Analysis and Information System Planning Of Material Requirement Planning Web

Eka Martyani¹, Hetty Rohayani², Edy Kurniawan³, Harlia Febrianti³

¹Information System, University of Adiwangsa Jambi
²Information Technology, University of Adiwangsa Jambi
³Architecture, University of Adiwangsa Jambi

*ekamartyanihs@gmail.com

Abstract. Many companies that have utilised sophistication system and information With Material Requirement Planning, each work unit can be well coordinated so that it can improve the operational efficiency of each work unit in the company. with this MRP can help to avoid shortages and delays in production, and can immediately identify the amount of inventory needs and transaction costs as well as the accuracy of the use of materials needed so that the warehouse can take appropriate action to meet the specified deadline for transaction costs or usage spare parts, stock of spare parts in the warehouse, and the results of calculating the total spare parts inventory listed on the information material plan needed for the future.

1. Introduction
The development system and information technology that have been penetrating in all field of life already. They are not assisting the people in data processing only, but also they have already developed rapidly to help the managerial parties in taking decision to get a better planning in a company. Many companies that have utilized sophistication system and information technology already to increase company competitive advantage, one of them is fancied the most web-based system and information technology. It can be kept the data in huge scale and also can be assisted in data submission process. It is hard to be reachabled, and shutted in distance and time. However it is not all companies that have utilised the usage of information system and technology optimally, one of them that does not utilize the sophistication system and information technology optimally yet namely PT. Produk Sawitindo Jambi. The place that the writers did the research.web.

PT. Produk Sawitindo Jambi is one of company that is engaging in plantation sector, the company has been producing palm oil to be semi-finished product, namely CPO (Crude Palm Oil). Processing palm oil to be CPO which has 4 (four) main processes, they are the segregation of fruit palm oil with bare, the enumeration and dozing meat, pressing and purification pengepresan, dan oil refining. And all the processes need good equipment, it does not become obstacle in product processing. It can get the yield maximally in oil palm processing to be CPO, Then the procurement of material Then the procurement need material must be managed well, in order not to be occurred lack of material when the production takes place. Production material that always gets the concerning and needing a good plan in procurement is spare parts. Procurement of spare part has important role in
production process because if there is damaged tool in production process, then it must be replaced directly and repaired it, so that production process can be continued directly [1], [2].

However the production department sometimes has obstacles in palm oil production process to be CPO, wherefore the occurrence of spare part material that is needed in production process. These material obstacles of spare parts are not occured in a good plan within procurinement of production material needs which is in the form of spare parts [3]. All this time the material procurement is done when needed only, in case there is not spare part, then the warehouse department reports to the office section to order the goods, there is not a plan in minimal procurement stock in warehouse yet. The material requisite report is submitted periodically each month. It has admission report of spare parts and expenditure report (usage) of spare parts. The commentary process needs a time, because the warehouse department has to check and process the admission data and expenditure of spare part each month on Microsoft Excel, then submitting the report file to the office section to be delivered to the management.

Aside from that, PT. Produk Sawitindo Jambi’s material requirement planning of information system uses the offline computer, by using Microsoft Excel application and it is not intergrated with information system of spare parts data processing yet, as of PT. Produk Sawitindo Jambi’s spare parts data information in warehouse department that can not be accessed directly by office section and production department in the importance company with the data of spare parts [1], [4], [5]. It can be concluded that PT. Produk Sawitindo Jambi does not utilise usage, web-based and information technology system optimally yet [6]. It can help the company to simplify the data processing, required data distribution, and information system that can assist the company in the planning of material required planning. Whereas web-based information system existence will help the company to increase the effectiveness and efficiency of the employee’s performance, especially the company condition which is not found in a room/building [2], [7]. The example can be seen in the warehouse section and office section which are located separately and are not in one building, however they always connect each other. If it has web-based information system then the data preprocessing activity, data distribution and accessing by two sections that always connect. It can be easier, because the employees can access the Web page easily. They do not have to attend to the place directly [8].

It is needed a web-based information system MRP (Material Requirement Planning) in PT. Produk Sawitindo Jambi which can be used for assisting in material planning needs of production in PT. Produk Sawitindo Jambi, one of them regards spare part material stock at the warehouse [2]. Furthermore this information system can also assist in the data of reporting process, expenditure and admission data, and spare parts stock that done by employee of warehouse department, it can improve the effectiveness and efficiency of the employee’s performance in PT. Sawitindo Jambi [1], [4], [5].

2. Related Work

2.1 Identification of Problem
Identification of Problem is the first step that will be done in this research. At the phase of identification problem that can be understood. It can understand the problem that will be researched, and the analysis phase and design do not go forth from the research problem[2], [9], [10].

2.2 Study of Literature
In the phase of study literature, the writers study and understand about the theories that becomes a guidance and reference from various books, journals and internet to complete concept treasury and theory. They have the based and good science. In order to finalise the problem in this thesis and studying about the relevant research [2], [9], [10].
2.3 Data Collecting
As a supporting material that usefuls to the writers to find and collect the data in this research, the writer uses several ways, they are: hard document, observation, Interview.

2.4 Analysis and System Planning
In this phase, the writers analysed and made a policy service information system planning by using UML (Unified Modeling Language) here are the steps: Determining first planning, Doing business, Analysing information system that is used at the moment, Modelling information system by using UML, Creating information system prototype [3], [11], [12].

2.5 Making Research Report
In this phase, the writers make research report that is containing the problems and solution in the object [2], [9], [10], [13], researched by the writer namely system information of MRP (Material Requirement Planning) in PT. Produk Sawitindo Jambi, the theories that are taken by the writers as support in a research, the writers use the method of How to make a research, research result, the analysis and severals objects from the research report.

2.6 Result and Discussion
A System planning is analysis phase from the cycle of system development, the definition’s functional needed and preparation design how to form a system. After doing all of the phase, this research is obtained the final result from this research, namely the information system prototype of MRP (Material Requirement Planning) web-based in PT. Produk Sawitindo Jambi that has advantages as follows: Easy to be used, because planned by suitable needed in the company section of data requirement spare parts, has a completed facility in the spare parts. data requirement, presentable information display structured, because it is created in the certain categories based on user needed [14], [16].

3. Results
3.1 Conclusion
Based on the discussion that has been done in the chapters before, then can be conclude some conclusions from this research as follows:

3.1.1 Use Case Diagram MRP Information Services PT. Jambi Sawitindo Products
Based on the use case diagram of the MRP (Material Requirement Planning) information service PT. Sawitindo Jambi products (figure 3.1.1) show that actors consist of Admin, warehouse staff, office clerk, and production officer. From Figure 3.1.1 it is also known that all actors can perform information viewing activities (UC-01) and print information (UC-02). It is also known that besides being able to see and print the information provided, the Admin can also Manage Access (UC-03) and Manage User Data (UC-04). As for the warehouse staff, the activities that can be carried out are managing data spare parts (UC-07), office clerk can carry out verification activities of spare parts request data (UC-09), and production officers can carry out activities to manage spare expenditure request data parts (UC-08). But to do all activities on the system, before all actors must do the Login process (UC-05) first. The use case model is determined on the basis of the needs of the functions to be built [17], [18], [19]. Based on the assumptions used, it can be described the use case information service MRP (Material Requirement Planning) diagram of PT. Jambi Sawitindo Products are as follows:
3.1.2 Based on the class diagram image on the web-based MRP (Material Requirement Planning) information system at PT. Jambi Sawitindo Products can be seen that the class user is a super class of class warehouse clerks, office parts officers, production department officers and class administrators. In the class user there is one user who can manage access to the class managing access, namely the class administrator. From the diagram it can also be seen that all actors can carry out viewing and printing information provided. From the diagram, it is also known that shrimp parts officers can manage inventory data on spare parts, receive spare parts, spend spare parts, and plan data on spare parts requirements according to their access rights. Where management activities carried out by the warehouse will produce information on spare parts needs, in the form of inventory information, receipts, expenses and information plans for spare parts needs that can be seen by many users, in accordance with access rights. From the diagram, it is also known that the production officer can manage goods demand data that produces goods demand information. From the diagram it is also known that office clerks can verify / approve goods requests [19].
3.1.3 The figure below is a design view of the management of spare parts inventory that can be carried out by the warehouse officer. From the picture, it can be seen that the user can carry out the management of spare parts inventory in PT. Jambi Sawitindo Products, including add, change, and delete spare parts data. And for the display of spare parts inventory information that can be seen and printed by all users is almost the same, the difference is that the page has a print button and does not have a spare parts data management function [19], [20].

Figure 2. Class Diagram In Web-based MRP (Material Requirement Planning) Information System

Figure 3. Design Display Manage Inventory Spare Parts
3.1.4 The picture below is a design view of managing the receipt of spare parts that can be carried out by the warehouse officer. From the picture it can be seen that the user can carry out the activities of managing the spare parts in the PT. Jambi Sawitindo Products, including add, change, and delete data from spare parts. And for information display of spare parts that can be seen and printed by all users is almost the same, the difference is that the page has a print button and does not have the function of managing data for spare parts.

Figure 4. Draft Display of Manage Receipt of Spare Parts

3.1.5 The figure below is a design view of managing the expenditure of spare parts that can be done by the warehouse officer. From the picture, it can be seen that the user can carry out the management activities of the spare parts in the warehouse of PT. Jambi Sawitindo Products, including add, change, and delete data on spare parts expenses. And for displaying information on spending spare parts that can be seen and printed by all users is almost the same, the difference is that the page has a print button and does not have the function of managing data on spare parts expenditure.

Figure 5. Draft Display of Expenditure Manage Spare Parts

3.1.6 The picture below is a design view of managing the plan for spare parts needs that can be carried out by the warehouse officer. From the picture it can be seen that the user can carry out management activities of the plan for the needs of spare parts in the PT. Jambi Sawitindo Products, including adding, changing, and deleting planned data for spare parts needs. And for display information, the plan for spare parts needs that can be seen and printed by all users is almost the same, the difference is that the page has a print button and does not have a data management plan for spare parts.
3.1.7 The picture above is a verification list of requests for spare parts that have been previously sent by the production department, where the user of the office can see and verify the demand data for the spare parts by taking action to approve or reject the request.

3.1.8 Design of Input Display / Add Data Spare Parts
Figure 8. Design of Input Display / Add Data Spare Parts

The picture above is a display of input / added data spare parts can be managed by the warehouse staff to add data on existing spare parts. In the picture above, it can be seen that the data input consists of: item code, item group, item name, item unit, stock quantity, and unit price. From the input / add activity of the spare part data, it will produce a data management page and also a spare parts data information page.

3.1.9 Design of Input Display / Add Data for Receiving Spare Parts

The picture above is a display of input / added data on spare parts receipts can be managed by warehouse staff to add data on the receipt of existing spare parts. In the picture above it can be seen that the data input consists of: SPB Name, OP Number, Date, item code, item name that automatically appears when the item code is entered, the number of receipts, and the unit price that automatically appears. From the input / add data activity, this will produce a manage data receipt page and also the information page on the receipt of spare parts.

3.1.10 Design Input Display / Add Expenditure Data Spare Parts

Figure 10. Design of Input Display / Add Expenditure Data Spare Parts
The picture above is a display of inputs / added data on spare parts expenditures can be managed by a warehouse officer to add to the expenditure data on spare parts that occur. In the picture above, it can be seen that the data input consists of: Expenditure Number, item code, item name that automatically appears when the item code is entered, date, unit of goods that also automatically appear, total expenditure, unit price that automatically appears, and information on expenses happen. From the input / add data activity, this will produce a page managing the expenditure data and also the information page on the expenditure of spare parts.

3.1.11 Design of Input Display / Add Data Plan for Spare Parts Needs

![Figure 11. Design of Input Display / Add Data Plan for Spare Parts Needs]

The picture above is a display of input / add data plan spare parts needs can be managed by warehouse staff to add data plan for spare parts requirements per period. In the picture above it can be seen that the data input consists of: RK number, item code, item name that automatically appears when the item code is entered, period, quantity which is the number of items that have been set for a certain period, and unit price that automatically appears when the item code entered. From the input / add data activities, the plan for this need will produce a data plan management page for the needs and also the data information page for the plan for spare parts requirements. Where from the results of the input, it will be known the total cost of the planned spare part requirements per period.
3.1.12 Design Input Display / Add Spare Parts Request Data

The picture above is a display of input / add demand data for spare parts can be managed by production department officers to add the required spare parts demand data. In the picture above it can be seen that the data input consists of: Request ID, item code, item name that automatically appears when the item code is entered, Date, quantity which is the number of items requested, and unit price that automatically appears when the item code is entered. From the input / add data activity this request will produce a page managing demand data and requesting data information on spare parts that can be seen and printed.

3.1.13 After carrying out all stages of the research, the final result of this research is the web-based MRP (Material Requirement Planning) information system prototype at PT. Jambi Sawitindo Products which have the following advantages: 1. Easy to use, because it is designed according to the needs in the field of data processing spare parts in the company. 2. Has complete facilities in managing spare parts data. 3. The structure of information display is neat, because it is made in certain categories according to user needs.

4. Discussion
Based on the results from the previous table, it can be concluded that with the implementation of the MRP system at PT. Sawitindo Jambi products the ability and work system of employees to be faster and more efficient so that information on the needs of data on spare parts in warehouses can be accessed directly by parts of offices and parts of production in companies concerned with data spare parts, and prototype information systems need to be developed become an application, so that it can really be used online and can be applied to PT. Jambi Sawitindo Products to support all business processes from web-based MRP (Material Requirement Planning) information systems at PT. Jambi Sawitindo Products.

5. Suggestion
Based on the research that has been done then can be stated the suggestions as a follows: 3.2.1 Because of the web-based MRP (Material Requirement Planning) information system prototype in PT. Produk Sawitindo Jambi that the writers made just explaining 1(one) kind of managed production material by warehouse’s PT. Produk Sawitindo Jambi, namely spare parts Sawitindo Jambi product. To improve the web-based MRP (Material Requirement Planning) of information system research in the future in PT. Produk Sawitindo Jambi. It can manage the whole material needed that managed by PT. Prosuk Sawitindo.
Reference

[1] Sholiq and R Imam 2010 *Analisis dan Perancangan Berorientasi Obyek* Bandung : CV. Muara Indah

[2] Azzam A, Saptomo, W. L. Y, and Irawati, T 2014. *Aplikasi Perhitungan Kebutuhan Bahan Baku Produksi Buku Lks Dengan Metode Material Requirement Planning (MRP) Study Kasus Pada PT. Harapan Makmur Abadi*. Jurnal Teknologi Informasi dan Komunikasi (TIKomSin), 2(1)

[3] Munawar 2005 Pemodelan Visual dengan UML Yogyakarta : Penerbit Graha Ilmu

[4] A S Rosa and Shalahuddin M 2013 *Rekayasa perangkat Lunak Terstruktur dan Berorientasi Objet* Bandung : Informatika

[5] Nugroho Adi 2010 *Rekayasa Perangkat Lunak Berorientasi Objet dengan Metode USPD* Yogyakarta : Andi

[6] Al Fatta Hanif 2007 *Analisis dan Perancangan Sistem Informasi untuk Keunggulan Bersaing Perusahaan dan Organisasi Modern* Yogyakarta : Andi

[7] Sidik Betha 2014 *Pemrograman Web dengan PHP* Bandung : Informatika

[8] Pressman Roger S 2010 *Software Engineering : A Practitioner’s Approach* ed Fifth New york : McGraw-Hill

[9] Jatmiko, Eric. Tri; Oktaroz, Magnaz. Lestira; & Diamonalisa, 2015. *Analisis dan Perancangan Sistem Informasi Persediaan Barang di Toko Sofia*. Prosiding Penelitian SPeSIA – Akuntansi

[10] Marsaulina, K. S.1999. *Analisis Optimalisasi Produksi Crude Palm Oil (CPO) Dan Palm Kernel (PK) Study Kasus Pada PT. Perkebunan Nusantara XIII (Persero) Kalimantan Barat*. Skripsi. Fakultas Pertanian Institut Pertanian Bogor. Bogor

[11] Dennis, Alan Wixom Haley Barbara and Tegarden, David 2005 *Systems Analysis and Design with UML Version 2.0 : An Object-Oriented Approach*. Ed Second United States of America - John Wiley & Sons, Inc

[12] Kusrini and Koniyo, Andri 2007 *Tuntunan Praktis Membangun Sistem Informasi Akuntansi dengan Visual Basic dan Microsoft SQL Server* Yogyakarta : Andi

[13] A Hall James, Singleton Tommie. 2007 *Information Technology Auditing and Assurance*. Second Edition. Jakarta : Salemba Empat

[14] Amri. 2008 *Peranan pengendalian internal persediaan bahan baku dalam memupuk efektivitas pengelolaan persediaan bahan baku pada PT. Samudera Puranabile Abadi* Bitung

[15] McLeod Jr. Raymond and P S George 2007 *Management Information Systems* 10 New Jersey, United States of America : Pearson Prentice Hall

[16] O’Brien James A 2006 *Pengantar Sistem Informasi* Jakarta : Salemba Empat

[17] B Wahyudi 2008 *Konsep Sistem Informasi*. Yogyakarta : Andi

[18] Whitten L Jeffery Bentley D Lonnie and Dittman, C Kevin 2004 *Systems Analysis & Design Methods*. 6 New York, United States of America : The McGraw Hill Companies, Inc

[19] Kendall E Kenneth and Kendall E Julie 2011 *Systems Analysis and Design* 8 United States of America : Pearson Education Inc

[20] Laudon K C and Laudon J P 2005 *Sistem Informasi Manajemen* (Yogyakarta : Andi)