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Development of fishery marketplace app for fishermen to support local products during the covid-19 pandemic

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ABSTRACT

Since the Covid-19 pandemic, the growth of E-commerce in Indonesia has increased sharply. The COVID-19 pandemic has caused a shift in human habits or activities from offline to online. However, the lack of facilities and infrastructure, especially the fish auction place, is an obstacle fishers face when they want to market and distribute their catch. This study aims to provide an alternative solution to the limitations of fish auction places. This research develops a prototype of a fishery marketplace application to make it easier for fishers to market their catch. The research method in software development uses a prototyping model and usability testing using the SUS scale. Based on fishermen's gadgets owned, including network infrastructure availability in hinterland areas. This study used technology that utilizes SMS Gateway. SMS messages in the form of information on fish products. Based on the analysis and calculation of the SUS score, the result is 79.25, meaning that the fisherman's application is functionally perfect and can be accepted by users. The fisheries marketplace application displays a catalog of fish products that can access the public to view product information, prices, and transact. Buyers and sellers meet in the fisheries marketplace application to make offers via call communication or take advantage of the provided WhatsApp API.

1. Introduction

The State of Indonesia is an archipelagic country whose marine resources should be an essential concern. Fishers, for example. Where the community around the hinterland area, most of them make a living as fishermen. There are many problems regarding fishermen [1], [2], such as fishing skills, tools, technology used, facilities and infrastructure, and electricity infrastructure and internet networks in the hinterland areas, which are quite adequate and affordable. The welfare of fishers should be a concern of the government, especially considering the role of a fisherman who is very important in fulfilling community nutrition. Fish protein is a source of food to meet the nutritional needs of the community [3].

The local products of the hinterland community are none other than fish and all kinds of fishermen's catches, as well as processed products of marine resources. The Covid-19 pandemic has made it difficult for fishers to market their catch. In addition, there are limited fish auction places at every point in the archipelago. Income has decreased drastically, mainly due to the COVID-19 pandemic. People's purchasing power has decreased because the economy is also unstable. A fisherman in Bintan Island who has been working as a fisherman for 20 years regrets that there is no fish auction place (TPI) in Bintan; this makes it difficult for fishers to sell fish after going to sea.

Middlemen (collectors) control the marketing and distribution of fish. Fish export activities are not one-way. They are big vessels for fishing and have their export market to neighboring countries. So far, those who enjoy reasonable prices from fresh fish are traders, middlemen (collectors): no government support, no buying fish from fishers [4]. Hence, there are facilities for fishing spots so that fishers do not sell fish in the middle of the sea to large ships, both from Indonesia and foreign vessels. So far, those who do not have ships, some sell them to collectors. Sometimes the price is played with, and sometimes it goes up, sometimes it goes down far, so the fishermen's income is uncertain [5]. The government needs to release fishermen's dependence on capital owners and abolish the bondage system [6]. Exports to Singapore are 90% of fish caught by fishermen in the Batam area. The prices offered by the Singapore market are higher when compared to the domestic market and can even increase two times compared to local prices.

In addition to these problems, the government should pay attention to fuel (fuel oil) availability [7]. Solar is complicated to obtain, even though diesel fuel is the primary need for fishers to go to the sea to find fish. Fishers sometimes queue to buy retail, so the price is higher. It is conceivable that when they go to sea, fishers need gasoline. After getting the catch, they need to market and distribute the fresh fish immediately; this also requires transportation, including gasoline.

Uncertain fish prices and the absence of fish auctions are the government's main concerns. Therefore, the existence of fish auction place for fishers is essential to improve the welfare of fishers [8], [9]. The fish auction place makes it easy for buyers and sellers to meet in one area with central and local governments' supervision [4]. In addition, it is also a means of fostering the quality of fishery products by the government or fishing communities [10] and controlling prices [11], [12] that are reasonable for consumers [13]. Physically, making a fish auction place is not easy. It costs the government budget. Besides that, it requires reasonable regulations and systems in the hinterland area community [14].

Several fishermen's problems have another side related to ownership of ICT devices in the form of cellphones which are pretty high by fishers. Making the fishery marketplace app application becomes an alternative solution to market fish [15]. Suppose you see from e-commerce activities that purchases are doing by visit the web or mobile app. Product orders are doing by select the features of the products provided. Marketing can be expanded by share information through social networking sites, search engines, and online advertising sites. Provision of products does not have to be physical but can display product catalogs digitally. There is a delivery fee, but the reach of consumers is wider.

Based on data from the Central Statistics Agency, in 2018, the number of Batam residents who access the internet reached 61.75%. Then in 2019, it came 72.63%. The increase is relatively high, soaring more than 10%, dominated by social media activities such as Facebook, Twitter, and WhatsApp. The percentage is 74, 43% of Batam's men can already access the internet, while women reach 70.78%. Then 88.06% of Batam residents already use computers, laptops, cellphones, and other wireless equipment. Based on data from iPrice and Jakpat (iprice.co.id and jakpat.net), 26% of the total 1000 respondents said they chose to use e-wallet/e-money as a payment method. In addition, some use ATM transfers and COD (Cash on Delivery), which are safe and convenient options when doing online shopping. Meanwhile, the transactions carried out ranged from 1-5 million rupiah.

Therefore, this study tries to develop a marketplace application for fishers used technology that utilizes SMS Gateway and Cash on Delivery (COD) transactions to match the background knowledge and skills. As an alternative to make it easier to market and distribute fresh fish and control market prices.

2. Method

The research method in software development uses a prototyping model. To make it easier to explore real needs in the field, use the prototyping method. The first step is to analyze the needs of fishers and the availability of infrastructure in the hinterland area. The survey was conducted in two locations: areas of Batam and Bintan, Riau Islands. In analyzing the application needs, we conducted a literature review survey, interviews and looked at the condition of the network infrastructure and the behavior of the hinterland community.

After developing the prototype of the application, we carried out usability testing using the SUS scale [16], [17]. Respondents were taken as many as 30 respondents from 150 participants in ICT

training activities for home industries (SMEs) spread across Batam [18]–[20]. The questions consist of 10 questionnaire items, according to the respondent's understanding of the fishermen's application. Participants will rate each question from 1 to 5 based on how much they agree with the statements they read. Five means strongly agree. One means strongly disagree.

3. Results and Discussion

The results of the application prototype are based on interviews and surveys on the availability of internet network infrastructure in hinterland areas, especially Batam and Bintan. Development of an SMS Gateway system [21], to send fish product catalogs by fishers. The internet network is not adequate when fishers go to sea, but the GSM connection is still relatively stable. Therefore, the SMS option is the most supportive option for fishers. Ownership of gadgets and background knowledge [2] and skills of fishers are also supportive to be applied [22]. Fishers send fish products via SMS gateway after they finish looking for fish, or they will dock [23].

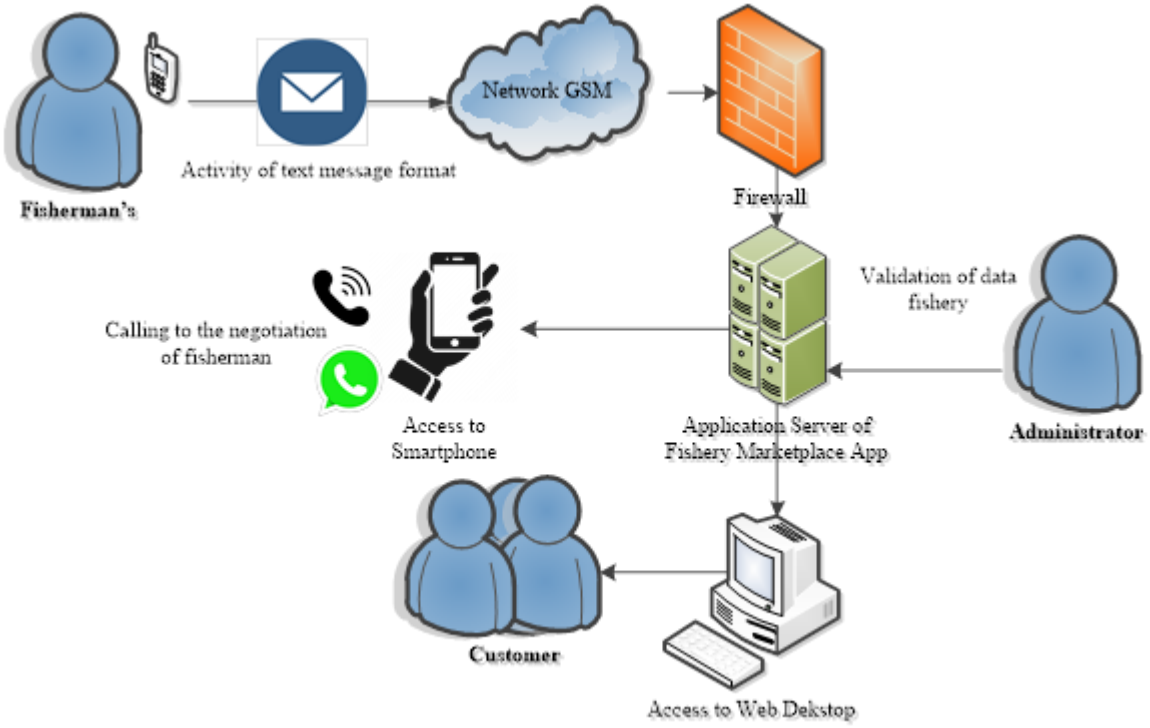

Fig. 1. Design of Fishery Market App

Fig. 1 shows the overall system design of the fishery marketplace app, starting from fishers sending SMS to marketing fish products. The SMS gateway server will capture and send it to the server of the fishery marketplace app. SMS can work if it matches the fisherman's cellphone number registered on the SMS gateway server. SMS in the form of information on fish products and prices per kilogram of fish. The format of the SMS messages sent by fishermen to the SMS Gateway server, in Table 1.

Table.1 Text Message Format for SMS Gateway

Activity	Message Format
Adding of fish product	Tambah#Selar#1#27000
Editing of fish product	Ubah#Selar#1#24000
Deleting of fish product	Hapus#Selar

Table 1 shows the activities of fishers in sending SMS message formats to the gateway server. SMS activities that can be done include adding fish products, updating fish products, and deleting fish products. Add and Edit is used to add and change fish data, the format added#selar#1#27000 means

adding a product of Selar fish, the weight of Selar fish is in one kilogram, and finally, Selar fish is in one-kilogram price is Rp. 27,000. Delete#selar activity is used to remove the product of Selar fish. The gateway server will filter the SMS message format suitability. The gateway server will refuse if the mobile number is not registered and the SMS text format activity is inappropriate. The gateway server then forwards to the marketplace webserver to display catalog information of fish products.

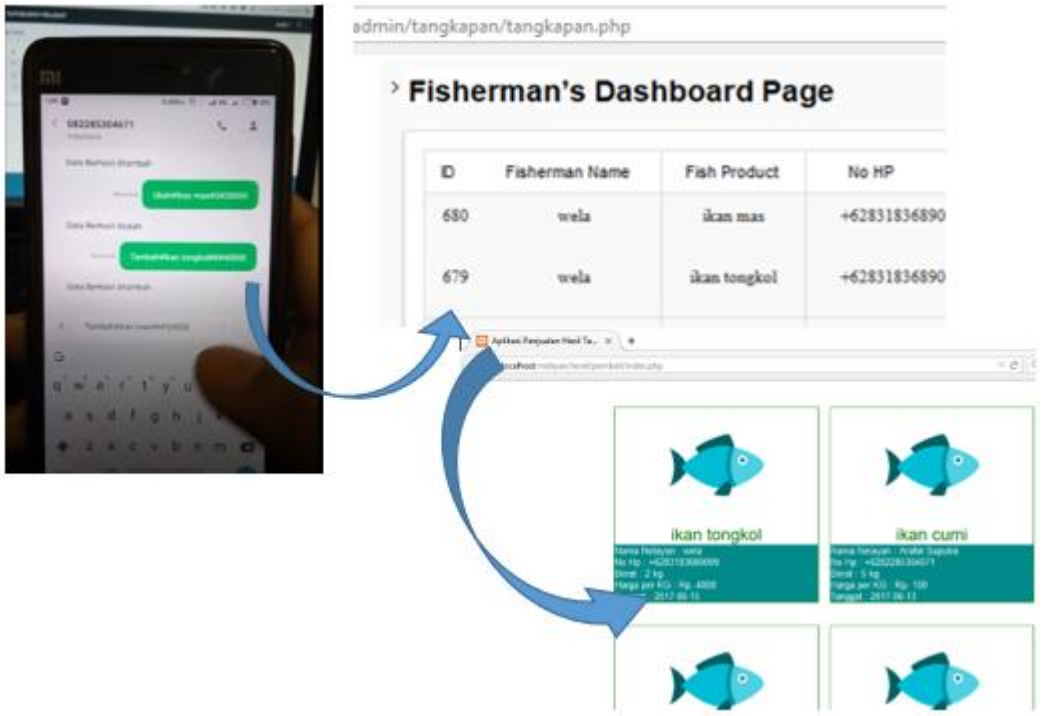

Fig. 2. Activity of Updating Fishery Market App

Fig. 2 is an activity of updating fishery market app. The application can run on the web and can also be accessed on a mobile app. Before using the fisherman application, register to the marketplace website by completing the profile and mobile number that has been registered in the WhatsApp application. The mobile number will also be registered on the Gateway Server to receive SMS message format activities. After registering and completing the profile, fishers can send short messages in the form of Table 1 SMS message format activities. Fishermen can also add, change and delete activities on the dashboard account of the fishery marketplace application.

The development of a fishery marketplace app brings together sellers and buyers. Buyers can access the fishery marketplace app on Desktop PC platforms and Mobile Devices. It is enough to open a browser and go to the fishery marketplace app site. The information available is in the form of fish products, prices, and cellphone numbers from fishers. To facilitate the buying and selling communication process, the buyer can contact the mobile number available in the call mode or use the chat mode on the Whatsapp application. The product display has integrated the Whatsapp API technology from the previously registered fisherman's cellphone number.

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<a
href="https://api.whatsapp.com/send?phone=628xxxxxxxx&text=Hallo,%20saya%20ingi
n%20membeli%20produk%20ini.">Contact us on WhatsApp</a>
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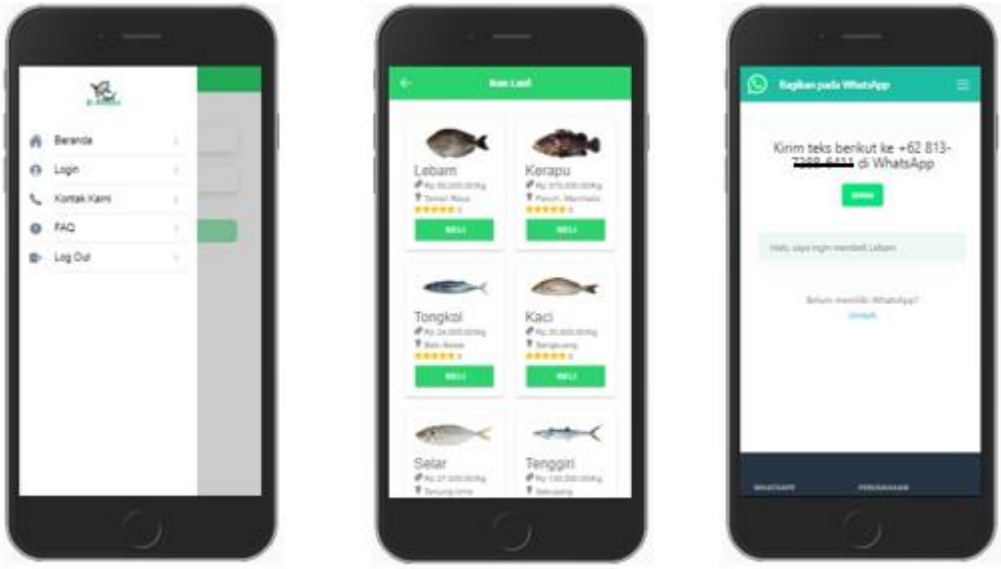

Fig. 3. Fishery Market App (a), (b) Fish Menu, (c) WhatsApp API.

Fig. 3 is a display of the fisheries marketplace application. The application displays a catalog of fish product data that appears periodically following SMS message information from fishers. The fish product display is updated automatically after being filtered on the SMS gateway server. Fish product catalog information and information validation can also be done by the admin manually as needed. The fish product catalog is shown in Fig. 3(b) so that buyers can view and make purchases—communication through mobile phone call services or by utilizing the WhatsApp application features. Transactions can be made by ATM transfer or COD (Cash on Delivery) according to needs.

Next, do the testing during the training event. Respondents tried the fisherman application and then filled out a questionnaire. The responses obtained were 30 respondents. Respondents are application users from the hinterland area of Batam and its surroundings.

Table.2 Result of System Usability Scale (SUS)

No	SUS Question	Likert Scale				
		1	**2**	**3**	**4**	**5**
1	I think I want to use this app often.	0	0	4	12	14
2	I found some of the menus to be uncomplicated.	3	20	7	0	0
3	I think the app is easy to use.	0	1	2	11	16
4	I think I need support from a technical person to be able to use this app.	9	18	3	0	0
5	I find the various functions in this app well integrated like the SMS and Whatsapp app.	0	0	3	11	16
6	I think there are too many inconsistencies in this application.	7	16	7	0	0
7	I imagine that most people will learn to use this application very quickly.	0	0	2	14	14
8	I think this application is very complicated to use.	7	21	2	0	0
9	I feel very confident using this application.	0	0	4	24	2
10	I need to learn a lot of things before I can use this app.	5	20	5	0	0
	Total average score	4.3	2.1	4.4	1.8	4.4

Table 2 displays the responses from 30 participants for each item in the SUS questionnaire as a total item. As noted earlier, the score takes between 1 (strongly disagree) and 5 (strongly agree). Question items were positive and negative on odd and even to reduce extreme agreement and response biases.

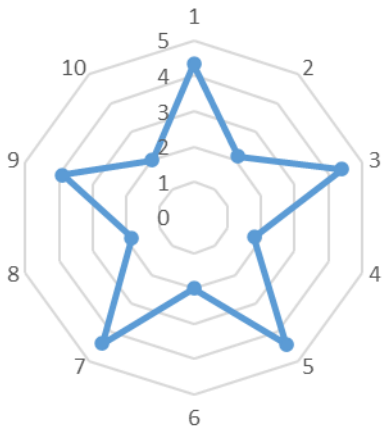

Fig. 4. Radar Chart of Question SUS

Fig. 4 shows the radar chart of question SUS (System Usability Scale). The average response to positive statements 1,3,5,7 and 9 is at the top point, which means it is functionally good and easy to use. However, responses to negative statements 2, 4, 6, 8 and 10 found that although they were easy to use, some inconsistencies and complications still exist.

The rules for calculating the SUS score on the questionnaire are that each question obtained is reduced by 1 for the odd-numbered questions, and the score is five minus the question scores obtained from the user for each even-numbered question. Furthermore, the sum of the scores for each question is multiplied by 2.5. The SUS is scored using the following formula [24]:

$$\text{SUS Score} = ((Q1-1)+(Q3-1)+(Q5-1)+(Q7-1)+(Q9-1)+(5-Q2)+(5-Q4)+(5-Q6)+(5-Q8)+(5-Q10)) \text{ x } 2.5 \quad (1)$$

Table.3 Result of Question SUS

Respondent	Item of Question										Total	SUS Score
	Q1	*Q2*	*Q3*	*Q4*	*Q5*	*Q6*	*Q7*	*Q8*	*Q9*	*Q10*		
Respondent 1	4	2	4	4	4	3	4	4	3	4	36	90
Respondent 2	4	2	4	4	4	2	4	4	2	2	32	80
Respondent 3	3	3	4	3	2	3	3	3	3	3	30	75
…	…	…	…	…	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…	…	…
Respondent 30	4	3	4	3	3	3	3	3	3	3	32	80
SUS Score												79.25

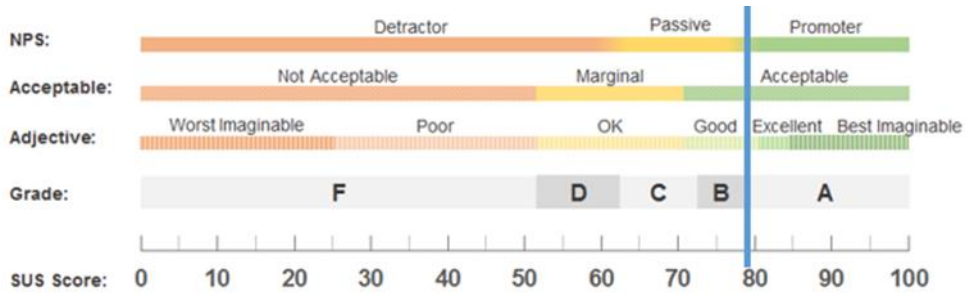

Fig. 5. SUS Score

Table 3 is the calculation of the Question SUS, and Fig. 5 is the SUS score. Based on the tabulation of SUS scores using a Likert scale, the result is 79.25 (blue line). This shows that the fisherman's application is good (grade B) and can be accepted by users, which means that it is functionally excellent and easy to use. In functionality, the application utilizes SMS gateway technology that supports GSM networks in the middle of the sea. Fishers can easily update fish product information by sending a short message according to the format specified in Table 1. In addition, it makes it easier for consumers to view and shop from the fish product information available on the web or smartphone. Effectively and efficiently, the application is considered better in distributing and marketing fish widely without being limited by the time and limitations of fish auction places.

4. Conclusion

The SUS score is 79.25, indicating that the fisherman's application is functionally perfect and user-acceptable. This research was motivated by the constraints of fish auctions and the difficulty in selling and distributing fish obtained by fishermen. The project focuses on building fish marketplace applications that support local items in the Batam and Bintan hinterlands. Based on the analysis and calculation of the SUS score, the result is 79.25, meaning that the fisherman's application is functionally perfect and can be accepted by users. The results of the application design utilizing SMS gateway technology are considered better and support GSM networks in the middle of the sea. Fishers can send short messages according to the specified format so that fish product information can be directly distributed or marketed widely through the fishery marketplace app. The Fishery Marketplace App makes it easy for consumers to get fish without taking a long time. At least it can minimize transportation and limitations of fish auction places. In addition, the public can view updates on fresh fish products. If interested, you can make transactions using the COD (Cash on Delivery) system. COD payment transactions are carried out to minimize fraud in commerce. Further research can examine business procedures and user login security following the behavior of the hinterland community in the fishery marketplace application, besides the application of gamification to attract the hinterland community as users of the fishery marketplace application.

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