THE DEVELOPMENT OF WEB-BASED PRODUCTION MANAGEMENT INFORMATION SYSTEMS AT PT. KABEPE CHAKRA BANDUNG

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ABSTRACT

PT. Kabepe Chakra is a private company engaged in the plantation and tea trade, has several large gardens and factories spread in West Java and Sumatra. PT. Kabepe Chakra is moving with the vision to become a world-class company in the field of agribusiness supported by a total management system and focusing on tea. Production activities carried out every day, namely processing raw materials in this case are wet shoots into dry tea.

One of the problems faced by the company today is the difficulty in determining the amount of production that tends to be ignored and does not become a reference in the production process. Based on the current problems at PT Kabepe Chakra, a development of management information systems is needed that can manage production planning management and production scheduling using the PDCA approach (Plan, Do, Check, Act) and forecasting using the Single Moving Average method.

The results of the study can be concluded that this system has assisted the Head of Gardens / Factories in determining the number of shipments of production in accordance with directives from the Head Office.

Keywords : Information Systems, Production Management, Single Moving Average, PDCA.

1. INTRODUCTION

PT. Kabepe Chakra is a private company engaged in the plantation and tea trade, has several large gardens and factories spread in West Java and Sumatra. PT. Kabepe Chakra is moving with the vision to become a world-class company in the field of agribusiness supported by a total management system and focusing on tea. PT. Kabepe Chakra with eight gardens / factories has the potential to expand its core and grow to be related diversification either through own direct investment, joint ventures and or expanding services to other parties.

Production activities carried out every day, namely processing raw materials in this case are wet shoots into dry tea. The production process starts from the planning stage, then the implementation, namely processing raw materials into finished products. Each factory in PT Kabepe Chakra has 100-120 employees for large factories, and 50-75 employees for small factories, uses 32 processing machines and 13 sorting machines with maximum production capacity every day, which is 25,000 kg wet shoots for large factories.

Based on the results of interviews with Ms. Puji Laksonowati as the Deputy Production Manager determining the amount of current production based on the tea raw material available in each garden / factory and relatively the same every month, in determining the amount of production that tends to be ignored and not a reference in the production process . The influence of the remaining excess stock is the product buildup in the warehouse. Because this is a consumption product that has an expiration period, then if there is a buildup of products in the warehouse it will be a loss for the company because it will increase the risk of product damage.

Based on the results of interviews with Ms. Puji Laksonowati as the Deputy Production Manager determining the amount of current production based on the tea raw material available in each garden / factory and relatively the same every month, in determining the amount of production that tends to be ignored and not a reference in the production process . The influence of the remaining excess stock is the product buildup in the warehouse. Because this is a consumption product that has an expiration period, then if there is a buildup of products in the warehouse it will be a loss for the company because it will increase the risk of product damage.

Based on the problems described, a production management system is needed at PT. Kabepe Chakra that can help resolve the problem.

The objectives of developing this management information system are:

1. Facilitate the Production Manager Assistant in determining the amount to be produced from each grade of tea.
2. Facilitate the Production Manager Assistant in planning production activities.

2. CONTENT OF THE STUDY

2.1 Foundation of the theory

The definition of a theoretical basis is a collection of definitions and concepts from various sources. The foundation of this theory is a strong foundation in a study, so some of the theoretical foundations described are the theoretical foundations that support the Development of a Web-Based Production Management Information System at PT. Kabepe Chakra Bandung.

2.1.1 Information Systems

At this point we will discuss the meaning of information systems. The meaning of information systems is a combination of information technology and activities of people who use that technology to support operations and management.

2.1.2 The Concept Of Basic Management

This point will explain the basic concepts of management. The word "management" can be interpreted as a process of managing various available resources to achieve a goal. In general, the resources available in management include human, material, and capital. The task of management is to try to understand the many conditions faced by the organization, make decisions, and formulate a plan of activities to solve problems within the organization. [2]

2.1.3 Management Information System

At this point we will discuss the meaning of management information systems. Definition of SIM or Management Information System is a system of planning within a company that involves internal controls such as the use of resources, documents, technology, and management accounting as one of the strategies in the business.

From the definition of the system above we can define information systems as integration between people, data, tools, and procedures that work together to reach one goal.

2.1.4 Production

This section will discuss production. The meaning of production is an activity carried out to add value to an object so that it is more useful. The form of production with the category of goods (goods) and services (services) is very dependent on the category of business activities owned by the company concerned.

2.1.5 PDCA theory

In this section, we will discuss the understanding and explanation of PDCA (Plan - Do - Check - Action).

PDCA stands for "Plan, Do, Check, Act" (Plan, Do, Check, Follow Up), namely a continuous process improvement cycle or continuously like a circle that does not end. The PDCA concept was first introduced by a quality management expert named Dr. William Edwards Deming.

The following is the PDCA stage flow :

Figure 1 Flowchart of PDCA

1. **P (Plan)**

At this stage we set the target to be achieved, then determine the method that will be used to reach the predetermined target.

2. **D (Do)**

The Do stage is the stage of implementing all that has been planned in the Plan stage, including running the process, producing and collecting data which will then be used for the Check and Act stages.

3. **C (Check = Evaluations)**

Check stage is the stage of inspection and review as well as studying the results of the application in the Do phase.

4. **A (Act = Follow Up)**

The Act stage is the stage of evaluating the results of the targets and the process to follow up with improvements. If what we have done is still lacking, immediately take action to fix it. [5]

2.1.6 Method of Forecasting Single Moving Average

At this point, I will explain one of the forecasting methods, namely the Single Moving Average. The Single Moving Average method or a single moving average method uses a number of actual data requests that are new to generate predictive values for future demand. The use of this method will be effectively implemented if we can assume that the market demand for the product will remain stable at all times. SMA (single moving average) has two special properties, namely to make forecast requires data.

If historically in a certain period of time, the longer the moving averages will produce a smoother moving average, systematically the moving average can be calculated with the following formula :

St+1= (xt+xt-1+⋯+xt -n+1)/n

Information:

St+1 = Forecast for period to t+1.

Xt = Data in period t.

N = Moving Averages period [9]

2.1.7 *Mean Absolute Error* (MAE)

Mean Absolute Error (MAE), which is the average absolute error value of forecasting errors (positive and negative values not seen) can be seen in the following equation:

$$MAE = \frac{\sum |x_t - F_t|}{n}$$

2.2 Analysis Of Problems

Problem analysis is a description of the problems obtained from the currently running system that will be described in data processing procedures in the WEB-Based Production Management Information System program at PT. Kabepe Chakra. The following is a problem analysis of the current system as follows :

1. Difficulties in determining the amount of production that tends to be ignored and does not become a reference in the production process.
2. There is no plan for the number of production of each grade, which is happening at this time in the company, scheduling is carried out on employees and machines used by not including the amount of production of each grade of tea.

2.3 Production Management Analysis

This production management analysis is an analysis of how a production procedure will be implemented in a web-based production management information system at PT. Kabepe Chakra that was built. This production management includes the process of determining the amount to be produced and planning production activities. The following is the PDCA Production Management cycle :

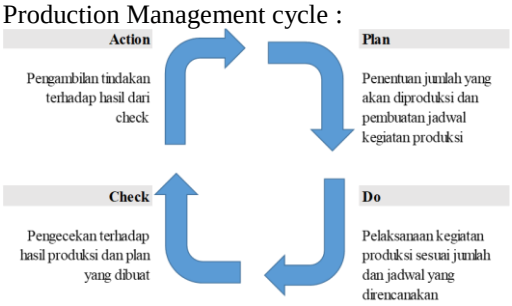

Figure 2 PDCA Production Management Cycle

1. Planning for Determining the Amount to be Produced

At this stage is the planning stage of the production demand for each grade. The core activity is to determine the amount of demand for grade tea to the garden / factory with the method of calculating the Single Moving Average.

In calculating this forecasting, one example of the garden / factory that will be used as an object to be analyzed is the Canaanite garden. The Canaan Garden was chosen because of its location closest to the Head Office. Production data is processed from January 2017 to December 2017 as in the following table :

No.	Periode	Jumlah (Kg)	Hasil Peramalan
1	Jan-17	88,065	
2	Feb-17	66,026	
3	Mar-17	76,064	77,046
4	Apr-17	76,282	71,045
5	May-17	78,315	76,173
6	Jun-17	61,004	77,299
7	Jul-17	83,843	69,660
8	Aug-17	51,399	72,424
9	Sep-17	65,916	67,621
10	Oct-17	82,605	58,658
11	Nov-17	85,372	74,261
12	Dec-17	97,776	**83,989**

Table of Total Production

The following calculation for forecasting in December 2017 is :

St+1= (xt+xt-1+⋯+xt -n+1)/n

St+1= (82.605+85.372)/2

St+1= 83.989

Furthermore, in this plan, it is determining the amount to be produced that must be done by the garden / factory. That is forecasting with a single moving average (which was previously at the

stage of determining the amount to be produced) minus the stock in the garden / factory.
Production planning forecasting = 83.989 kg for December 2017.
Average calculation per week = 83.989 : 4 = 20.997 kg.

So it can be concluded, for a period of 1 month in December 2017 it is predicted that production will require a total of 83,989 kg with an average calculation of 20,997 kg / week.

2. Implementation of Production Activities

When this is done, look at the actual data. It can be seen from the data on the realization of production in the December 2017 period that the total production for the month was 97,776 kg.

When compared with the previous plan of 83,989 kg, the amount of implementation of this production activity has increased.

3. Monitoring of Production Results

At this stage, it will examine or compare related events that occur between the Plan and Realization. After calculating the forecasting and obtaining data, the comparison is obtained as follows :

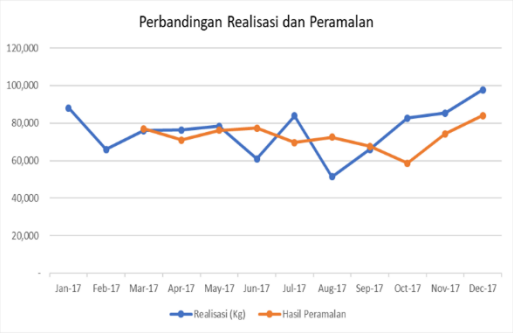

Figure 3 Monitoring Production Results

4. Follow-up of Production Evaluation Phase

At this stage, it is obtained that :

1) If forecasting is in accordance with realization
   When planning in accordance with the implementation / realization of course that is expected. So, forecasting as the best solution is done. The next action in the production process is to keep following the forecasting.
2) If forecasting exceeds realization
   Then, the excess goes into stock and the next action for the next production process must be reduced by the excess.
3) If forecasting is less than realized
   So, it is necessary to record the possibility that in a certain period there will be a lot of expenditure and other factors, namely production from the garden itself decreases, to overcome this problem there needs to be the purchase of outer shoot raw material in addition.

2.4 Database Analysis

Data analysis was obtained from data that will be used in the process of building a Product Management Information System at PT. Kabepe Chakra, then the data that has been obtained is built a database design using Entity Relationship Diagram (ERD) tools which can be seen in the picture.

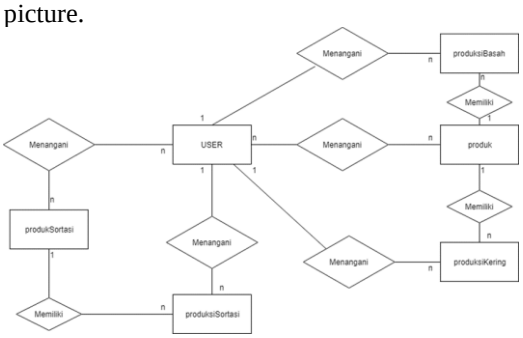

Figure 4 ERD Model of Production Management

2.5 Context Diagram

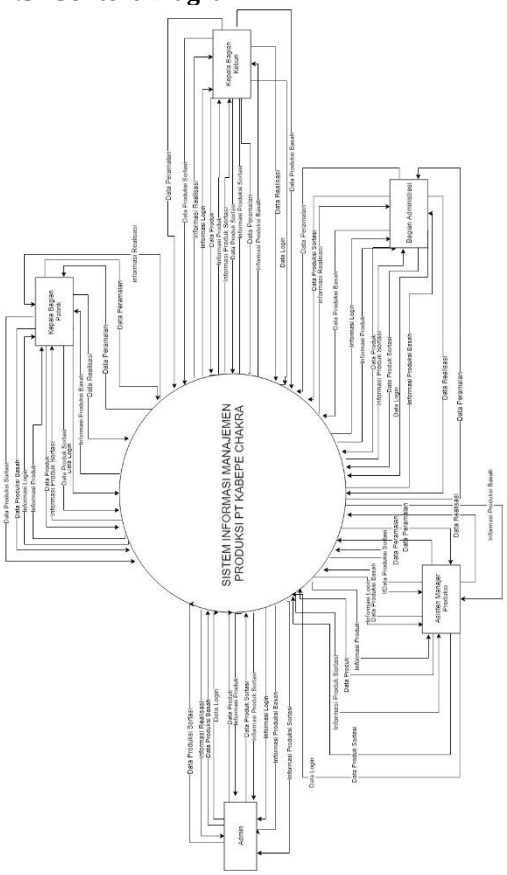

Figure 5 Context Diagram of PT. Kabepe Chakra

2.6 Data Flow Diagram Level 0

DFD Level 0 explains in general what processes can be done on a web-based production management information system at PT. Kabepe Chakra. DFD Level 0 can be seen in the following figure :

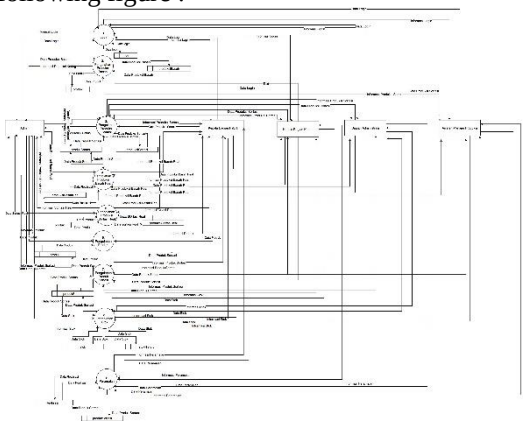

Image 6 DFD Level 0 at PT. Kabepe Chakra

2.7 Relationship Table

Relationship table is a series of relationships between several tables in the database system. Explanation of database on this system can be seen in the following figure.

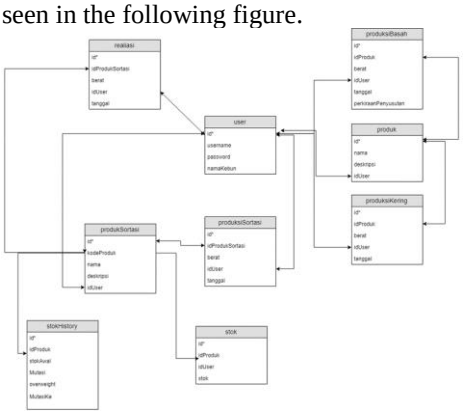

Figure 7 Table of Information System Relationships at PT. Kabepe Chakra

2.8 The Design Interface

Interface design is made to describe the appearance of the program that will be used by users to interact with the system to be built. The design is made based on the interface display both input and output that will be generated when the application is implemented.

Designing the interface in a web-based production management information system at PT. Kabepe Chakra can be seen as follows :

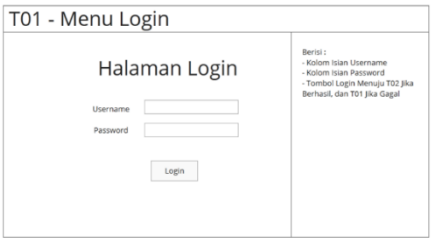

Figure 8 T01 Login Interface Design

2.9 Semantic Network Designing

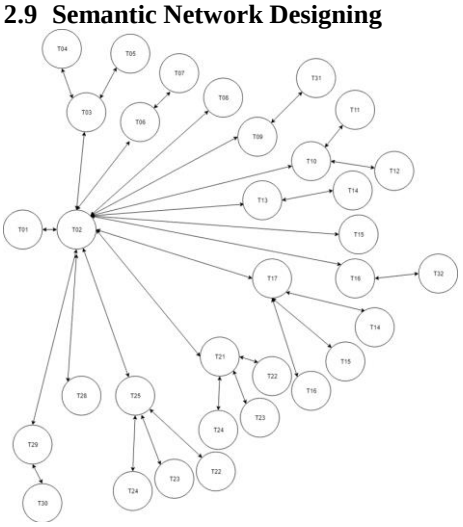

Figure 9 Semantic Network

2.10 Designing Menu Structure

The menu structure design is an illustration of the application usage path so that the application that is built is easy to understand and easy to use. the design of the menu structure describes the relevance of each menu that can be accessed by the user described as follows.

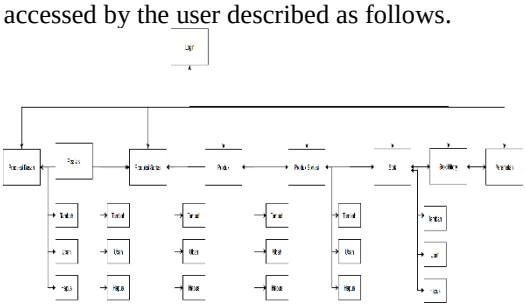

Figure 10 Menu Structure

2.11 System Testing

System testing is the most important thing that aims to find errors or deficiencies in the information system being tested.

The tests used to test the new system are black box testing and beta testing. Black box testing focuses on testing functional information systems requirements.

2.12 Black Box Testing Conclusions

Based on the results of testing with a sample test case that has been done, it gives a conclusion that the process is correct. Filtering process errors in the form of a message page display direction is quite maximal. Functionally the system can produce the expected output.

2.13 Conclusion of Beta Testing

After the interview at PT. Kabepe Chakra with Head of Gardens / Factories, KTU, Garden Manager, and Manager / Assistant Production Manager can be concluded that this information system has helped PT. Kabepe Chakra in managing weekly production potential data, forecasting to determine the amount of production needs, monitoring garden stockings quite well, in terms of usage The language used is good, easy to use and the interface between them is good enough.

3. CONCLUDING

3.1 Conclusion

Conclusions that can be drawn from all the processes that have been carried out in building a Web Based Production Management Information System at PT. Kabepe Chakra namely:

1. This production management information system can assist the Head of the Garden / Factory in determining the amount of production shipments that are in accordance with the directives from the Head Office.
2. This production management information system can assist the Production Manager Assistant in monitoring stock and production in each garden / factory.

3.2 Advice

Based on the conclusions described above, the expected thing or suggestion for the future is that the system built can work better, should be added to the monitoring of stocks in the warehouse in the Web-Based Production Management Information System at PT. Kabepe Chakra.

BIBLIOGRAPHY

[1] Kadir, Abdul. 2003, Pengenalan Sistem Informasi. Yogyakarta : Andi.
[2] James A. O'Brien, George M.Marakas. 2008, Sistem Informasi Management Edisi Sembilan. Jakarta Selatan : Salemba Empat.
[3] Davis, Gordon B. 2002, Kerangka Dasar Sistem Informasi Manajemen, PT.Gramedia.
[4] Fahmi, Irham, Manajemen Produksi Dan Operasi, Alfabeta.
[5] Kurniawan F. 2010, Pengendalian Kualitas : PDCA Cycle. Jakarta (ID) : Pusat Pengembangan Bahan Ajar
[6] Wahono, Romi, Brainmatics. 2005, Business Process Model and Notation (BPMN). Yogyakarta : Cipta Informatika
[7] B, Indra, Yatini. 2001, Pemrograman Terstruktur. Yogyakarta : J&J Learning
[8] Nugroho, Adi. 2011, Perancangan dan Implementasi Sistem Basis Data. Yogyakarta : Andi.
[9] Makridakis, S., Wheelwhright, S.C. dan McGee, V.E. 1993, Metode dan Aplikasi Peramalan. Edisi Kedua Jilid 1. Terjemahan oleh Andriyanto, U.S. dan Basith, A. Jakarta: Erlangga.