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MSMEs Marketplace Application Design "NUTREAZY": Food Delivery Service Based on Nutrition Optimization

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Abstract

NUTREAZY is a marketplace application that provides food delivery service with complete nutritional information. This application can provide food menu recommendations based on optimization of nutritional fulfillment at the most optimal price. This marketplace application was created to provide solutions to the problems of food needs and intake in today's millennial era. Millennials tend to want food that is practical, easy to get, but at an affordable price. These habits make the millennial society's eating patterns become instantaneous. In addition, the role of the NUTREAZY application innovation is to increase the branding of quality MSME products and attract consumer buying interest. Delivery services can add value to the services of MSMEs while at the same time responding to the wishes of the millennial community with digital services that are easily available

Keywords: Marketplace application, food delivery, nutrition optimization, and nutritionist consultation

1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) have a very important role in driving the wheels of the economy, especially in developing countries such as Indonesia (Fijay et al. 2021; Andriyani et al., 2021). separated from people's lives in meeting the necessities of life and having high flexibility in their activities (Revindo et al., 2019; Agyapong, 2010; Tambunan, 2019). According to data processed by the Ministry of Cooperatives and SMEs (KPU) together with the Central Statistics Agency (BPS), the number of MSMEs in Indonesia reaches 99% of the total number of existing business sectors, thus acting as one of the most appropriate forums to increase the level of community welfare. In addition, MSMEs have absorbed 97% of the workforce in Indonesia or as many as 116.97 million people, this can be seen in Figure 1.

Figure 1. Contribution of Employment Absorption
(Sources: Ministry of Cooperatives and SMEs of the Republic of Indonesia, 2019)

MSMEs with food products, both freshly processed and ready-to-eat, are a large commodity in Indonesia (Prihadyanti, 2013; Bekele and Worku, 2008; Suwarni and Handayani, 2021). Besides the important role of MSMEs for the community and the country's economy, these business actors have several problems, such as management, technology, and production and marketing operational constraints that are difficult to avoid. Based on KPU data, the number of MSMEs experiencing business difficulties is 72.47%, the remaining 27.53% have no problems (Ministry of

Cooperatives and SMEs of the Republic of Indonesia, 2019. The problems faced by MSMEs are capital and production and marketing, this can be seen in Figure 2.

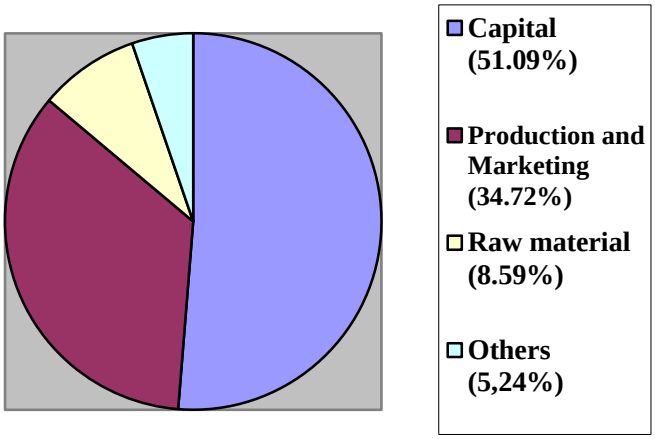

Figure 2. The obstacles faced by SMEs
(Sources: Ministry of Cooperatives and SMEs of the Republic of Indonesia, 2019)

The focus of the problem that can be handled entrepreneur management is the process of production and marketing. Perpetrators of SMEs with a food product, it has a vulnerability quality is based on the production process that reflects the quality of the product. Then the marketing process can affect consumer interest in buying the product. According to the research of Wicaksono et al. (2021). The priority of product selection that is still a complaint from consumers is product performance, service, and hygiene. These results are based on an assessment of the importance of high quality, but low consumer satisfaction. The details of consumer complaints can be seen in Table 1.

Table 1. Complaints based on Product Ratings for Consumers

	Assessment Indicators	Form of ComplaintsIndicators
Product Assessment Indicators for Consumers	Product Performance	content (nutrition) texture and shape Aroma Taste
	Service	and price
	Hygiene	Product Market

The obstacles faced by most MSME actors to obtain customer satisfaction are assessment of the quality of the food product itself. Because consumers today choose to buy food products based on their quality, this is reflected in their hygienic processing and good nutritional content. Apart from the quality value, consumers also choose to buy products in an easier way, this is included in the service indicator. Easier access to shopping services and affordable prices, one of which is through food delivery services (Candra et al., 2021).

At this time, the development of food delivery services continues to increase. This is because consumer needs continue to grow. Based on 2018 data, online food delivery in Indonesia grew by 23.8%. There are several business actors who have carried out delivery services independently, then there are also those who use third parties with food delivery applications. However, MSME actors have not been able to fully implement this digital service. Therefore, it is necessary to encourage the development of services and quality of MSMEs in order to meet consumer expectations so that product quality will increase directly (Suhartanto et al., 2019).

As an effort to develop MSMEs, innovation from experts who apply science and technology is needed. Therefore, this study intends to develop the quality of MSME products through the creation of the NUTREAZY marketplace application with delivery services based on the optimization model of nutrition fulfillment. This is expected to answer the needs of business actors to improve product quality (product performance and hygiene) with marketplace marketing that focuses on meeting nutritional or nutritional needs. In addition, delivery services can increase the service value of MSMEs as well as answer the wishes of the millennial community who tend to choose the convenience of instant shopping through digital means. The focus of the marketplace designed with an optimization model for nutrition fulfillment is also expected to be useful for increasing the general public's nutritional index.

2. Literature Review

The design of the NUREAZY application design requires some literature to be applied to develop the quality of MSME products. Food delivery services based on nutrition optimization must pay attention to product quality indicators. The indicators are (1) Customer Satisfaction; (2) E-Service Quality; and (3) Price Saving Orientation.

2.1. Customer Satisfaction

According to Kotler and Keller (2012), customer satisfaction is a person's feelings of pleasure or disappointment resulting from comparing the perceived performance (or outcome) of a product with expectations. This definition shows that marketplace and food delivery services must be able to manage expectations and service performance to consumers so that they can be satisfied with the services offered by service providers, in this case, MSMEs. There are several factors that determine customer satisfaction in using the marketplace, according to a study by Zulkarnain et al. (2015) showing that marketplaces and delivery services are influenced by service quality and marketplace application design.

Application design in this case can be equated with E-Service Quality. Research by Sheng and Liu, (2010) has also conducted similar research on online marketplace consumers. The results show that application design, information design, delivery service, and customer service have a significant influence on customer satisfaction. Customer satisfaction in this marketplace and delivery service can make consumers more loyal to certain products. Consumers who are satisfied with the services provided can make repeat purchases and even promote indirectly to other customers. At this time, the application of customer satisfaction-oriented services has not been widely implemented by MSME actors. Meanwhile, if MSMEs implement this, it will directly form a market commodity that is loyal to these MSMEs.

2.2. E-Service Quality

The processes and systems used by a marketplace to order food that can be done through an application show that there are aspects of E-Service Quality. Benhardy and Ronadi (2020) say that service quality on the internet is an area where a website or application facilitates an efficient and effective shopping, purchasing, and delivery experience of products and services. E-Service Quality is applied to shape the marketplace user experience to feel comfortable with the user experience offered. A good user experience from a marketplace will form user loyalty for reasons of being comfortable to use. This needs to be used as a reference to form a digital-based service because the E-Service Quality orientation will strengthen the quality of MSME products that will be offered indirectly through user complaints.

2.3. Price-Saving Orientation

Price Saving Orientation is the orientation of a person to save money when buying certain products. This price-saving orientation has a positive relationship with purchases in an online marketplace. The research of Escobar-Rodríguez and Carvajal-Trujillo, (2014) gives similar results where the more significant the price savings offered, the higher the probability that consumers will buy at a price that is considered worth it based on the benefits obtained. Another study, in the food delivery industry, found that consumer behavior tends to prioritize the orientation of price savings and is accompanied by the determination of good product quality. So that consumers tend to pay attention to more affordable prices after fulfilling the desired product quality. Therefore, the marketplace and MSME product delivery services that will be developed in this study implement a price optimization model with nutritional intake constraints. It is hoped that it can provide food menu recommendations at affordable prices, but can still meet nutritional needs.

3. Materials and Methods

3.1. Materials

The partner object of the application design in this study is the Sumedang Regency UMKM which sells ready-to-eat food. The MSME partner's business has been running with conventional operational implementation. MSME partners have never marketed their products through an online marketplace or delivery service. The software used for the design of this application is Adobe XD and Marvel App.

3.2. Methods

Method used in this research is an exploratory experimental method. Exploratory research is a type of research that aims to explore deepening knowledge or looking for new ideas. The activity in the experimental method is to design a

marketplace application with a delivery service based on nutrition optimization. These activities are implemented by implementing several things that underlie the application design, namely as follows.

3.2.1. Optimization Model for Basic and Specific Nutrition Fulfillment

Development of marketplace and delivery services through the recommended food menu features according to basic and special nutritional needs. The optimization form used is the optimization theory of nutrition fulfillment, using a linear programming model.

The following is a mathematical model of optimization of basic nutrition fulfillment:

$$\begin{aligned} &\textit{Minimum } Z = x_1 + x_2 + \ldots + x_j \\ &\textit{Subject to} \\ &\qquad a_1 x_1 + a_2 x_2 + \ldots + a_j x_j \geq b \end{aligned} \tag{1}$$

where x_j: food products to-j, a_j: calories in food-j, b: basic caloric requirements.

Then the mathematical model of optimizing the fulfillment of specific nutrients:

$$\begin{aligned} &\textit{Minimum } Z = x_1 + x_2 + \ldots + x_j \\ &\textit{Subject to} \\ &\qquad r_{11} x_1 + r_{12} x_2 + \ldots + r_{1j} x_j \geqslant\leqslant b_1 \\ &\qquad r_{21} x_1 + r_{22} x_2 + \ldots + r_{2j} x_j \geqslant\leqslant b_2 \\ &\qquad \vdots \\ &\qquad r_{i1} x_1 + r_{i2} x_2 + \ldots + r_{ij} x_j \geqslant\leqslant b_i \end{aligned} \tag{2}$$

where x_j: food products to-j, r_{ij}: nutrient content-i in food-j, b_i: specific limits on nutritional needs to-i.

The optimization model of basic and specific nutrition fulfillment in equations (1) and (2) will produce food choices that are in accordance with the required nutritional requirements constraints. As for the basic nutrition optimization model, the nutritional requirements used are only calories. However, for a specific nutrient optimization model, several nutrients are required. Adjustment of these nutritional constraints, depending on consumer needs, for example for diabetics, there will be obstacles to meeting the carbohydrate limit, as well as for certain other conditions (Gazan et al., 2018).

3.2.2. Price Optimization Model with Nutritional Intake Constraints

Implementing a price-saving orientation, it is necessary to develop marketplace services through the recommendation of food menus that are in accordance with nutritional needs but at the most affordable prices. The form of optimization used is the theory of price optimization of food that meets nutrition, using a linear programming model (Rizkya et al., 2019).

The following is a mathematical model of optimizing the price of food that meets nutrition:

$$\begin{aligned} &\textit{Minimum } Z = c_1 x_1 + c_2 x_2 + \ldots + c_j x_j \\ &\textit{Subject to} \\ &\qquad r_{11} x_1 + r_{12} x_2 + \ldots + r_{1j} x_j \geq b_1 \\ &\qquad r_{21} x_1 + r_{22} x_2 + \ldots + r_{2j} x_j \geq b_2 \\ &\qquad \vdots \\ &\qquad r_{i1} x_1 + r_{i2} x_2 + \ldots + r_{ij} x_j \geq b_i \end{aligned} \tag{3}$$

where c_j: price of food to-j, x_j: food products to-j, r_{ij}: nutrient content-i in food-j, b_i: limit of nutritional needs to-i.

3.2.3. Implementation of Nutrition Optimization Model in Java Programming

The basis used in nutrition optimization is a linear programming model. So, to do application development in programming, a basic linear programming model algorithm is needed. The programming language used is Java which was developed for the Android platform. The linear programming model algorithm in the Java programming language is presented as follows (Martínez et al., 2012).

```
public class LinearProgramming {
    private static final double EPSILON = 1.0E-10;
```

```
    private double[][] a;
    private int m;
    private int n;
    private int[] basis;

    public LinearProgramming(double[][] A, double[] b, double[] c) {
        m = b.length;
        n = c.length;
        for (int i = 0; i < m; i++)
            if (!(b[i] >= 0)) throw new IllegalArgumentException("RHS must be
nonnegative");

        a = new double[m+1][n+m+1];
        for (int i = 0; i < m; i++)
            for (int j = 0; j < n; j++)
                a[i][j] = A[i][j];
        for (int i = 0; i < m; i++)
            a[i][n+i] = 1.0;
        for (int j = 0; j < n; j++)
            a[m][j] = c[j];
        for (int i = 0; i < m; i++)
            a[i][m+n] = b[i];

        basis = new int[m];
        for (int i = 0; i < m; i++)
            basis[i] = n + i;

        solve();

        // check optimality conditions
        assert check(A, b, c);
    }
```

4. Results

4.1. Analyzing The Needs Of MSME Partners Through Thorough Brainstorming.

This stage is the beginning of mapping and analyzing the needs of MSME partners. It is hoped that through thorough brainstorming, appropriate results will be obtained. The needs of these partners will be the basis for designing services and features in the MSME food product marketplace application.

4.2. Conduct market analysis that is the target of the product.

In addition to needs analysis from the partner's perspective, it is also necessary to analyze the market that is the target of the MSME partner product. The results of market analysis can be used as a reference for a good marketing approach to consumers. Consumer behavior must be a special concern to achieve customer satisfaction indicators.

4.3. Service and feature design in marketplace applications.

After analyzing the needs of partners and market behavior obtained. Furthermore, the design of services and features in the marketplace application is carried out. The main services are food delivery, product nutritional information features, and optimization of nutrition fulfillment. The features were developed to reflect the branding of the products being marketed. Quality improvement of partners is carried out through the marketing of products resulting from optimization of nutrition fulfillment.

4.4. Marketplace application design

In relation to the implementation of E-Service Quality, application design is an important aspect to increase user satisfaction. User Interface (UI) and User Experience (UX) design affect the user experience of an application. The initial design of the marketplace application design to be made can be seen in Figure 4.

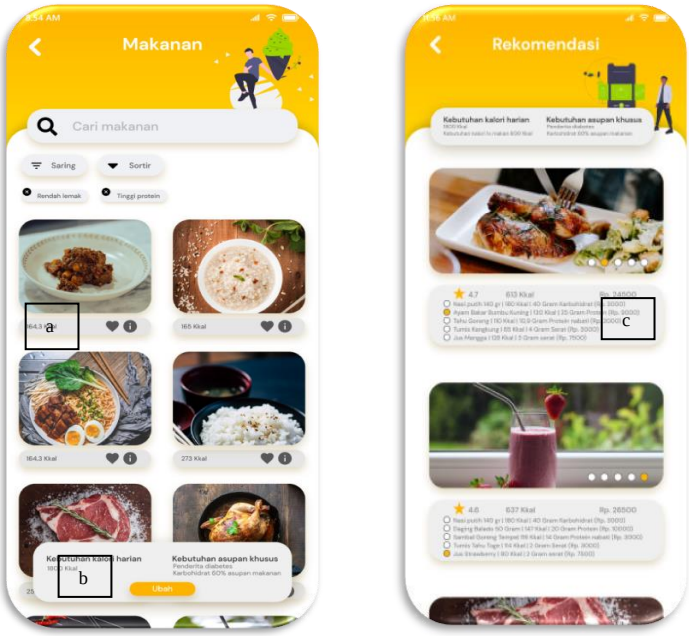

Figure 4. Design of the MSME Marketplace Application

In Figure 4 you can see several displays features designed, namely (a) displaying the calorie content of MSME food products, (b) displaying daily nutritional needs for application users according to health history, and (c) displaying menu recommendations resulting from price optimization and nutritional fulfillment models, thus displaying menus with the most affordable prices.

4.5. Market application development

After the application design is complete, then the application development process is carried out. This marketplace application will be developed on an Android basis. The development process will be carried out in outline using the Java programming language. The reason for using the Java programming language is its advantages in the ease of application development process and one of the programming languages that are multiplatform.

4.6. Recruitment of delivery courier partners delivery

Implementation of services will require delivery courier partners, so recruitment is required. Directly, this delivery courier partner recruitment process will absorb workers. MSME business development steps like this are a form of improving people's welfare by opening up new job opportunities.

4.7. Product marketing through the marketplace application

After the marketplace application and its feature services are ready to be used, then the distribution process for MSME products begins to be marketed. Digital forms of marketing play an important role in reaching the potential of consumers widely. The advantage of digital marketing is the flexibility of consumer interaction, where business actors can connect anytime and anywhere to serve customers. This has the opportunity to generate higher sales due to the unlimited service time. In addition, this digital marketing allows MSMEs to compete more strongly with big business actors.

4.8. User satisfaction research

While marketplace products and applications are already running, business development aspects must continue to be analyzed. One of the aspects of user satisfaction that greatly affects the business development process, that the results of user assessments can reflect the state of the business from the consumer side. User satisfaction research is used as the basis for the business evaluation process carried out by MSMEs. Both complaints and praise must be used as an evaluation in order to improve service to consumers.

4.9. Feature development according to market and consumer needs.

The results of user satisfaction research are used as the basis for developing features or services in marketplace applications. The feature development process based on user input will continue to form a cycling process. Businesses that are oriented to customer satisfaction will continue to innovate to create useful service features so that the cycling process will not stop.

5. Conclusion

This research has designed the NUTREAZY marketplace application with food delivery services for MSME products. Based on the results of the research, the design of this application can be carried out in nine stages, namely, 1) Conducting an analysis of the needs of MSME partners through thorough brainstorming; 2) Conduct market analysis which is the target of the product; 3) Design of services and features in the marketplace application; 4) Marketplace application design; 5) Marketplace application development; 6) Recruitment of delivery courier partners; 7) Product marketing through marketplace applications; 8) User satisfaction research; and 9) Development of features according to market and consumer needs. The innovative features developed are (a) displaying the calorie content of MSME food products, (b) displaying daily nutritional needs for application users according to health history, and (c) displaying menu recommendations resulting from price optimization models and nutrition fulfillment, thus displaying menus. at the most affordable price.

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