing a number of marketing tools, namely email marketing and also Google analytics in order to strengthen the existence of website applications and to continue to be able to communicate with users.
3. Hajj website applications are tested using black box testing.

7. Suggestions

Based on research conducted in the development of digital education ecosystem on Hajj website applications, the recommendations are as follows:

1. Add more information provided on the Hajj website application.
2. Improve the appearance of Hajj website applications so that they have more characteristics about Hajj and Umrah.
3. Collaborate with Umrah travel in several cities in order to make Umrah service bookings through the Umrah website application.

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