Inventory Information System Design in PT.Adi Satria Abadi Indonesia

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Abstract

This study was done at PT. Adi Satria Abadi (ASA) which produces leather. To compete with other leather goods manufacturers during the economic crisis, PT. ASA must be able to minimize production costs. One of the ways is to reduce the cost of raw materials. It is needed for planning and controlling raw material inventory. For that purpose, a computerized conceptual information system for raw material inventory was designed.

Keywords: PT. Adi Satria Abadi (PT.ASA), information system, raw material stock, raw material procurement

I. INTRODUCTION

PT. Adi Satria Abadi (ASA) is a leather processing company. Product demand for leather in PT. ASA is dynamic and volatile. However, demand monthly and annual have a trend of linear increased. Nonetheless, for certain times, a high increase occurs. Based on such demands pattern and production capacity, PT. ASA only applies one shift of work and sometimes performs overtime in high demand situation. Nevertheless, PT. ASA's production is often hindered due to insufficient raw material stock. Raw material stock must be able to anticipate the production plan (Al Momani et al, 2020). The stock of raw material is needed to handle uncertain demands (Polotski et al, 2020). The lateness in the fulfillment schedule of the ordered by consumers cause a bad image of the company. Meanwhile, if raw material stock is abundant, it will be ineffective because storage cost and damage cost of raw material will be increased (Ishfaq and Raja, 2020).

It is caused by inconsistency data in the stock card with the material amount in the warehouse. Consequently, the availability of adequate raw material stock for the production process must be maintained (Ishfaq and Raja, 2020). Data inconsistency in-stock cards with the amount of material in the warehouse will cause a hindered production process (Al Momani et al, 2020). The raw material stock of PT. ASA has not yet been planned and controlled. Thus, the production process is often hindered due to run out raw material, or either ordered raw material has not yet been received. At certain times, the raw material is available in large numbers and it is often lost. Besides, PT. ASA's

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computers are not yet optimally utilized. PT. ASA's computers only can be used for presenting past activity reports, but not presenting accurate information.

The availability of raw material information which fast and accurate in raw material procurement for the decision-maker is greatly important (Tejesh and Neeraja, 2018). Due to raw material information inconsistency in the warehouse, determination of the amount and time of procurement becomes inaccurate (Polotski and Kenne, 2017). The accuracy of raw material procurement decisions depends on the availability of fast and accurate raw material information data (Calle et al., 2016). By using an information system of procurement management, raw material stock in the warehouse can be known at any time (Handayani et al., 2019). Therefore, with this information system, decision making can specify policy in fast and precise in raw material procurement in the warehouse. Such policy determination among others is the determination of time and amount of raw material order (Polotski and Kenne, 2017). Hence, raw material orders may be able to be done directly without waiting for requests from the production department. As consequence, real-time information data is greatly needed in an information system. Then, it needs an information system application that can provide information on raw material and payment deadlines.

Thus, these research aims are (1) identifying issues relating to the raw material procurement process in PT. ASA, and (2) generating a SIM application that can help the company to handle raw material procurement lateness. Meanwhile, the advantage of this research are to (1) increase performance effectiveness in the production process, and (2) accelerate information flow from the warehouse to other departments.

II. RESEARCH METHODOLOGY

This research was performed in PT. ASA. This company is a skinned animal processing company. Located in Bantul, DI Yogyakarta. Data collection was done with field research. This data collection method could be done through an interview. Besides, such a data collection model might take the form of direct observation of physical objects such as ongoing activities. As for stages in observation were planning, analysis, and design. Completeness on field research model was continued with a decision-supporting information system design.

A decision supporting system was made with the system approach method. This method used a structured approach. Supporting tools used in this structured approach were in form of flow maps, context diagrams, and flow diagrams. Flow map was used as assistance tools in the designing process. Meanwhile, assistance tools in database design used data dictionary, relation table, ERD (Entity Relationship Diagram), and normalization. As for assistance tools in designing software were input design, output design, coding, menu structure, and system needs. In system development, the model used was a prototype. In this model, the process was initiated by the collection of users' needs towards the software. Afterward, it was continued with a software prototype. The arranged software prototype was not yet a finished application program. It still needed to be evaluated continuously by users and developers to achieve users' functional needs upon the software.

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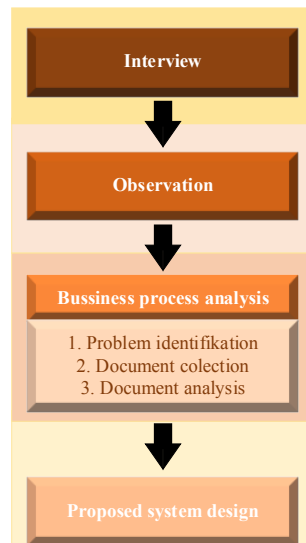Sigit Haryono, Agus Ristono, Ahmad Muhsin, Nur Afni

Figure 1. Stage of the research

Stage combination between field research with a decision-supporting system design could be seen in Figure 1. The first stage was an interview with stakeholder. This initial stage aimed to establish issues which were existed in PT. ASA. The interview was addressed to the person in charge of raw material procurement in PT. ASA. The second stage was an observation. After the interview was being done, the next stage was an observation. The observation was used to see operational activity in the raw material procurement department in PT. ASA. The next stage was the business process analysis. In this stage, the analysis was performed upon process activity in the company from the start until the end of the activity. However, since the research was about raw material, the process analyzed was sales and delivery in PT. ASA. Within such business process analysis, then performed activities as follows:

a. Problem identification. This stage was aimed to establish issues which were not disclosed by stakeholder based on business process in PT. ASA.
b. Documents collection. The documents submitted were data involved in the business process, started from raw material procurement until the production process was performed.
c. Documents Analysis. This analysis process was aimed to establish ingoing and outgoing documents within the business process of PT. ASA. By analyzing such documents, context diagram and zero diagrams could be made from the system currently running in PT. ASA.
d. The last stage was designing the system proposal. The last result of this system proposal the last output based on the solution obtained in the previous stage. In this proposal design, it was made (1) context diagram proposal, (2) proposed system zero diagrams, and (3) software design. To design an application program, it needed a structured processing chart and operation menu structure.

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III. FINDING AND DISCUSSION

Running system process procedure on raw material procurement in PT. ASA passed three big stages. The first stage is the goods order procedure. Warehouse asks for raw material procurement to the purchasing department by giving a form of material requirements. The purchasing department checks the material requirement form. Based on the inspection result, the purchasing department then entering material requirements data into the material requirement archive. Furthermore, the purchasing department makes a purchase order in which its data obtained from the material requirement archive. The data taken contain the name of the item including code and amount of item needed. After a purchase order is made, the purchasing department sends the purchase order to the supplier of raw material.

The second stage is the procedure of writing a receipt. This receipt can be made if the items ordered by the purchasing department have been sent by the supplier and accepted by the warehouse. Such a receipt is made in line with the data of receipt, invoice, and standard tax invoice. Those three data are from the warehouse. The next step is those three data are stored in a filing cabinet. In making receipt, only several data which can be taken. From the standard tax invoice form, the data taken are the only number. Meanwhile, from invoice form, date data, and invoices only are taken. As for the receipt form, the data taken only receipt item data and its number. The next step is the receipt which was made into the warehouse then sent to the supplier.
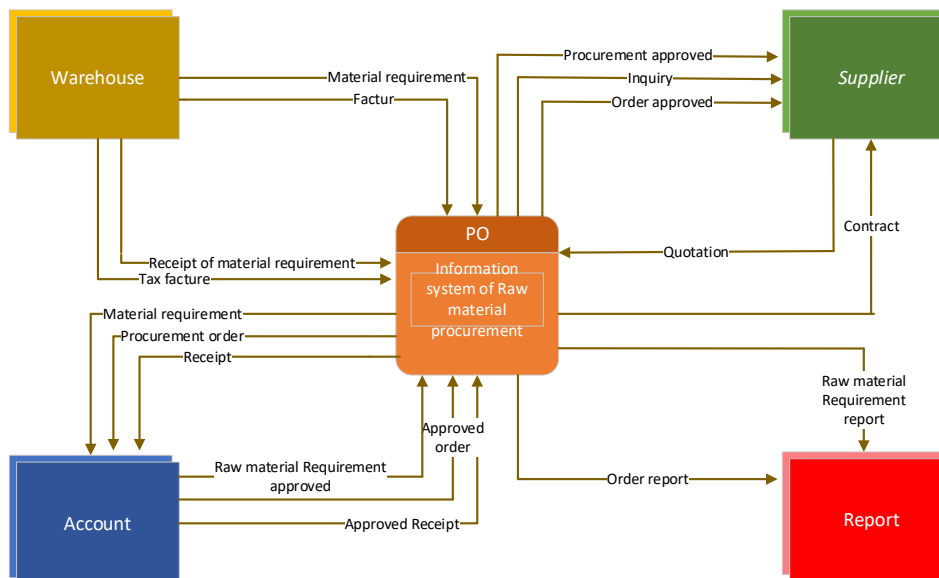

Figure 2. Existing context diagram

The third stage is the reporting procedure. In this stage, the report output must consist of material requirement reports and material purchase order reports. Both of this report, then, submitted periodically (usually within one month) to the factory manager and purchasing department. As for terms and conditions are (1) in order implementation or purchase order, the data source must be from material requirement data approved by leader, (2) purchasing department always makes two types of report, in which purchase order report and material requirement report, (3) report is made every end of the month and submitted to factory manager and purchasing department, (4) purchase order of raw

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material is carried out one month before the raw material used. Running system process procedure in PT. ASA can be made into a context diagram as in Figure 2 and Figure 3.
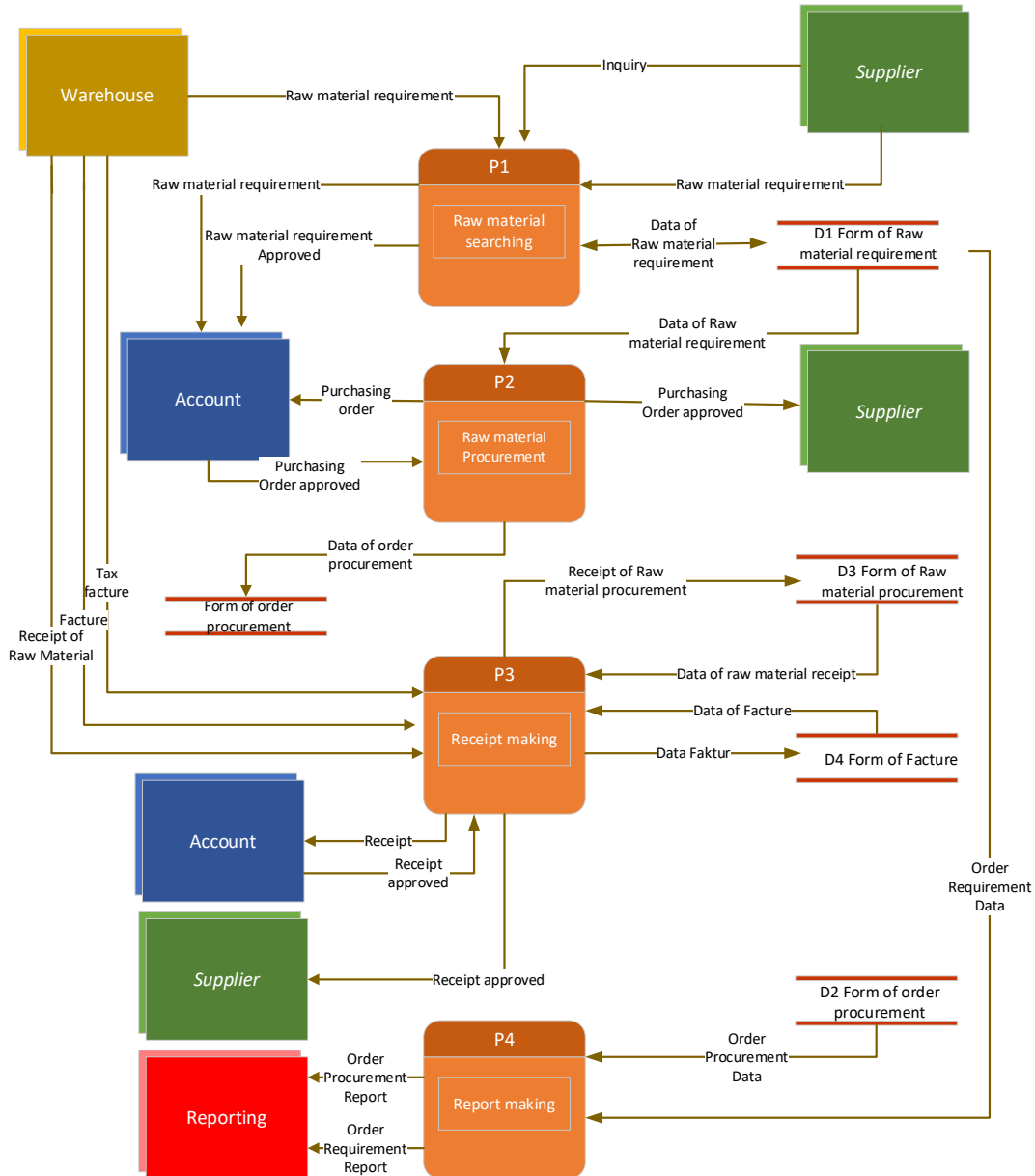

Figure 3. Existing null context diagram

By observing existing system analysis result, proposal system design as improvement is created. The first phase of the proposal is the initial data recording procedure. This procedure was done through data recording which was later used as input in the proposed system. Initial data recording includes material requirements and its raw material itself. The second phase is the raw material order

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procedure. The accounting department gives material requirement form to the purchasing department. Purchasing department checks material requirement form and at once record the data on material requirement file. Furthermore, the purchasing department contacts the supplier to ask for raw material data and price details. In this process, the purchasing department may perform price negotiation or work agreement with the supplier. If the price negotiation is agreed upon, the purchasing department asks for approval from Resourcing & Purchasing Manager. Also, the purchasing department creates a Purchase Order form in which the data are from the material requirement form. The data are taken the only name of raw material and its amount needed. Afterward, the purchasing department sends a Purchase Order to the Supplier.
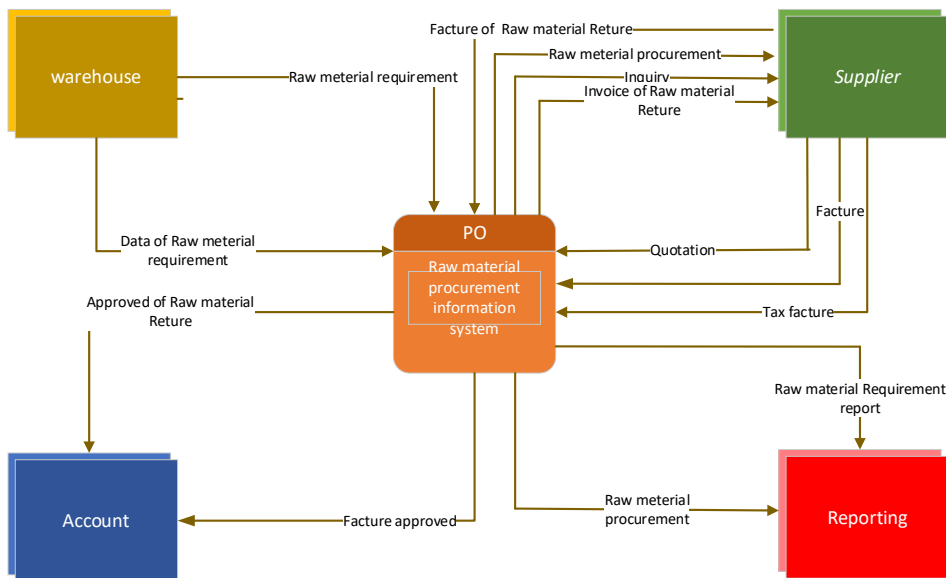

Figure 4. Proposed context diagram

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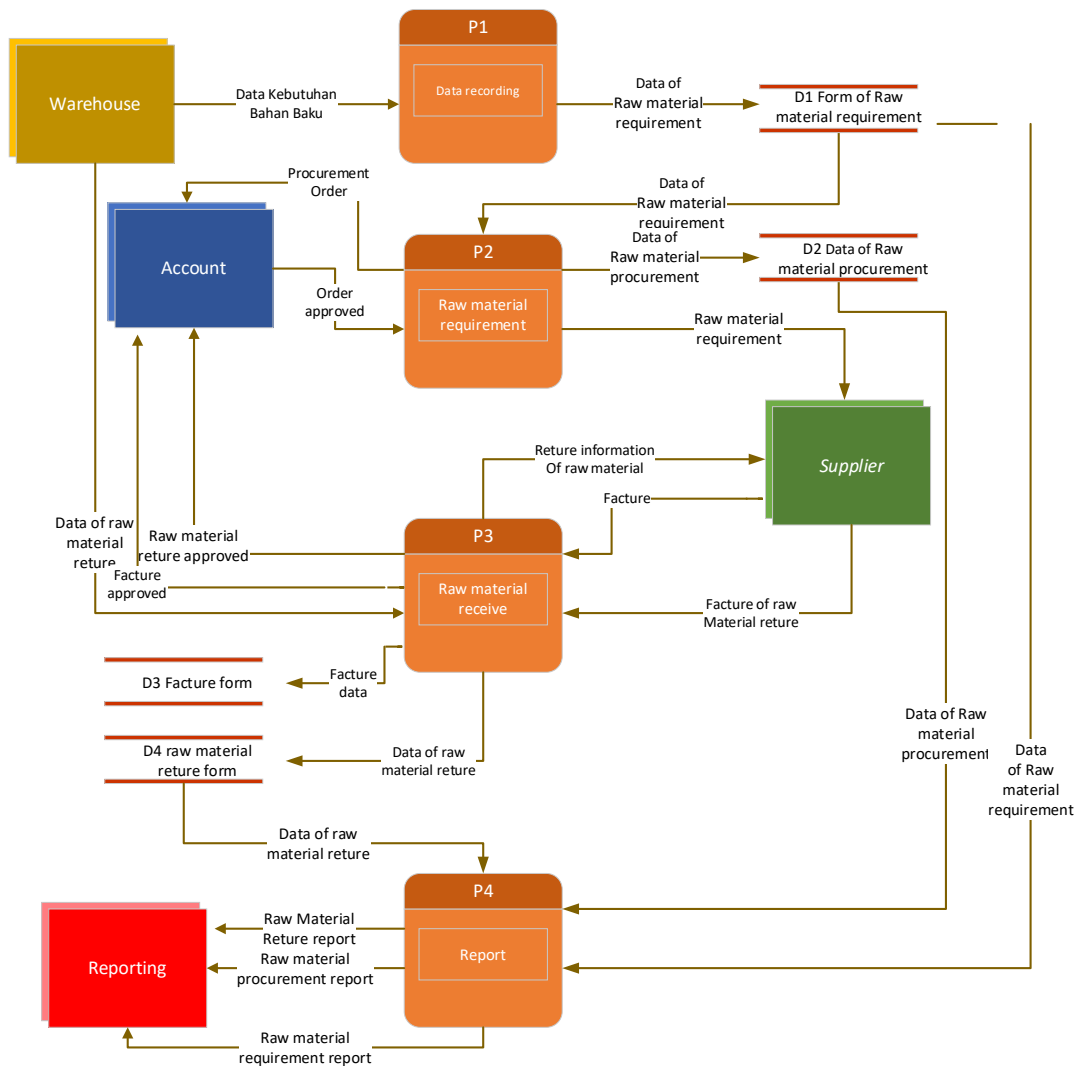Sigit Haryono, Agus Ristono, Ahmad Muhsin, Nur Afni

Figure 5. Proposed null context diagram

The proposal for the second phase is the raw material acceptance procedure. This procedure is applied if the supplier has sent the material ordered by the purchasing department and has been received. Moreover, the purchasing department checks the raw material. The checking includes the proving of delivery. This checking process is to know whether raw materials sent are by type and amount of materials which has been ordered. Another checking process is whether the invoice and standard tax invoice of the ordered materials have been given by the supplier or not. Furthermore, the purchasing department sends the raw material to the warehouse. In the delivery process, a receipt form is needed to be filled by the warehouse department. Nevertheless, if there any raw materials which do not by order or there are defective, the purchasing department will contact the supplier, and then the purchasing department will make a material return form.

The last phase proposal is the reporting procedure. In this phase, the reports made are (1) material requirement report, (2) purchase order report, and (3) return report of materials either based on the type of return based on the supplier. The end of this phase is the submission of all reports at the end of the month to the factory manager and purchasing department. As for terms and conditions applied

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in this proposed process are (1) purchasing department negotiates the price or work agreement with a supplier, (2) raw material order is executed by purchasing department, (3) the materials are sent by the supplier to purchasing department, (4) materials received and checked by purchasing department, checking also done on materials delivery invoice, (5) if there any returns, purchasing department informs such return together with the defective material description and the defect information to the supplier, (6) each at the end of the month all reports are made.
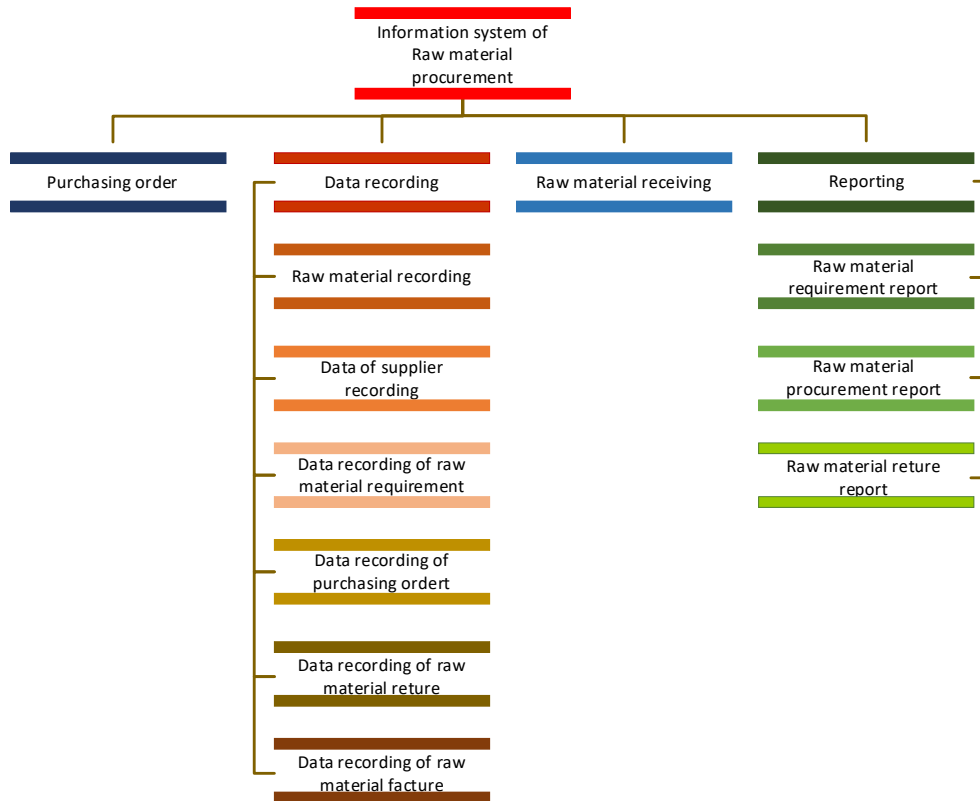

Figure 6. Structured processing chart

A structured chart for the proposed information system can be seen in Figure 6. This chart model is made into a hierarchy chart. This hierarchy chart or structured chart is used as a definition and illustration of the system organization of raw material PT. ASA in the hierarchy in form of module or sub-module. Structured chart as in Figure 6 used as tools to elaborate the raw materials availability system of PT. ASA in form of module and sub-module. This structured chart is also made as a structured design base for PT. ASA's raw material information system. Thanks to this chart, the relationship of data element and control element, module, and the relationship between modules for the raw material procurement program of PT. ASA. Proposed program design for PT. ASA's raw material information system is divided based on each department. It is because not all departments can access other departments' programs. A module program, which supports the work, has been created for each department. Detailed design of the operation menu structure program for the availability information system in PT. ASA can be seen in Figure 7.

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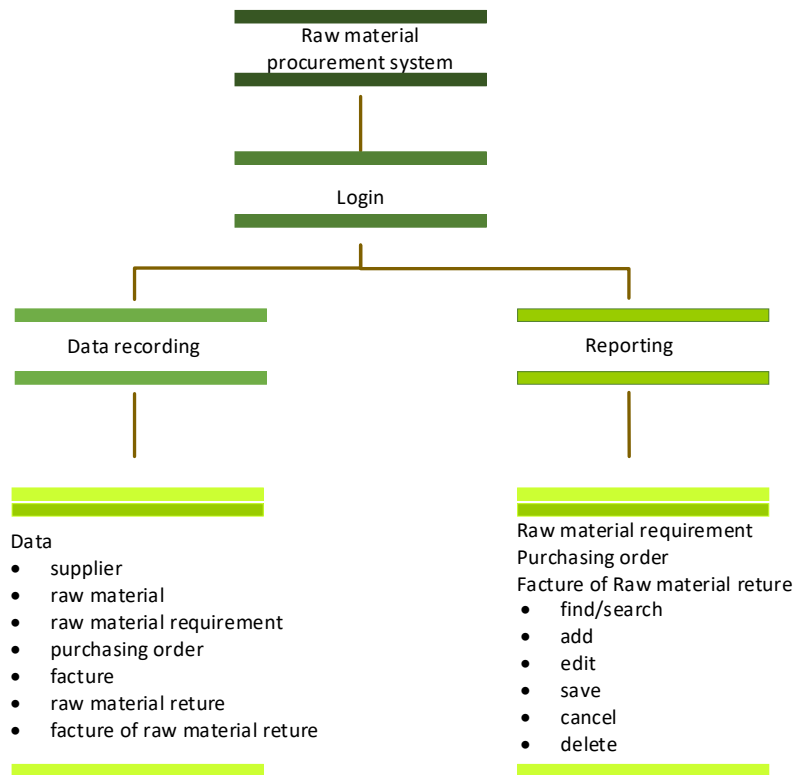Sigit Haryono, Agus Ristono, Ahmad Muhsin, Nur Afni

Figure 7. Operation menu structure

In this information system design, the security system design also followed. This security system design is used to avoid data corruption or system utilization without permission. Therefore, this computer security creation aims to optimize data protection and limitation of system utilization. Computer security design in this information system comprises two types of security. Both of these securities are software and hardware securities. Security computers include (1) backup data, (2) Uninterruptable Power Supply (UPS) use, and (3) access control mechanism. The first computer security is performed periodically or every business day. This method is used to avoid data loss due to hard disk loss. UPS utilization in this security is to anticipate electric disturbance. Thus, it can prevent system corruption and information loss. Meanwhile, for the access control mechanism, it comprises two parts. The first one is physical access control, and the latter one is logical access control. The first control aims to prevent not concerned people to physically access the system. This control is more focused on physical methods of prevention, among others padlock use, security, ID card, or any administration signs. Meanwhile, logical access control is prevention on people who would exploit physical access to the system with information or knowledge or user-ID and password.

Raw material availability information system of PT. ASA needs adequate facilities and infrastructure. It is correlated with smoothness in raw material stock working implementation in PT. ASA. Therefore, to establish and apply a computerization system, it needs software and hardware. The software and hardware consisting of three groups related to its function. Those three groups are the input device, data processing device, an output device. As for the design of server hardware, the specification used in detail is in Table 1. While the design of the detailed specification of client computer hardware is provided in Table 2. After hardware specification, it is continued to software

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specifications. It is also important as information system operating facilities. Network topology which the author proposed for PT. ASA is using Star topology (see Figure 8). One of the nodes is made as a central point. This system has a simpler complexity level so this system is more economical, yet the load in the central point is quite heavy.

Tabel 1.Server specification

Item	Minimum	Recommended
Processor	Intel Xeon	Intel Xeon ES or E7,4 or more core
Memory (RAM)	8 GB	16 GB
Operating system	Windows 10 Pro/Server 2012	Windows Server 2012
Storage configuration	100 GB, RAID 0	250 GB, RAID 1
Database	Microsoft Access/SQL Server 2012	MS SQL Server 2012 or higher
Net framework	3.5	4.5
Networking	10/100 MB	Gigabit, Dual interfaces

Tabel 2.Client specification

Item	Minimum	Recommended
Processor	Any intel 1 GHz or higher	Intel 2GHz or higher, Dual-core, 64-bit
Memory (RAM)	8 GB	8 GB or higher
Operating system	Windows 7	Windows 7, 64-bit or higher
Storage configuration	50 GB, RAID 0	100 GB, RAID 1
Net framework	3.5	4.5
Networking	10/100 MB	Gigabit, Dual interfaces

Figure 8. Topology for PT.ASA

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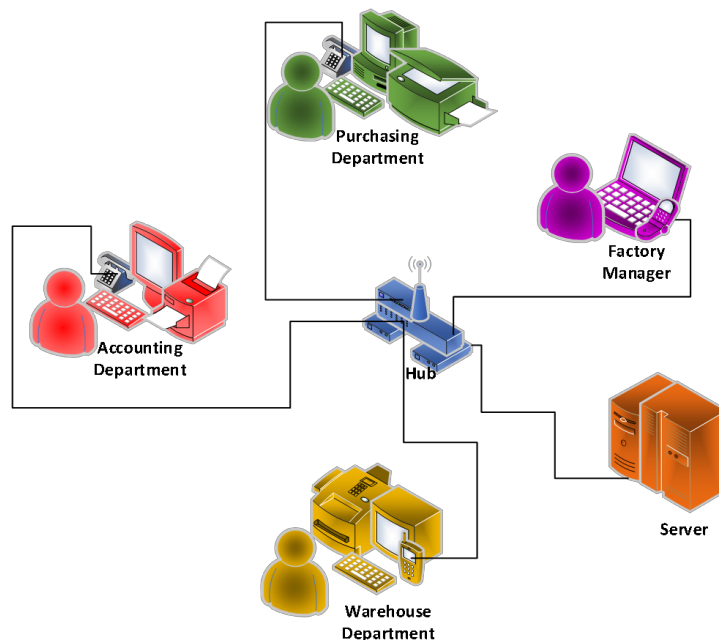
IV. CONCLUSION AND FURTHER RESEARCH

Based on running system analysis on the raw material procurement system in PT. ASA, it could be concluded that the running system was still manual and did not connect. Thus, in presenting information, lateness often occurred. There were no linkages between departments that are connected. Hence, each department needs to wait for information from other departments. This obviously would be a big issue if it was not immediately solved. If the resulted information was slow, it certainly could be ensured that all activities in PT. ASA would be disturbed. Due to this disturbance, it meant all of the production processes would be disturbed as well.

To solve such an issue, the author tried to give an alternative solution by using a network system where each department could be connected. This meant information would be obtained and processed fast by related departments. To support the information system of raw material with the network, it needed a system integration. For its operation, it needed initial data collection for recording. This system needed a server, in which a component which could control the network system in general. In a further development, the author suggested to always perform maintenance so that it could support the system's performance. The limitation of this research is not entered the security system in the inventory information system.

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