


## TaniMarket: An E-Commerce Platform for Empowering Local Agricultural MSMEs

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Article Info	ABSTRACT
<b>Keywords:</b> TaniMarket, MSMEs, Information Systems, Agricultural Products, Web-based.	The development of information technology provides a great opportunity for Micro, Small, and Medium Enterprises (MSMEs) to market their products digitally, including in the agricultural sector. However, there are still many agricultural MSME actors who have not utilized this technology optimally. This research aims to build a web-based information system called TaniMarket, which can be used as a means of marketing agricultural products by MSME actors. Application development is carried out using the Waterfall method, which includes the stages of needs analysis, system design, implementation, testing, and maintenance. The application is built using PHP programming language version 8.1, the CodeIgniter 4 framework, and the MySQL database. This system consists of two main roles, namely admin and user. Admins have full access to product and category management features, including adding, modifying, and deleting data, as well as uploading images and order information. Meanwhile, users can view a list of products by category and place orders directly through the WhatsApp button that has been provided with automatic messages. The results of the system test show that all features run according to the design that has been determined. The TaniMarket application is considered to be able to provide convenience for MSME actors in marketing their garden products more widely and efficiently. With a simple and responsive interface, this system also supports users in accessing product information quickly and practically. Overall, this application is an effective digital solution in supporting the increase in the competitiveness of agricultural MSMEs in the era of digital transformation.
This is an open access article under the <a href="https://creativecommons.org/licenses/by-nc/4.0/">CC BY-NC</a> license 	<b>Corresponding Author:</b> Adli Abdillah Nababan Universitas Prima Indonesia Jl. Sampul No. 3, Medan <a href="mailto:adliabdillahnababan@unprimdn.ac.id">adliabdillahnababan@unprimdn.ac.id</a>

### INTRODUCTION

The agricultural sector is the backbone of Indonesia's economy which contributes greatly to the Gross Domestic Product (GDP) and absorbs a large amount of labor (Kharisudin &

Irwandi, 2022). However, smallholders and MSME (Micro, Small, and Medium Enterprises) actors in this sector still face various challenges, such as limited market access, dependence on middlemen, and low technology adoption (Endris & Kassegn, 2023). Agricultural MSMEs have a vital role in the food supply chain, but the lack of ability to market products is the main obstacle in increasing income (Quaralia, 2022). In the era of increasingly rapid digitalization, digital transformation is an important step to encourage the growth of the agricultural sector, especially for MSME actors (Darra et al., 2023).

The use of information technology in the agricultural sector is starting to show a significant impact in facilitating the production process to the distribution of agricultural products (Harahap et al., 2024). One potential solution is the construction of an e-commerce platform that can be a bridge between farmers and consumers directly without intermediaries (Suprihandari, 2024). E-commerce has been proven to improve product marketing efficiency, price transparency, and expand market reach (Rachmawati & Gunawan, 2020). With the presence of e-commerce, farmers can increase the competitiveness of their products and obtain real-time market information (D. T. Putra et al., 2023).

However, the adoption of e-commerce by farmers in rural areas is still relatively low due to limited infrastructure, digital literacy, and the unavailability of user-friendly platforms that are in line with local needs (Eko Wahyunto, 2024). Therefore, it is necessary to develop a platform based on local needs that is lightweight, fast, and accessible through simple devices such as smartphones (Muhammad Wali et al., 2023). One of the relevant technical approaches in building this kind of application is the use of web frameworks such as CodeIgniter 4 (CI4), which is known to be lightweight, flexible, and supports modular development (R. A. Putra, 2021). CI4 also has an efficient security and route management system, which is very suitable for use in the creation of transaction-based applications such as e-commerce (Dicky & Kurniawan, 2022).

The platform is expected to be able to provide various features, including farmer and buyer registration, agricultural product management, shopping cart system, digital payment methods, as well as agriculture-related education and news (Huang et al., 2023). In addition, the system must also have an admin dashboard to monitor user activities and transactions in real-time (Fahrezi & Asriningtias, 2024). Data security and user-friendliness are important factors in the development of digital platforms for village communities (Meilin et al., 2025).

Various previous studies have shown that the digitalization of the agricultural sector through e-commerce platforms contributes to increasing farmers' income and the efficiency of agricultural product distribution (Chunfang et al., 2024). This research also refers to the principle of sustainable agriculture by minimizing distribution costs and shortening the supply chain. By integrating technology and local needs, the TaniMarket platform is expected to be able to become a concrete solution to encourage a village-based digital economy.

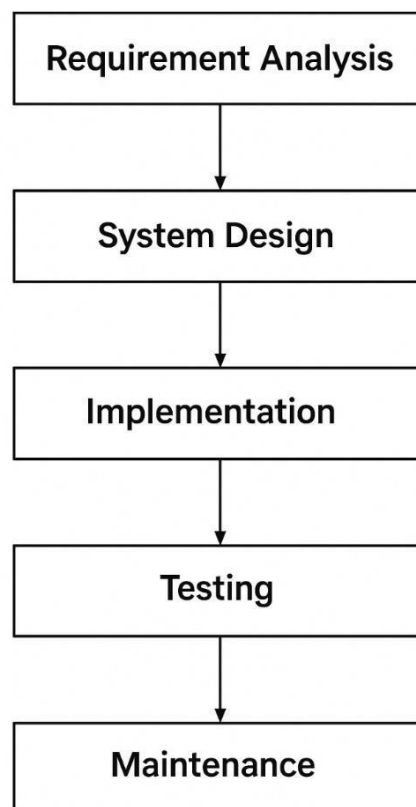
Although there are many e-commerce platforms available in the market, there are still few that focus on the small-scale agriculture sector with a community-based approach (Nurjati, 2021). Therefore, there is a need for innovation in the form of a system that not only sells products, but also supports the empowerment, training, and capacity development of farmers. The use of open source technology and the CI4 framework allows for the

development of systems that are economical, quick to develop, and easy to maintain. With the integration of technology and local empowerment, TaniMarket has the potential to become an inclusive and sustainable e-commerce solution.

Based on the above background description, this study aims to design and build a web-based e-commerce system called TaniMarket using the CodeIgniter 4 (CI4) framework as an effort to empower local agricultural MSMEs through the use of technology that facilitates MSME actors in the agricultural sector to digitally market garden products such as vegetables, fruits, and spices.

## METHODS

The method used in this study is the Waterfall approach. The Waterfall Model is one of the methods in the software development process which consists of a series of structured and sequential stages, namely: needs analysis, system design, implementation, testing, and maintenance (Harefa & Fawwaz, 2024). Each stage in this model must be completed completely before proceeding to the next stage. This approach is suitable when the needs of the system have been clearly defined from the start. An illustration of the Waterfall model's workflow can be seen in Figure 1 below.



**Figure 1.** Waterfall method

Figure 1, shows the various stages in the Waterfall method which can be described as follows:

### Requirement Analysis

At this stage, the need for a web-based system was identified to facilitate agricultural MSMEs in marketing products such as vegetables, fruits, and spices. The system is designed to support a simple and effective e-commerce-based digital marketing process. User needs include product management features, grouping by category, WhatsApp contact integration, and an easy-to-use interface.

### System Design

System design includes designing data structures, user interfaces, and relationships between entities in a database. TaniMarket uses two main entities in its database structure, namely:

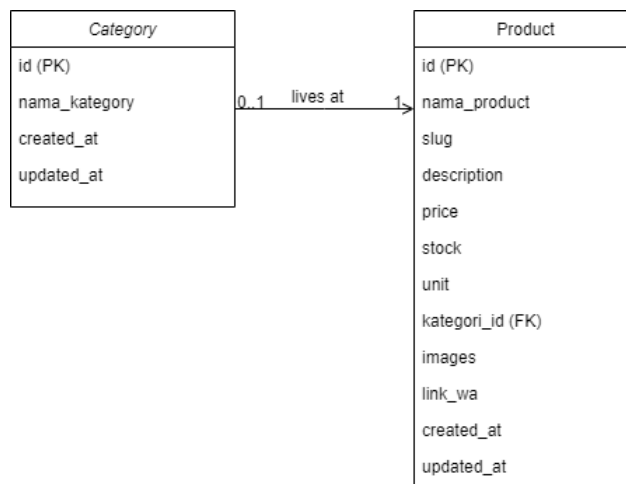


Figure 2. Relation Database

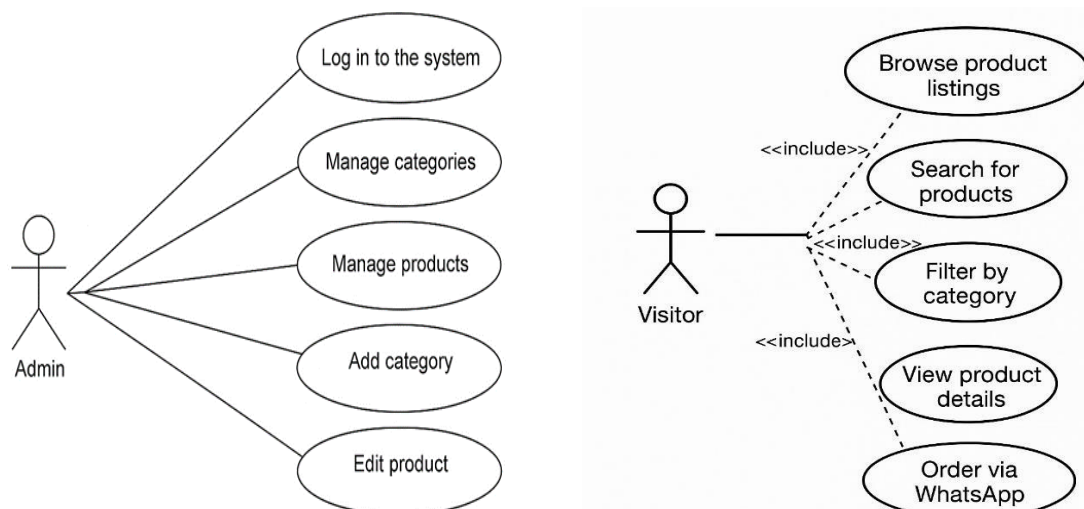


Figure 3. Use Case Diagram

In addition to the database design, at this stage, the folder structure, display flow, and page layout are also determined using AdminLTE 3 as the interface template.

### **Implementation**

The implementation phase of the system involves developing the application using the CodeIgniter 4 framework, which adopts the MVC (Model-View-Controller) architectural pattern. This phase begins by ensuring that the system requirements are met, including having PHP version 8.1 or higher, MySQL or MariaDB as the database system, the CodeIgniter 4 Framework, and Composer for managing dependencies.

The installation process starts with cloning the repository into the designated server directory. After that, the composer install command is executed to install the necessary dependencies. Next, the .env file is configured to define the database connection settings. Once configured, the developer runs the migration and seeder commands to create and populate the required tables in the database using the following commands: `php spark migrate`, `php spark db:seed CategorySeeder`, and `php spark db:seed ProductSeeder`. Finally, to launch the application locally, the command `php spark serve` is used, allowing the system to be accessed and tested in a development environment.

### **Testing**

After the development process is complete, testing is carried out on each feature using the Black Box Testing method. Testing was carried out on the admin login module, category and product management, WhatsApp integration, and the process of storing and updating data to the database. The goal is to ensure that all functionality runs as expected without errors or process failures.

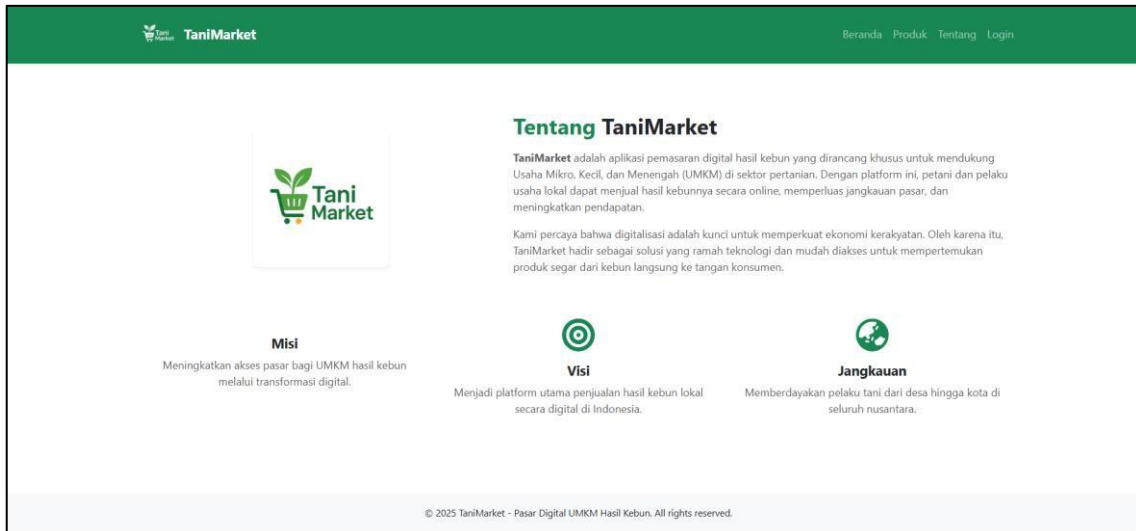
### **Maintenance**

Implemented systems require regular maintenance, such as updating the CodeIgniter framework if there is a new version, adjustments to the needs of new users, and fixing bugs found after the system has been used. The system can also be further developed by adding features such as an online payment system, transaction management, or product delivery tracking.

## **RESULTS AND DISCUSSION**

### **Home Page View**

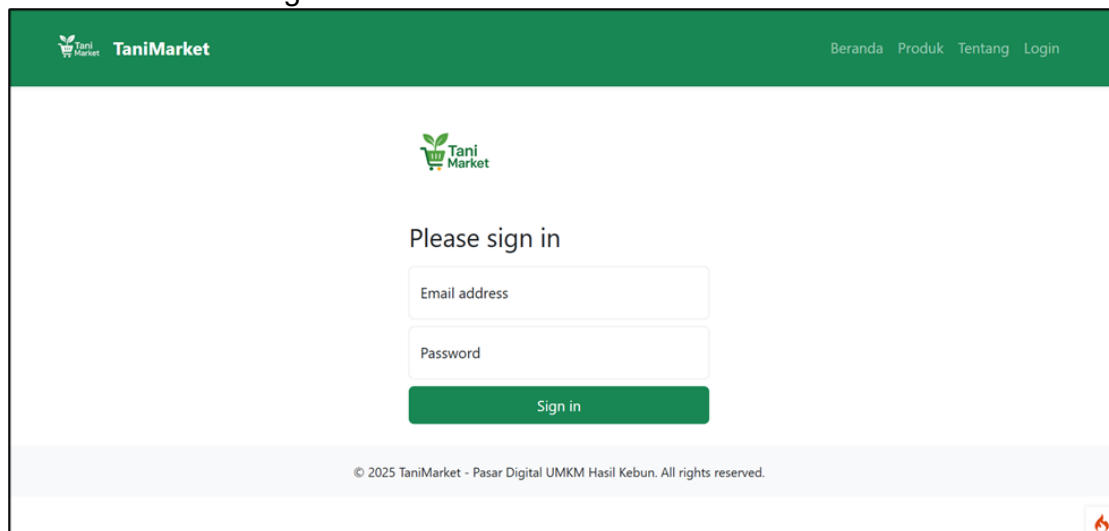
The main page of the TaniMarket application serves as the starting point for user interaction with the system. On this page, you will see important elements such as the app logo, platform name, and three main navigation buttons: "Products" to view a list of agricultural products, "About" for information about the app, and "Login" for admins who want to enter the management panel. This view is designed to be simple and informative to make it easier for users to explore the app's features.



**Figure 3.** Home Page View

### Login Page View

The login display on the TaniMarket application is designed in a simple but functional way, to make it easier for users who have access rights as admins to manage the system. This page displays two main fields of entry, namely email and password, which must be filled in correctly to enter the admin panel. After the data is inputted, users simply press the "Sign In" button to continue the authentication process. If the data entered matches the data stored in the database, then the user will be directed to the admin dashboard. However, if an error occurs such as an incorrect input or an account is not found, then the system will display an informative error message.



**Figure 4.** Login Page View

## Dashboard Page View

The admin dashboard in the TaniMarket application serves as the main control center that provides a comprehensive overview of data and activities in the system. On this page, important information is visually displayed in the form of colored panels that show statistical data, such as the total number of products, the number of product categories, the number of users who have registered, and the number of visitors. This information is displayed in blue, green, yellow, and red panels to make it easier to identify each data. On the left side of the screen, there is a navigation menu in the form of a sidebar that contains options such as Dashboard, Products, Categories, and Logout, which makes it easier for admins to access and manage data on each page. In addition, at the top of the page there are also header elements such as the username who is logged in, navigation buttons to Home and Contact, and notification icons. The overall view of this dashboard helps administrators monitor platform development, perform content management, and support the decision-making process faster and more efficiently.

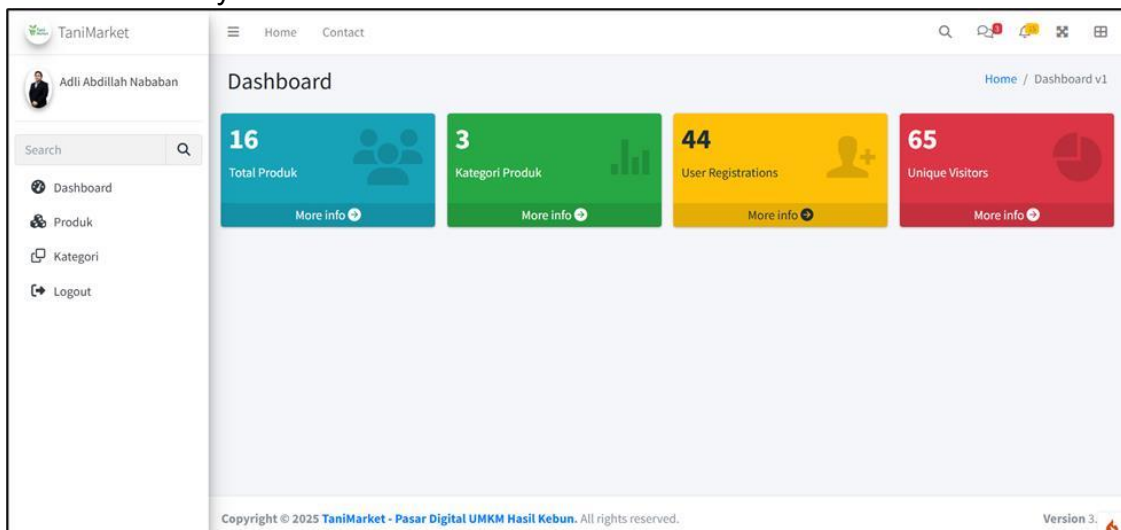
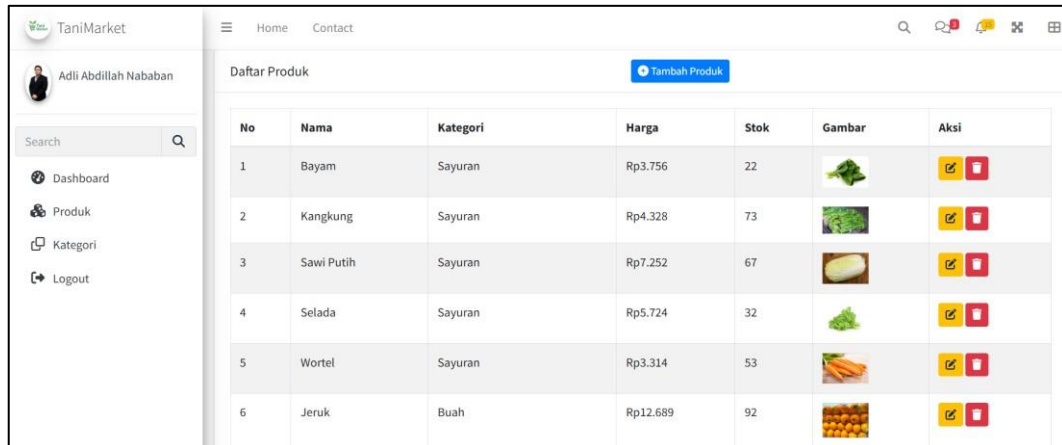


Figure 5. Dashboard Page View

## Product Listing Page

The Product List page in the TaniMarket application is the main feature in the admin panel that is used to display all product data that has been entered into the system. In this view, the products are organized in the form of a table that contains several important columns, namely Number, Product Name, Category, Price, Stock, Image, and Action. Each row represents a single product, complete with a category, price, amount of stock available, and product images that make visualization easy. In the Actions column, there are two buttons with edit and delete icons, which you can modify or delete product data. In addition, there is also an Add Product button at the top of the table that allows admins to add new products quickly and easily. This feature is designed to support efficient inventory management, so admins can update product information in real-time according to market needs.





















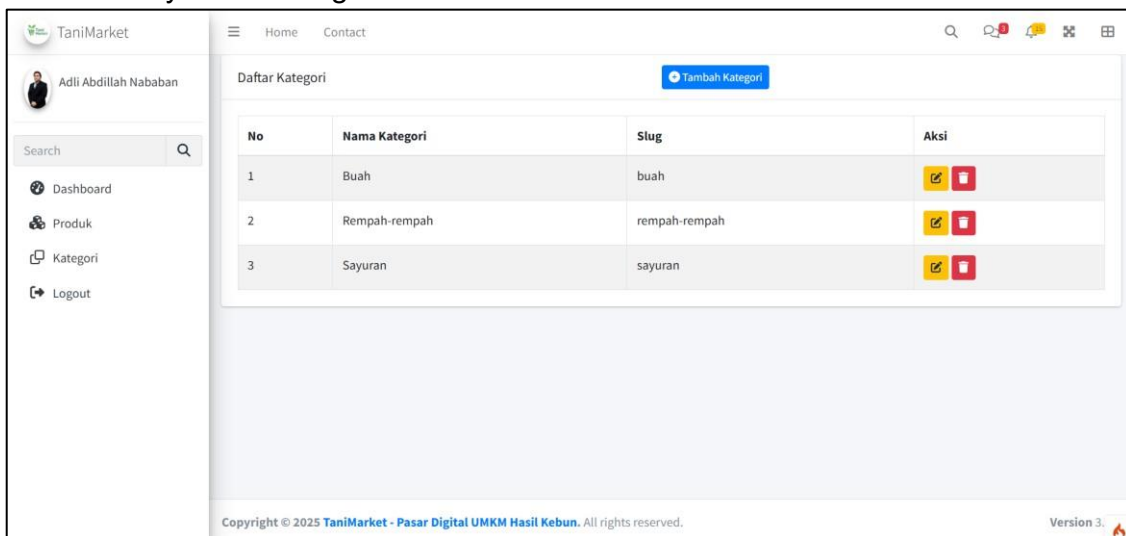
No	Nama	Kategori	Harga	Stok	Gambar	Aksi
1	Bayam	Sayuran	Rp3.756	22		 
2	Kangkung	Sayuran	Rp4.328	73		 
3	Sawi Putih	Sayuran	Rp7.252	67		 
4	Selada	Sayuran	Rp5.724	32		 
5	Wortel	Sayuran	Rp3.314	53		 
6	Jeruk	Buah	Rp12.689	92		 

Figure 6. Product List Page View

### Category List Page

The Category List page in the TaniMarket application displays data on all product categories available in the system. Categories serve as the main grouping of products that are displayed to users. Each row represents a single category, such as Fruits, Spices, and Vegetables, complete with slugs used for URL mapping or programmatic identification. In the Actions section, there are two main buttons: the edit button that allows admins to update the category name or slug, and the delete button to remove the category from the system. At the top of the table, there's also an Add Category button that makes it easy for admins to quickly add new categories. This view is made concise and efficient to facilitate the management of category data, so that all products can be classified neatly and easily found by users and system managers.









No	Nama Kategori	Slug	Aksi
1	Buah	buah	 
2	Rempah-rempah	rempah-rempah	 
3	Sayuran	sayuran	 

Figure 7. Category List Page View

## CONCLUSION

The development of the TaniMarket application has succeeded in creating a web-based information system that can be used as a digital marketing tool for Micro, Small, and Medium Enterprises (MSMEs) in the agricultural sector. The application is designed and built using the Waterfall method, which includes important stages of system requirements analysis, system design, implementation, testing, and maintenance. In its implementation, the application was developed using PHP programming language version 8.1, with the CodeIgniter 4 framework, as well as using MySQL as a database and Composer for dependency management. Overall, the TaniMarket application has fulfilled the purpose of the system development, which is to help agricultural MSME players in expanding market reach and facilitating the digital product marketing process. This application also provides convenience for consumers to access information and place orders directly. With a simple design and appropriate features, TaniMarket is an effective, efficient, and relevant digital solution in supporting the agriculture-based people's economy in the digital era.

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