

## PEDULI HERBAL: INNOVATIVE MARKETPLACE AND CONSULTATION APP FOR HERBAL MEDICINE BASED ON MACHINE LEARNING

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### ABSTRAK

Obat herbal diakui dan digunakan secara luas di berbagai populasi, terutama di kalangan komunitas Muslim yang mematuhi tradisi pengobatan Nabi Muhammad SAW. Indonesia dengan keanekaragaman hayatinya yang kaya menonjol sebagai negara dengan potensi besar dalam pengembangan dan pemanfaatan obat herbal, dengan lebih dari 2.850 spesies tanaman obat yang telah diidentifikasi. Meskipun memiliki potensi ini, penggunaan efektif obat herbal terhambat oleh kurangnya pendidikan dan informasi yang dapat diakses. Makalah ini memperkenalkan 'Peduli Herbal', sebuah aplikasi pasar dan konsultasi inovatif yang memanfaatkan teknologi pembelajaran mesin. Aplikasi ini bertujuan untuk mendukung praktik pengobatan herbal dengan menawarkan sumber daya pendidikan, opsi pembelian yang aman dan legal, serta informasi ilmiah untuk mengurangi kesalahpahaman tentang perawatan herbal. Aplikasi 'Peduli Herbal' menampilkan platform terintegrasi yang memberikan akses kepada pengguna untuk konsultasi ahli, konten edukasi, dan pasar untuk membeli produk herbal yang terverifikasi. Dengan memanfaatkan pembelajaran mesin, aplikasi ini menawarkan rekomendasi yang dipersonalisasi dan wawasan ilmiah terkini, memastikan pengguna menerima informasi yang andal. Implementasi aplikasi ini diharapkan dapat meningkatkan minat masyarakat terhadap obat herbal, mendukung perekonomian lokal, dan memaksimalkan pemanfaatan sumber daya alam Indonesia. Pada akhirnya, 'Peduli Herbal' bertujuan untuk menjembatani kesenjangan antara praktik herbal tradisional dan perawatan kesehatan modern, mempromosikan pendekatan holistik terhadap kesehatan dan kesejahteraan.

**Kata kunci:** Peduli Herbal, Machine Learning, Konsultasi.

### ABSTRACT

Herbal medicine is widely recognized and utilized among various populations, particularly within Muslim communities that adhere to the medicinal traditions of Prophet Muhammad SAW. Indonesia, with its rich biodiversity, stands out as a country with immense potential in the development and utilization of herbal medicines, housing over 2,850 identified medicinal plant species. Despite this potential, the effective use of herbal medicines is hindered by a lack of education and accessible information. This paper presents 'Peduli Herbal', an innovative marketplace and consultation application leveraging machine learning technology. The application aims to support the practice of herbal medicine by offering educational resources, safe and legal purchasing options, and scientific information to mitigate misconceptions surrounding herbal treatments. The 'Peduli Herbal' application features an integrated platform providing users with access to expert consultations, educational content, and a marketplace for purchasing verified herbal products. By utilizing machine learning, the application offers personalized recommendations and up-to-date scientific insights, ensuring that users receive reliable information. The implementation of this application is anticipated to enhance public interest in herbal medicine, bolster the local economy, and maximize the utilization of Indonesia's natural resources. Ultimately, 'Peduli Herbal' seeks to bridge the gap between traditional herbal practices and modern healthcare, promoting a holistic approach to health and wellness.

**Keywords:** *Peduli Herbal, Machine Learning, Consultation*

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## 1. INTRODUCTION

Herbal medicine is the use of drugs to reduce, eliminate disease, or cure someone from disease by using parts of plants which are then processed into herbal medicinal plants<sup>1</sup>. Herbal medicine is one of the choices taken by the community, especially Muslims, relying on the traditions that explain that the Prophet treated with herbal medicine. Such as the Prophet's habit of consuming honey, habatusauda or black cumin, cupping, and other examples. In some traditions the Prophet stated the efficacy of certain herbal remedies. For example, the Hadith narrated by Imam Bukhori, Muslim, Ibn Majjah, Ahmad, and other narrators from Abu Hurairah R.A which reads:

الحبة السوداء شفاء من كل داء إلا السام

“Habatusauda (black cumin) is a cure for all diseases except death.”<sup>2</sup>

Based on these sahih hadiths, it reinforces how great the efficacy of herbal medicine is and is able to become an effective alternative treatment for the community. In particular, Indonesia has excellent potential for the growth of herbal plants and the habitat of animals that produce herbal medicines. Indonesia is an agricultural country that has a tropical climate. It is known that Indonesia has more than 2,850 species of medicinal plants that have been identified<sup>3</sup>. The Indonesian Ministry of Health states that 30,000 plant species live in Indonesia and 6,000 have been identified<sup>4</sup>. Looking at the benefits and potential of herbal medicine in Indonesia, it is very strategic if it is developed for public health and treatment as well as economic opportunities for the country to export to the world.

The fact is that there are still many people who are not interested in using herbal medicine for various reasons. One of them is due to the lack of education and knowledge about herbal medicine. People have difficulty finding a web or any form of information source to find out about the sources of herbal medicines, the efficacy of various herbal plants, and medicines that are safe for consumption. There is no legal and guaranteed herbal medicine consultation forum by the government, so it is also difficult for people to identify what herbal medicine is right for the disease they are experiencing.

Therefore, it is important to have a breakthrough application that can support the practice of herbal medicine. The application collects features that can educate and serve the needs of the community for herbal medicine. With the app, people are able to consult, expand their literacy, and purchase safe and legal herbal medicines. Not only that, the application will also upload scientific information that will eradicate hoaxes or misunderstandings related to

<sup>1</sup> Zakiyah, Kiki. (2017). Herbal Healthcare Center. Hal 1. [media.neliti.com](http://media.neliti.com). Accessed May 1, 2024.

<sup>2</sup> Bukhori. (2007). Shahih Bukhori. Hal. 1060 Dar Kutub Ilmiah

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<sup>4</sup> Kementerian Kesehatan RI. (2022). Perkembangan Obat dan Pengobatan Tradisional Dalam Kesehatan Masyarakat dan Pemanfaatannya di Rumah Sakit. Accessed May 6, 2024 dari [https://yankes.kemkes.go.id/view\\_artikel/13/perkembangan-obat-dan-pengobatan-tradisional-dalam-kesehatan-masyarakat-dan-pemanfaatannya-di-rumah-sakit](https://yankes.kemkes.go.id/view_artikel/13/perkembangan-obat-dan-pengobatan-tradisional-dalam-kesehatan-masyarakat-dan-pemanfaatannya-di-rumah-sakit)

herbal medicine. So this paper is made to provide an overview of the herbal medicine application called 'Peduli Sehat'.

**a. Problem Formulation**

1. What is the 'Peduli Sehat' app?
2. What are the features offered by the 'Peduli Sehat' app?
3. How important is the app to the community?

**b. Research Objectives**

The purpose of writing this work is to provide an overview of applications that support the practice of herbal medicine in Indonesia by presenting features that support the actual and factual needs of the community.

**c. Benefits of Writing**

The expected benefit of writing this scientific paper is to be able to increase the interest of Indonesian people in herbal medicine through the provision of the 'Peduli Herbal' application. Apart from the awareness of following the sunnah of the Prophet Muhammad SAW, it also optimises the natural potential that Allah has bestowed on this motherland. With an increase in interest, it is able to stretch the economic land that improves the welfare of the people and provides additional income for the state. Indonesia is also able to promote research on the discovery of new herbal ingredients and optimise the production of medicines to be marketed domestically and abroad.

**d. Writing Limitations**

The writing will be limited to the driving factors that necessitate the need for the 'Peduli Herbal' application and the description of features along with an overview of the 'Peduli Herbal' application prototype.

## **2. METHOD**

This research uses a qualitative approach with a literature research method, which investigates the natural situation of the object of research and emphasizes the relevance of research results rather than generalization. This type of research is exploratory, where researchers aim to identify initial problems in general and explore problems that need to be investigated further (Marfai, M.A., 2018). The focus of the research is to obtain data that is objective, valid, and applicable to certain variables, especially in finding literature on the concept of herbal care applications for the sale and consultation of safe herbal medicines (Sugiyono, 2014). The data used is secondary data, obtained from various literature references such as books, journals, and relevant websites (Nadzir, M., 2019). Data is collected through literature studies and analyzed by reviewing relevant information, collecting sources of study materials, taking quotations from reading materials, and interpreting and concluding the results of data analysis.

## **3. RESULTS**

**a. Definition and history of Herbal Medicine**

Herbal medicine, also known as phytomedicine or botanical medicine, is medicine derived in whole or in part from plants. The term herbal actually means non-woody plants or plants that are shrub<sup>[1]</sup>. The use of herbs or medicinal plants as medicine is said to be as old as the age of man himself. The use of herbs has been known and widely used since ancient times because it has efficacy and potenc.

Plants have been used to treat various medical conditions since ancient times. From leaves, roots, stems, to flowers, every part of the plant often contains natural chemicals that can provide health benefits. Various cultures around the world have developed traditions of using medicinal plants that continue to survive to this day. The advantage of herbal medicines is that they come from natural sources that are often more easily absorbed by the human body and have fewer side effects compared to synthetic drugs. However, it is important to remember that despite their natural nature, medicinal plants can also have interactions with other medicines or cause allergic reactions in some individuals. Although the existence of herbal medicine has long been recognised, modern research continues to reveal more potential and benefits of medicinal plants. As a result, the use of herbal medicine is increasingly widely accepted in the field of modern medicine, both as part of alternative therapies and adjunctive therapies for certain health conditions (Notoatmodjo, 2011, p. 345).

The history of herbal medicine can be traced back to ancient times, when food and medicine were inseparable. Many plants were eaten for their healthy properties. Nowadays, experts are becoming more interested in the use of herbal medicines because the side effects are minimal. This is because the composition in it can still be digested by the body. The use of herbal medicine has been known and widely used since ancient times because it has efficacy and potency. Herbal medicine is processed traditionally and from generation to generation, based on ancestral recipes, customs, beliefs, or local habits, both magically and traditional knowledge.

In Indonesia, herbal plants are a biological wealth that is owned. These plants are usually processed into traditional medicine. However, it turns out that traditional medicinal plants existed earlier when compared to conventional medicine. Traditional medicine does not only consume herbal medicines but also includes non-medical measures such as acupuncture, acupressure, massage, yoga, and others. Jamu, an example of Indonesian traditional medicine, has been claimed to exist in Indonesia from 1300 years ago when the Mataram Kingdom was victorious. Evidence that strengthens this claim is the carvings on several existing temples such as Borobudur Traditional medicine traditions in Indonesia have deep roots in its culture and history. Various tribes and ethnicities in Indonesia have unique knowledge about the use of medicinal plants to treat various diseases and health problems. Traditional medicine often involves practices that have been passed down through generations, accompanied by deep beliefs and philosophies.

In addition, traditional medicine also includes spiritual and holistic aspects that view health as a balance between body, mind, and spirit. Therefore, many of the traditional medicine practices in Indonesia aim not only to cure physical ailments, but also to strengthen energy balance and improve overall well-being (Wibowo, 2015, p. 2).

In the modern era, traditional medicine still remains relevant in Indonesian society, both as a primary choice and as a complement to conventional medicine. Indonesia's cultural and natural diversity is a rich source of knowledge on the use of medicinal plants and traditional medicine practices, which continue to evolve and be passed down from generation to generation.

#### **b. Benefits and limitations of herbal medicine**

Herbal medicine, also known as phytotherapy, has significant benefits and limitations in its use as a treatment alternative. One of the main benefits of herbal medicine is its broad and complex

properties. Many types of herbal medicines can be used to treat a variety of diseases, including chronic diseases such as diabetes, hypertension, and heart disease. These properties can be attributed to the active ingredients contained in herbal medicines, such as flavonoids, alkaloids, and saponins, which can function as anti-inflammatory, anti-oxidant, and anti-cancer agents.

Furthermore, herbal medicines are also considered safe and effective because the active ingredients come from nature and do not contain synthetic chemicals that can be harmful. Better quality can also be guaranteed because the active ingredients are naturally produced and do not go through a chemical synthesis process that can reduce quality.

Wide availability is also one of the benefits of herbal medicine, as it can be found in various parts of the world and can be processed traditionally or modernly. Medicinal plants grow in a variety of climates and environments, providing easier access to people living in different regions. In addition, for communities with traditional knowledge of medicinal plants, they can process them in ways that have been tested over centuries. The diversity of herbal medicine processing methods also allows for adaptation with the times. While traditional methods such as drying, soaking, or distilling are still used, modern technology has also been utilised to improve efficiency and safety in the herbal medicine manufacturing process. Modern processing can ensure more consistent quality and safety of herbal products.

In addition, herbal medicine is often the choice for individuals seeking a more natural and holistic treatment alternative. The use of herbal medicine often aims not only to cure diseases, but also to strengthen the immune system, improve overall well-being, and promote balance of body, mind, and spirit.

However, herbal medicine also has some limitations. One of the main limitations is the non-standardised quality. The quality of herbal remedies may vary depending on the manufacturer and processing method, so it is important to ensure the quality of the product before use. Unknown side effects can also be a limitation, as herbal medicines can have unknown or non-standardised side effects. Limitations in use may also occur, as herbal remedies cannot be used to treat all diseases, and some herbal remedies are only effective for treating certain diseases.

Limitations in availability may also occur, as herbal medicines are not always available everywhere and can be difficult to obtain in some areas. Knowledge about herbal medicine is also still limited, so it is important to continue to conduct research and development to improve the knowledge and quality of herbal medicine. Thus, it is important to understand the benefits and limitations of herbal medicine before using it as an alternative treatment.

### **c. Current market trends and consumer demand for Herbal Medicines**

Current market trends show increasing consumer demand for herbal medicines. In recent years, the herbal product business in Indonesia has experienced significant growth. This is caused by several factors. One of the main factors driving the growth of the herbal medicine market is public awareness of the importance of maintaining health naturally. More and more people are starting to pay attention to healthy eating patterns, active lifestyles, and the use of natural products as part of disease prevention efforts<sup>14</sup>. People are now more likely to seek more holistic and environmentally friendly solutions in managing their health, making herbal medicine an attractive option. In addition, increasing concerns about the side effects and risks associated with the use of synthetic chemical drugs are also factors driving demand for herbal medicines. Many consumers are looking for safer and natural alternatives, in the hope of reducing the risk of side effects that may arise from the use of chemical drugs.

The use of herbal products is also increasingly popular as part of traditional medicine which has been proven effective in treating various health problems. The healing tradition inherited from our ancestors using medicinal plants has become an inseparable part of the culture and identity of Indonesian society. With increasingly open access to information and

knowledge about the benefits of medicinal plants, the use of herbal products is becoming more accepted and sought after by modern society.

The herbal products market in Indonesia is expected to reach IDR 23 trillion in 2025, according to a Euromonitor International report. This growth is driven by the increasing use of herbal products in Indonesia, which have very strong roots and are used for various purposes such as treating common ailments, improving overall health, and maintaining beauty.

The growth trend in the herbal product market in Indonesia is also influenced by the COVID-19 pandemic, which has increased public awareness about the importance of health and safety of natural products. Since the start of the pandemic, people have increasingly paid attention to efforts to prevent disease and are looking for ways to boost the immune system naturally. This has prompted many individuals to turn to herbal products as part of their health strategy. The impact of the COVID-19 pandemic has also increased public interest in traditional medicine as a safer and more natural alternative. In response to limited access to conventional medical care during lockdown and isolation, many people are looking for health solutions that can be done at home using natural ingredients. The use of herbal products as traditional medicine has become increasingly popular, as they are considered safe, easily accessible, and have few side effects. Not only that, the increase in the use of herbal products is also driven by the public's desire to reduce the risk of contracting infectious diseases, including COVID-19, by improving the body's immune system. Many herbal products are promoted to increase immunity, such as herbs, herbal supplements, and herbal teas. Consumers are increasingly realizing that maintaining holistic health, including through the use of herbal products, can help them fight disease and maintain well-being.

Increased use of social media and e-commerce platforms has become an important factor in increasing the accessibility and demand for herbal products in Indonesia. In the context of scientific papers, this phenomenon shows shifts in consumer behavior and market dynamics which have a significant impact on the herbal products industry<sup>17</sup>.

Social media such as Instagram, Facebook and YouTube allow herbal product manufacturers to directly interact with potential consumers. They can share information related to product benefits, user testimonials, and other educational content, thereby strengthening public awareness about herbal products. In addition, e-commerce platforms such as Tokopedia, Shopee, and Bukalapak facilitate the purchase of herbal products online, making it easier for consumers to find and purchase the products they need. The use of social media and e-commerce in marketing herbal products not only creates new opportunities for producers and sellers, but also helps increase consumer confidence in herbal products. With reviews from other users and easy accessibility of information, consumers can make more informed purchasing decisions.

#### **4. DISCUSSION**

##### **a. Peduli Herbal: Trusted Solution for Consulting and Purchasing Herbal Medicines**

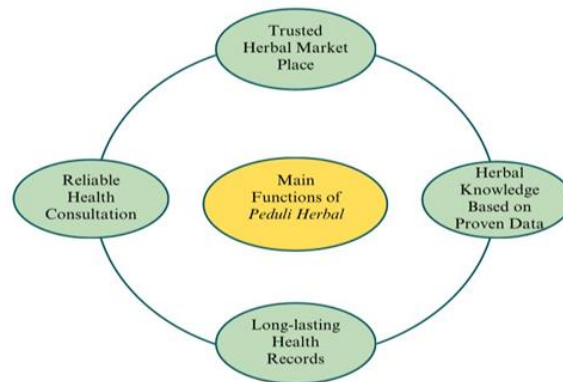
We already know the urgency of knowing the right herbal medicine and where the source of the herbal medicine comes from. The next step is to determine effective and efficient steps in implementing this urgency in everyday life. Consulting with experts before determining the right herbal treatment is an effective step. Apart from that, further selecting where the medicines and herbal plants come from is also very important. These two things can be achieved by consulting and purchasing medicines and herbal plants on

trusted platforms, especially in today's digital era. Peduli Herbal is here as an innovative and solution in providing various herbal medicines, herbal plants, and Islamic health services based on the Al-Qur'an and Hadith.

Peduli Herbal was initiated by utilizing technological advances by crowdsourcing. The result of combining the marketplace system and health services into a single application that is complete and easily accessible to all groups. This application focuses on user trust and satisfaction in herbal medicine practices such as purchasing herbal medicines, herbal medicine consultations, and knowledge about herbal medicines and plants. With Peduli Herbal, it is hoped that it can become an application to support the practice of herbal medicine in the digital era.

### **b. Main Function of Peduli Herbal**

In general, the Peduli Herbal application has 4 main functions, namely: reliable health consultations, trusted herbal marketplace, herbal knowledge based on proven data, and long-term health records.



**Picture 1.** Main Functions Circle of Peduli Herbal

#### **1.) Trusted herbal market place**

The first main function of the Peduli Herbal application is as a trusted place for buying and selling medicines and herbal plants. This function is summarized comprehensively in the Buy Herbal feature in the Peduli Herbal application. In this Buy Herbal feature, the Peduli Herbal application only collaborates with various herbal sellers and producers who already have product circulars and are standardized by the Ministry of Health or BPOM in their sales. This is done to minimize the sale of fake medicines. So you can be sure that all products sold in this feature are guaranteed safe and authentic.

On the home page of the Buy Herbal feature, users will be faced with various choices of herbal products along with product prices. Then the product page contains photos, prices, descriptions, benefits, consumption recommendations, as well as the source or manufacturer of the product. Buy Herbal also provides a basket feature that can collect any herbal treatment that will be purchased in one payment so that purchases will run more effectively and efficiently. Payments can be made via bank, e-wallet and COD (Cash On Delivery). Apart from that, in the Herbal Marketplace feature there is also a comments feature for each product, so that users can provide feedback on the herbal medicines they have purchased and become a track record for the product. This comments feature is also very useful for other users who are just about to buy the product.

## **2.) Herbal knowledge based on proven data**

There is a lot of knowledge about plants and herbal medicine spread across various platforms and from various sources. However, not all sources of herbal knowledge can be trusted and have been clinically tested. Peduli Herbal presents the Herbal Literacy feature where all knowledge about herbs such as herbal plants, types of herbal treatments, herbal medicines, and so on is summarized in the Herbal Literacy feature. The information is arranged in alphabetical order so that it is easier for users to find information about herbs in this feature. Apart from that, at the end of the word description sentence, the source of the meaning of the word is also attached. This source is of course taken from health journals with the International Journal of Islamic Medicine as the main source in completing the Herbal Literacy feature.

## **3.) Long-lasting health records**

To optimize the long-term use of the Peduli Herbal application, a continuous database update system is required. One such feature is "Data Sehatku" or long-term health records. Unlike user biodata, the Data Sehatku feature only contains users' health history data. The data collection technique uses questionnaires. At this stage, users are directed to fill out a short questionnaire at least once a month, especially before consulting a doctor. The questionnaire includes questions about possible symptoms of various diseases. Users' answers indicate how frequently they have experienced these symptoms in recent days. This can serve as an indicator of whether the user might be suffering from an illness.

To support the sustainability of the health data feature on Peduli Herbal, the concept of machine learning is used for data processing. When users fill out health data via the questionnaire, machine learning will process, integrate, and match the data from the database with the data obtained from each questionnaire answer. The questionnaire questions use an elimination method for every possible disease symptom. For instance, for users suffering from GERD or acid reflux (*Gastroesophageal Reflux Disease*), questions will be provided about the most common symptoms, such as headaches, pain in the torso (body and stomach), or pain in other parts of the body. If the symptom is pain in the torso, users will be asked to specify the type of pain experienced. The questions then continue to become increasingly specific and focused. The characteristics of these specified symptoms are then detected by machine learning, resulting in an output conclusion of a GERD diagnosis along with recommendations for herbal treatments for the disease.

## **4.) Health consultation with reliable medical expert**

Health is a crucial thing and should not be taken lightly, so it requires special supervision from experienced medical personnel. Although various sources of health information are available, proper medical experience and knowledge is only available to trained health professionals. When we feel the symptoms of a disease, we should not immediately diagnose ourselves without an expert. Self-diagnosing can lead to substance abuse, excessive anxiety, or even ignoring serious medical conditions that require professional attention. Therefore, it is important for us to carry out consultations.



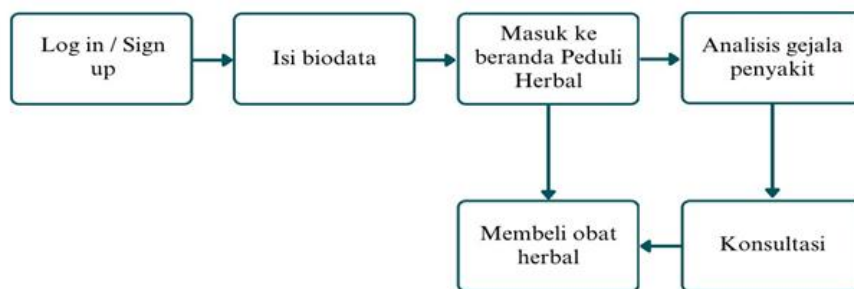
The final feature in the Peduli Herbal application is a consultation, where users who have carried out a disease symptom questionnaire test have a discussion session with the available doctors. At this stage the patient recounts details of his condition that were not revealed during the disease symptom test to the doctor. After that, the doctor analyzes, diagnoses and provides conclusions regarding what things the patient should do and what herbal medicines are appropriate to follow up on the patient's symptoms based on the consultation session and data from the questionnaire.

These four main functions of Peduli Herbal offer practical, effective and efficient herbal treatment solutions because they are packaged in one multi-purpose application.

### c. Peduli Herbal system workflow

The work flow of the Peduli Herbal system is divided into 2 stages/phases, both of which have the same output, namely purchasing herbal medicines on the Peduli Herbal application. The first phase flow is logging in/signing up, filling in biodata, going to the Peduli Herbal application homepage, analyzing disease symptoms, consulting, and purchasing herbal medicine. This first phase is intended for patients who do not yet know what disease they are suffering from, so consultation and analysis of disease symptoms is required first before purchasing herbal medicine.

Then the flow of the second phase is almost the same as the first phase, but there is a difference in that after successfully entering the application homepage, users can immediately buy herbal medicine according to their needs without analyzing disease symptoms and consulting first. A clearer depiction can be seen in the following flowchart.



**Picture 2.** Flowchart / Peduli Herbal system workflow

### d. SWOT Analysis

Dissection of internal and external factors plays an important role in inclusive herbal success. SWOT analysis (Strengths - Weaknesses - Opportunities - Threats) will present a comprehensive perspective of the Peduli Herbal application.

**Table 1.** SWOT analysis of Peduli Herbal

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>● It has four main features that can meet the health needs of the community.</li> <li>● All forms of user identity and information are guaranteed to be secure and confidential.</li> <li>● The quality of herbal products and medical professionals is guaranteed and reliable.</li> </ul>	<ul style="list-style-type: none"> <li>● A stable and good internet connection is required to access the application.</li> <li>● There is a shortage of qualified medical professionals.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>● Optimizing the utilization of Indonesia's rich flora and fauna potential and the development of herbal medicines.</li> <li>● Expanding the market reach for herbal medicines.</li> <li>● There is no digital application that combines consultation features and the purchase of herbal medicines.</li> </ul>	<ul style="list-style-type: none"> <li>● It takes a long time to coordinate from producers to consumers.</li> <li>● It could negatively impact small MSMEs (Micro, Small, and Medium Enterprises) that cannot keep up with developments.</li> <li>● System malfunctions can hinder the operation of the application.</li> </ul>

## 5. CONCLUSION

This article emphasizes the importance of integrating digital technology to support herbal medicine practices through the Peduli Herbal application platform. This application is designed to provide easy and reliable access to herbal health products and services by combining herbal purchasing features, consultation with experts, and storage

of user health data. Based on the analysis results, Peduli Herbal offers several significant benefits for its users.

First, this application expands public access to safe and quality herbal products. Second, the consultation feature allows users to get advice from medical personnel who are certified in the herbal field, thereby increasing accuracy and safety in the use of herbal products. Third, digital health data storage makes it easier for users to monitor and manage personal health information more efficiently and organized. The implementation of digital technology in herbal medicine practices can encourage local economic development by utilizing Indonesia's rich natural resources.

The Peduli Herbal app has potential for further enhancement and development, requiring support from various stakeholders to maximize its benefits for the community. Regulatory backing and policies from the government are essential to foster the growth and utilization of herbal medicines, including incentives for producers and stricter quality control measures. Involvement of certified medical professionals in the herbal field is crucial to ensure service quality and safety, necessitating continuous training to stay updated with advancements. Public education on herbal medicine benefits and usage is imperative for informed decision-making. Collaboration with the tech industry is vital for ongoing app improvement and user satisfaction, leveraging IT innovations for service efficiency. With concerted efforts from these stakeholders, Peduli Herbal can evolve into a dependable platform, offering extensive benefits and contributing significantly to public health through herbal medicine utilization.

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