



# Design and Implementation of Functional Drink Product Inventory Applications at Kulon Progo MSMEs

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## ARTICLE INFO

### Article History:

Received: 20 August 2024

Final Revision: 9 September 2024

Accepted: 9 September 2024

Online Publication: 11 September 2024

## KEYWORDS

Inventory Application, Google AppSheet, Google Sheets, MSMEs

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## ABSTRACT

The importance of the innovation process and the novelty of the MSME system is one of adding value to MSMEs in the current globalization. One of the innovation processes that need to be carried out is to improve the digitization process of MSMEs. Kulon Progo MSMEs do not have accurate and efficient inventory records, which is one of the causes of inventory management that has not been managed optimally. Based on the problems that occur in Kulon Progo MSMEs, it is necessary to develop a digital-based inventory application to minimize product recording errors. This study aims to apply digital-based inventory applications to functional beverage products in Kulon Progo MSMEs. This research was conducted in January-June 2024 at one of the MSMEs located in Kulon Progo Regency, Yogyakarta Special Region. The data collection method used uses interviews, observations, and literature studies. While the application development method uses the Waterfall method. the use of AppSheet-based inventory applications in Kulon Progo MSMEs can be implemented properly. After passing the implementation and testing stages, the application can be applied to manage inventory by recording product entry and exit. The application of mixed functional beverage product inventory applications in Kulon Progo MSMEs simplifies the recording process for MSMEs and can be a solution to inventory problems in MSMEs.

## 1. INTRODUCTION

### 1.1. Research Background

Micro, Small, and Medium Enterprises or MSMEs are defined as productive businesses on behalf of a person with a certain classification based on the net assets owned in the form of sales results each year from business operations. [1]. MSMEs have an important role in the economic industry in Indonesia in improving people's lives. Based on data from the Coordinating Ministry for Economic Affairs of the Republic of Indonesia, the contribution of MSMEs is at 60.5% for gross domestic product (GDP) and 96.6% for employment in Indonesia. [2]. However, the level of importance of the existence of MSMEs in the Indonesian economic arena is not proportional to the existing global challenges. The high level of competition amid the strong threat of globalization is one of the threats to empowering MSMEs. [3]. The importance of the innovation process and the novelty of the MSME system is one of adding value to MSMEs in the current globalization. One of the innovation processes that need to be

carried out is to improve the digitization process of MSMEs. Digitalization is present as a technology in society and can be applied to various fields needed in everyday life. [4]. Currently, digitalization is needed to improve MSMEs for the Indonesian economy. Digitalization is closely related to the operational needs of MSMEs in overcoming internal MSME problems.

One of the internal problems of MSMEs that is the reason for the need for digitalization is the problem of inventory management. A business, especially a business that is at a small or medium level, has many problems with inventory. [5]. Inventory is one of the company's resources in the form of raw or finished goods held by the company in order to fulfil consumer needs [6]. [6]. The inventory problem is related to the company's supply chain that spans the process of producing goods from raw materials to distributed goods. [7]. Inventory problems that are often present in the operational processes of MSMEs include a product recording system that is still manual and has not been able to document inventory records properly. There are 65% of the 3 million inventory records experience inaccuracies between records and real inventory [8]. One of the MSMEs with inventory problems that need to be addressed in the digitalization process is

Kulon Progo MSMEs. UMKM Kulon Progo is a home-based business engaged in the production of functional drinks since 1998. Functional drinks are one of the mainstays of MSMEs with production in the form of concoctions, liquid, and instant. The absence of accurate and efficient inventory records is one of the causes of inventory management that has not been managed optimally. As a result of this, MSMEs often do not record products that can be sold on that day because there is no definite recording model. MSMEs still apply a manual recording system that can be lost if not properly documented.

The emergence of this problem is one of the reasons why MSMEs do not have accurate records of demand and production. Apart from having an impact on MSME archivists, this can lead to a situation of lack of products or goods when the records do not match the state of the warehouse. This is as experienced by PT ABC, the company often experiences *warehouse* problems so that it experiences *stock out* when the material will be used and causing obstacles to the production process. [6]. The problem at PT ABC is due to the lack of stock adjustments in the *warehouse* with the manual data owned by the person in charge of the *warehouse*. The losses incurred are not only in terms of material but also time wasted checking the normal stock of the product. Therefore, the research requires a *Warehouse Management System* (WMS) based recording system to minimize the risk of wasted time.

Problems of the same type also occur in MPM Plastic, which carries out the process of buying and selling various plastic items such as spoons, forks, glasses, plastic bags and others in retail. [8]. Plastik MPM has been operating for a long time since 2017 which is managed directly by the business owner and his family. This means the inventory recording system at Plastik MPM has not been done either traditionally or modernly. The absence of exact inventory records causes the owner to check the remaining inventory manually when a customer buys. This disrupts the process of buying and selling goods so the company's supply chain and inventory process is very ineffective. The ineffectiveness of the inventory system can be seen from the service process that still needs to check the stock of goods manually. This can be further streamlined by making the inventory system effective. Therefore, in this research, the implementation of an inventory system with the basis of technology and the creation of *digital marketing* at MPM Plastics was carried out.

The urgency of inventory problems from previous research and the situation in the field is the reason why digital technology-based inventory control is needed. The digitization of technology in MSMEs can improve the operational performance of MSMEs and not interfere with services to consumers. This digitization can be done with a simple program based on data owned by MSMEs. This simple program can be done without special code and large costs. One of the digital applications or programs that can be implemented in MSMEs is the use of the Appsheet application. Appsheet application is one of the digital product development programs without code that can be done by anyone and can be developed on mobile or web applications. [9]. This program is assisted by Google Sheets to complete the data and its operation. Appsheet can be easily applied by MSMEs that do not yet have a digital-based inventory system.

## 1.2. Research Objectives

Based on the problems that occur in MSMEs and previous research on inventory applications, it is necessary to develop a digital-based inventory application to minimize product recording errors. The application design was carried out using the help of Google Appsheet and Google Sheets to record the inventory of concocted functional beverage products in Kulon Progo MSMEs. Therefore, this study aims to apply digital-based inventory applications to functional beverage products in Kulon Progo MSMEs.

## 2. MATERIALS AND METHODS

### 2.1. Research Time and Location

Research activities in the context of implementing inventory applications were carried out at Kulon Progo MSMEs located in Margosari Village, Kapanewon Pengasih, Kulon Progo Regency, Yogyakarta Special Region Province. Research in the context of service was carried out in January-June 2024 with the target of Kulon Progo MSMEs. This was chosen deliberately because the supply chain process carried out by MSMEs is still not optimal. The management of MSMEs has not maximized the shortage of products in the production process, thus disrupting MSME services to consumers.

### 2.2. Data Collection Methods

The data used in the research has two types of data, namely primary data and secondary data. Primary data is obtained from interviews and observations on the existing manual inventory system in MSMEs. Secondary data is obtained from literature studies related to Google Appsheet, Google Spreadsheet, and Inventory Applications. The data collection methods carried out in this study are described in the points below:

- a. Interview  
Data collection activities using interviews were carried out directly to MSME owners, five employees in the production sector, and one employee in the marketing sector. Interviews were conducted to identify problems that exist in Kulon Progo MSMEs regarding functional beverage inventory control.
- b. Observation  
Data collection is carried out by observation or observation of the inventory recording system carried out in Kulon Progo MSMEs. Observation activities are carried out to collect primary data from the point of view of the real state of the inventory system in Kulon Progo MSMEs.
- c. Literature Study  
A literature study or literature study was conducted to collect secondary data from books, journals or other reading sources regarding the implementation of inventory systems in Kulon Progo MSMEs.

### 2.3. Inventory Application Development Method

The application development method or inventory system used is the *Waterfall* method. The *Waterfall* method is a method of developing software applications for various kinds of government projects and large companies. [10]. The *Waterfall* method is highly structured but linear and through a sequential approach. The steps in the *Waterfall* method are carried out [11] as follows.

a. Needs Analysis

This stage is carried out data collection and analysis of the needs needed by Kulon Progo MSMEs in the product inventory system. This step is carried out by conducting interviews and observations with key informants regarding the problems and solutions to these problems.

b. Design

The design stage is carried out to develop an inventory application system design based on the needs or problems that exist in Kulon Progo MSMEs. The design includes application architecture, user interface display, and test plan. [12].

c. Implementation

The implementation stage is carried out by developing the application as a whole by connecting Google Appsheet and Google Sheets. When the implementation is carried out, the overall application development and the creation of functions in the application are carried out. [11].

d. Testing

The testing phase is carried out in order to ensure that the software runs according to certain specifications [12].

e. Maintenance

Maintenance is carried out to ensure the software is managed and used as it should be with the improvement of some features from the test results and adaptation to changing needs. [12].

### 3. RESULT AND DISCUSSION

Google Appsheet is a Google built-in *platform* that integrates with various data sources such as Google Drive, Google Sheets, and several other storage services. The help of the role of software without a coding system can be one way to make inventory applications easily. The following are the results and discussion of the design of inventory applications using the *Waterfall* method.

a. Needs Analysis

The needs analysis stage is carried out by conducting in-depth interviews with MSME owners, production employees, and marketing employees. Data collection using the interview method at this stage is carried out as a basis for understanding the needs of business actors who experience problems with the scope of functional requirements such as materials, processes, and results to develop a system. [6]. Apart from conducting interviews, at this stage observations were made of the existing inventory model in Kulon Progo MSMEs. The observation and interview stages resulted in several problems that occurred

in the product inventory system in MSMEs. The following are the results of the analysis of existing problems in MSMEs.

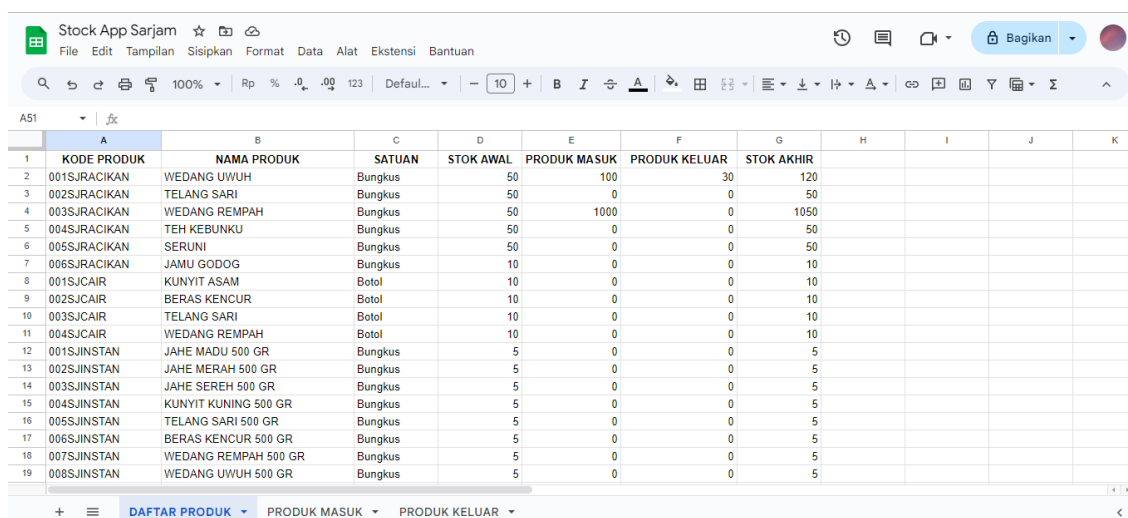
- 1) Writing down production and sales amounts is done manually.
- 2) The manual recording process requires a lot of record-keeping.
- 3) Monitoring and evaluation of production and demand data is inefficient.
- 4) Sales and production reports that are done manually allow data errors and require extra time to change the data.

The main problem that occurs in MSMEs is experiencing inventory problems due to inaccurate product records and cannot providing good product stock information. [13]. The digitization of inventory technology can be one way out of the inventory recording problem. Software requirements analysis is a critical step in application design in helping to understand and document the needs of the application to be developed. [12]. The results of the needs analysis at this stage make it technically possible to form an inventory application that is per the conditions of MSMEs.

b. Inventory Application Design

At this stage, application design is carried out by designing a database using Google Sheets. The use of Google Sheets is due to the ease of storage used and stored directly and tied directly to the application account. Compilation is done by compiling product data, product codes, initial products, incoming products, outgoing products, and product units. In addition to designing the inventory database, an interface design is carried out to fulfil the system *output* containing sub-menus that have functions in the application. Database is a collection of data that exists in a computer and can be changed using an application program to produce certain information. [14].

From the *database* in Figure 1. then the application design through AppSheet is adjusted to the data type, name, code, and formula formula needed. The design of the application is done according to the following figure. The design of the Appsheet system is used to arrange the design of the application display on a *smartphone* or laptop. The design considers the needs of MSMEs according to the results of the interview. Entering report data has a high risk of error, especially in the production data of a product. [14]. So it is necessary to design an application that can minimize the risk of production recording errors. The design is in Figure 2.



Stock App Sarjam

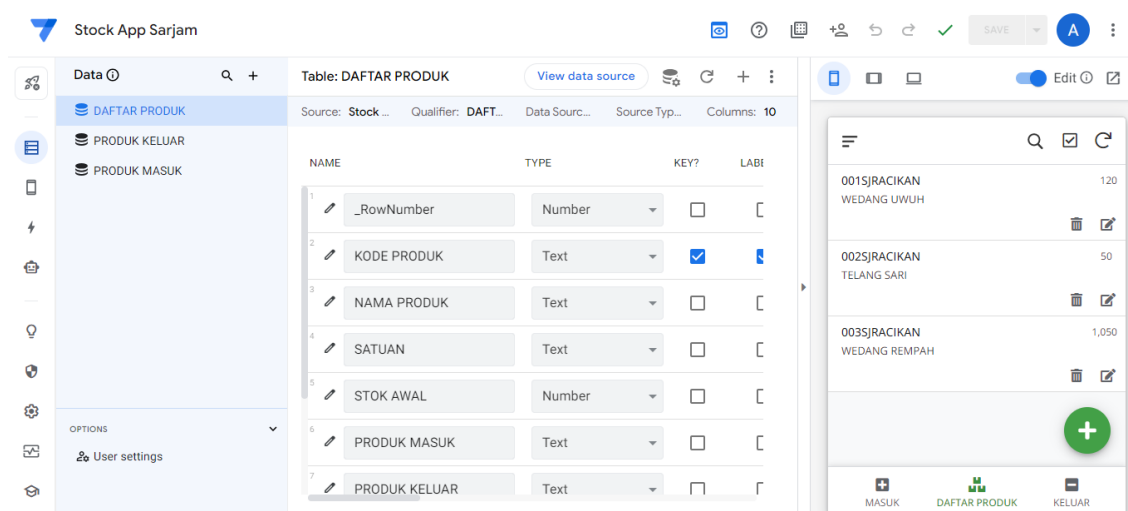
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| A            | B                    | C       | D         | E            | F             | G          | H | I | J | K |
|--------------|----------------------|---------|-----------|--------------|---------------|------------|---|---|---|---|
| KODE PRODUK  | NAMA PRODUK          | SATUAN  | STOK AWAL | PRODUK MASUK | PRODUK KELUAR | STOK AKHIR |   |   |   |   |
| 001SJRACIKAN | WEDANG UWUH          | Bungkus | 50        | 100          | 30            | 120        |   |   |   |   |
| 002SJRACIKAN | TELANG SARI          | Bungkus | 50        | 0            | 0             | 50         |   |   |   |   |
| 003SJRACIKAN | WEDANG REMPAH        | Bungkus | 50        | 1000         | 0             | 1050       |   |   |   |   |
| 004SJRACIKAN | TEH KEBUNKU          | Bungkus | 50        | 0            | 0             | 50         |   |   |   |   |
| 005SJRACIKAN | SERUNI               | Bungkus | 50        | 0            | 0             | 50         |   |   |   |   |
| 006SJRACIKAN | JAMU GODOG           | Bungkus | 10        | 0            | 0             | 10         |   |   |   |   |
| 001SJCAIR    | KUNYIT ASAM          | Botol   | 10        | 0            | 0             | 10         |   |   |   |   |
| 002SJCAIR    | BERAS KENCUR         | Botol   | 10        | 0            | 0             | 10         |   |   |   |   |
| 003SJCAIR    | TELANG SARI          | Botol   | 10        | 0            | 0             | 10         |   |   |   |   |
| 004SJCAIR    | WEDANG REMPAH        | Botol   | 10        | 0            | 0             | 10         |   |   |   |   |
| 001SJINSTAN  | JAHE MADU 500 GR     | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |
| 002SJINSTAN  | JAHE MERAH 500 GR    | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |
| 003SJINSTAN  | JAHE SEREH 500 GR    | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |
| 004SJINSTAN  | KUNYIT KUNING 500 GR | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |
| 005SJINSTAN  | TELANG SARI 500 GR   | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |
| 006SJINSTAN  | BERAS KENCUR 500 GR  | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |
| 007SJINSTAN  | WEDANG REMPAH 500 GR | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |
| 008SJINSTAN  | WEDANG UWUH 500 GR   | Bungkus | 5         | 0            | 0             | 5          |   |   |   |   |

+ DAFTAR PRODUK PRODUK MASUK PRODUK KELUAR

Figure 1. Application Database Design



Stock App Sarjam

Data + Table: DAFTAR PRODUK View data source

Source: Stock ... Qualifier: DAFT... Data Sour... Source Typ... Columns: 10

| NAME             | TYPE   | KEY?                                | LABE |
|------------------|--------|-------------------------------------|------|
| 1. _RowNumber    | Number | <input type="checkbox"/>            |      |
| 2. KODE PRODUK   | Text   | <input checked="" type="checkbox"/> |      |
| 3. NAMA PRODUK   | Text   | <input type="checkbox"/>            |      |
| 4. SATUAN        | Text   | <input type="checkbox"/>            |      |
| 5. STOK AWAL     | Number | <input type="checkbox"/>            |      |
| 6. PRODUK MASUK  | Text   | <input type="checkbox"/>            |      |
| 7. PRODUK KELUAR | Text   | <input type="checkbox"/>            |      |

OPTIONS User settings

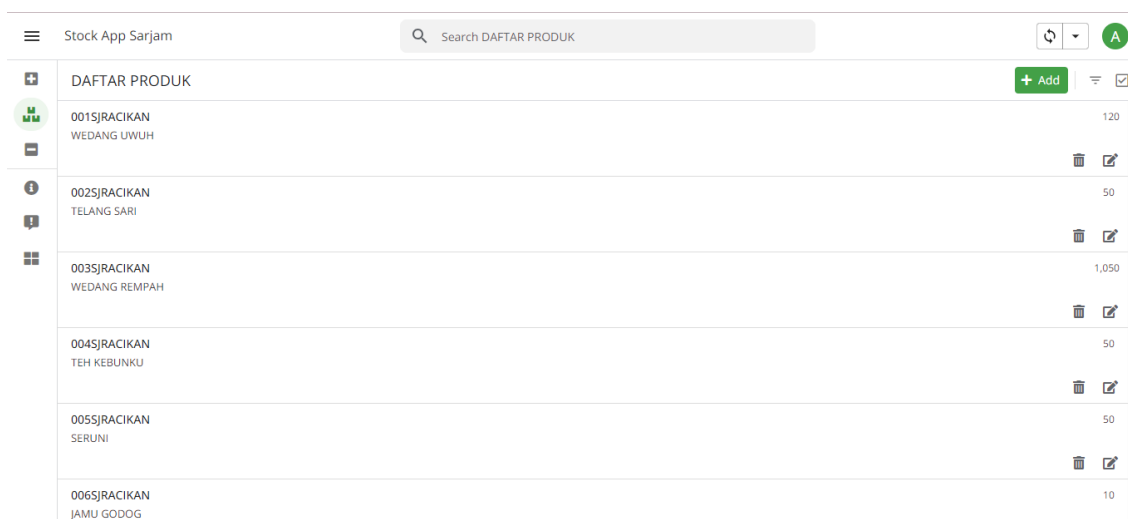
MASUK DAFTAR PRODUK KELUAR

Figure 2. Application Calculation Design Formula

### c. Implementation

In the implementation stage, tests were carried out by connecting AppSheet with Spreadsheet. The trial is by assessing the appearance of the application design results on the AppSheet and comparing it with the appearance of the Stock Application on a laptop or smartphone. The program design is translated into code or language that is understood by computer machines using a predetermined programming language. [13]. Because the use of AppSheet does not require a special programming language, the

application can be seen at the link provided. At this stage, the shortcomings of the compilation results between Google AppSheet and Google Sheets are assessed. The results can be seen in Figure 3. From the picture, you can see the display of the inventory application displayed by the inventory application. There is a list of products resulting from the database that has been transferred through the AppSheet application. There is a menu for adding or reducing products by increasing or decreasing the amount of stock of functional beverage products.

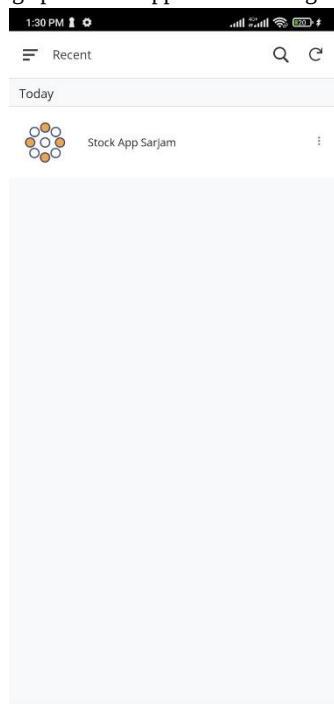


| Product ID   | Product Name  | Stock | Actions        |
|--------------|---------------|-------|----------------|
| 0015JRACIKAN | WEDANG UWUH   | 120   | [Trash] [Edit] |
| 0025JRACIKAN | TELANG SARI   | 50    | [Trash] [Edit] |
| 0035JRACIKAN | WEDANG REMPAH | 1,050 | [Trash] [Edit] |
| 0045JRACIKAN | TEH KEBUNKU   | 50    | [Trash] [Edit] |
| 0055JRACIKAN | SERUNI        | 50    | [Trash] [Edit] |
| 0065JRACIKAN | JAMU GODOG    | 10    | [Trash] [Edit] |

**Figure 3.** Display of Inventory Application on Laptop

#### d. Testing

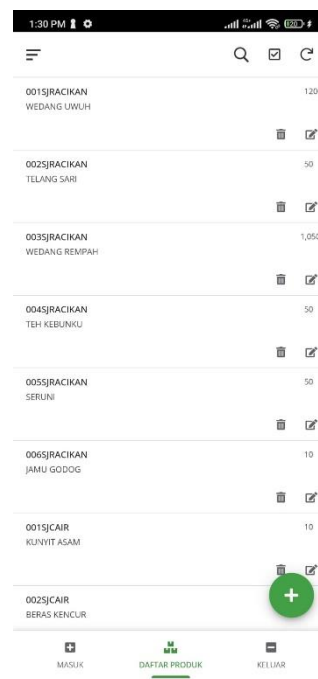
Application testing is carried out by applying a usage grace period. The trial was carried out by simulating the application after production activities. The application that has been designed can be simulated by Kulon Progo MSMEs in managing the inventory of functional beverage products. Application testing is carried out on



**Figure 4.** Application Display on Smartphone

Testing is done by trying to use the application on a smartphone. The application display is found in Figure 4 and enters the menu in Figure 5. Testing is done by trying to use applications such as increasing the number of products and reducing product stock due to sales. On the menu, there is a "+" sign to add or reduce products. After

a smartphone connected to the application. After the software is made, the next step is to do the testing. In software testing some standards must be met to ensure the quality of the information system is as expected, and the software can run properly. Application testing begins with trying to use the application on smartphones owned by MSMEs. The application display can be seen in Figure 4.



**Figure 5.** Display of Inventory Application Menu

touching the sign, a menu or display will appear as in Figure 6.

**Figure 6.** Product Entry and Exit Settings

After recording the outgoing or incoming products, the recording results can appear as shown in Figures 7 and 8. These results show that the records of product entry and exit have been recorded in the system. The recap can be used as the basis for daily records of MSME production and sales. With a system like this, MSMEs do not need to record manually and reproduce other records. The recording feature in the application is connected to the database that has been created in the inventory application design. This feature can be directly connected to the database so that existing data can be changed. This is shown in Figures 9 and 10.

The use of inventory applications increases operational efficiency and effectiveness in the Kulon Progo MSME inventory process. However, initially, there were difficulties at the initial stage for employees because they were not yet proficient in using the system. From the experiment, high benefits can be obtained in recording production, there are no manual calculations that are not properly recorded. This digitization process benefits MSMEs in running their business operations. The advantages offered by digital-based recording systems are very high, in terms of operations management and supply chain management, such as improvements in sustainable supply chain management, easier inventory management, and reduced inventory costs. The inventory application can record and process inventory data, making it easier for Kulon Progo MSMEs to carry out their operational activities in the long run. In addition, the application of basic digitization has also succeeded in increasing the attractiveness of MSMEs in cyberspace and can increase the potential for new markets. [8].

**Figure 7.** Outgoing Product Recap (Sold)

**Figure 8.** Recap of Incoming Products

#### e. Maintenance

Maintenance is carried out as a form of further management of applications that have been designed. Maintenance can be interpreted by operating the program and performing maintenance, such as adjustments or changes due to adaptation to the actual situation. [13]. Maintenance is carried out by the production section of Kulon Progo MSMEs as a

way of implementing digitalization to increase the capacity of MSMEs. This is the last stage in the design of information systems.

At the previous stage, there were no serious obstacles. However, further monitoring is needed in the management of the inventory application. In this case, Kulon Progo MSMEs have the rights and obligations to manage this inventory application for their business operations.

| A1 | TANGGAL JAM      | KODE PRODUK | NAMA PRODUK | JUMLAH TERJUAL | KETERANGAN |
|----|------------------|-------------|-------------|----------------|------------|
| 1  | 04/06/2024 11:29 | 001SJACIKAN | WEDANG UWUH | 30             |            |
| 2  |                  |             |             |                |            |
| 3  |                  |             |             |                |            |
| 4  |                  |             |             |                |            |
| 5  |                  |             |             |                |            |
| 6  |                  |             |             |                |            |
| 7  |                  |             |             |                |            |
| 8  |                  |             |             |                |            |
| 9  |                  |             |             |                |            |
| 10 |                  |             |             |                |            |
| 11 |                  |             |             |                |            |
| 12 |                  |             |             |                |            |
| 13 |                  |             |             |                |            |
| 14 |                  |             |             |                |            |
| 15 |                  |             |             |                |            |
| 16 |                  |             |             |                |            |
| 17 |                  |             |             |                |            |
| 18 |                  |             |             |                |            |
| 19 |                  |             |             |                |            |

**Figure 9.** Product Database Display After Application Use

| A1 | TANGGAL JAM     | KODE PRODUK | NAMA PRODUK   | JUMLAH PRODUKSI | KETERANGAN |
|----|-----------------|-------------|---------------|-----------------|------------|
| 1  | 18/04/2024 22:2 | 001SJACIKAN | WEDANG UWUH   | 100             |            |
| 2  | 04/06/2024 11:2 | 003SJACIKAN | WEDANG REMPAH | 1000            |            |
| 3  |                 |             |               |                 |            |
| 4  |                 |             |               |                 |            |
| 5  |                 |             |               |                 |            |
| 6  |                 |             |               |                 |            |
| 7  |                 |             |               |                 |            |
| 8  |                 |             |               |                 |            |
| 9  |                 |             |               |                 |            |
| 10 |                 |             |               |                 |            |
| 11 |                 |             |               |                 |            |
| 12 |                 |             |               |                 |            |
| 13 |                 |             |               |                 |            |
| 14 |                 |             |               |                 |            |
| 15 |                 |             |               |                 |            |
| 16 |                 |             |               |                 |            |
| 17 |                 |             |               |                 |            |
| 18 |                 |             |               |                 |            |
| 19 |                 |             |               |                 |            |

**Figure 10.** Product Database Display After Application Use

## 4. CONCLUSION

The conclusion that can be drawn from this research is that the use of AppSheet-based inventory applications in Kulon Progo MSMEs can be implemented properly. After passing the implementation and testing stages, the application can be applied to manage inventory by recording product entry and exit. The application of the mixed functional beverage product inventory application in Kulon Progo MSMEs facilitates the MSME recording process and can be a solution to inventory problems in MSMEs. So that the MSME digitization process applied to the product inventory process can be achieved.

## ACKNOWLEDGMENT

The author would like to express his gratitude to the entire academic community of the Agricultural Development Polytechnic of Yogyakarta Magelang, Kulon Progo MSME owners, and other parties who helped this research. Hopefully what the author conveyed in this study can provide benefits for readers and writers personally.

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