
CHAPTER 4 - RESULTS AND DISCUSSIONS

4.1 Introduction

The implementation methodology, adopted from ASAP implementation methodology and ADempiere implementation methodology, defines the activities in each phase and sub-phases. This chapter will tell the story about the results from each activity, mentioned in each phase.

4.2 Project Preparation

Starting from the Project Preparation phase, the project scope & objectives was negotiated with the company C.V. Indo Surya. Agreement and terms for the implementation was concluded. First kick-off meeting was done to achieve the perfect strategy before going to the next phase.

4.2.1 Define Project Scope & Objectives

After discussing the project scope & objectives with the company's executives, the final project implementation objective is to increase productivity by reducing work efforts, which is by using the ERP system. The scopes of the implementation were stated as:

- The ERP system will only selected type of product, this is because CV. Indo Surya's product list is still uncertain, meaning that there can be new type of product at any time of situation.
- The ERP system will only manage material management, or material movement. Starting from Sales Order, Purchase Order, Material Receipt, Shipment, and Production. It will not involve invoicing issues. If, the ERP system turns out to be effective in terms of the material management, then the implementation will have a continuous improvement.

4.2.2 Organizational Readiness

At the time the project scope & objectives were already discussed. The next discussion was convincing CV. Indo Surya's management that they are 100% ready for a change of state. The management was ready and prepared for the next implementation activity. This activity will be proven in the Contact Report.

4.2.3 Project Team

The project team was assembled, necessary for the corporation of all the work. The team consists of:

- Project Manager (Thesis worker)
- Purchasing staff
- Sales staff
- Logistics staff
- Production staff

4.2.4 High Level Demonstration

In the first kickoff meeting, the project manager demonstrated a high level demonstration of the ADempiere software. The demonstration was done by using the information from www.adempiere.com and using the GardenAdmin simulation in the ADempiere ERP.

4.2.5 Implementation Strategy

The project manager created an implementation strategy in order to give a brief introduction to the organization of the activities in ahead of them. The implementation strategy such as buying hardware and software installation continued by configuration and finished with training. The description of the strategy is actually the implementation methodology itself.

4.2.6 System Availability

The following system availability was explored:

Table 4.1 System Availability

System Availability	Yes/No	Remarks
Are there any server available/installed?	Yes	Low specifications and not allowed to be used as prototype
Are there any networking system installed?	No	All data are transferred by USB
Is there any router available?	Yes	Available in each department
Is the internet connection available?	Yes	Available in each department

By using the information from the exploration above, the next step is to prepare the system to be used.

4.2.7 System Preparation

This activity is to prepare the system and buying all the required hardware to be used in the implementation. Below is the list of hardware with specifications bought:

- Intel Core i5 4440
- Gigabyte GA-H81M-DS2
- Corsair CMZ8GX3M2A1600C9 (2x4GB)
- WDC SATA III Blue 1 TB 64MB 3.5 Inch
- Dazumba D-Vito 782
- LG DVDRW 24x Sata OEM

From the specification above, a pc was built as a server for this implementation. A real server hardware was not necessary due to the size of transactions and number of users in the organization.

4.3 Business Blueprints

The results from this phase are company's blueprint documents. The documents will be explained in the next sub-phases. Gap analysis was also collected with purpose of defining new business process. The end result in this phase is a new proposed business process with the company's acceptance.

4.3.1 Data Gathering

In order to achieve a detailed documentation or blueprints about the company's business, processes, and organization structure, interviews with the high executives and staff were done with a BPM tool.

4.3.1.1 Core Business Process

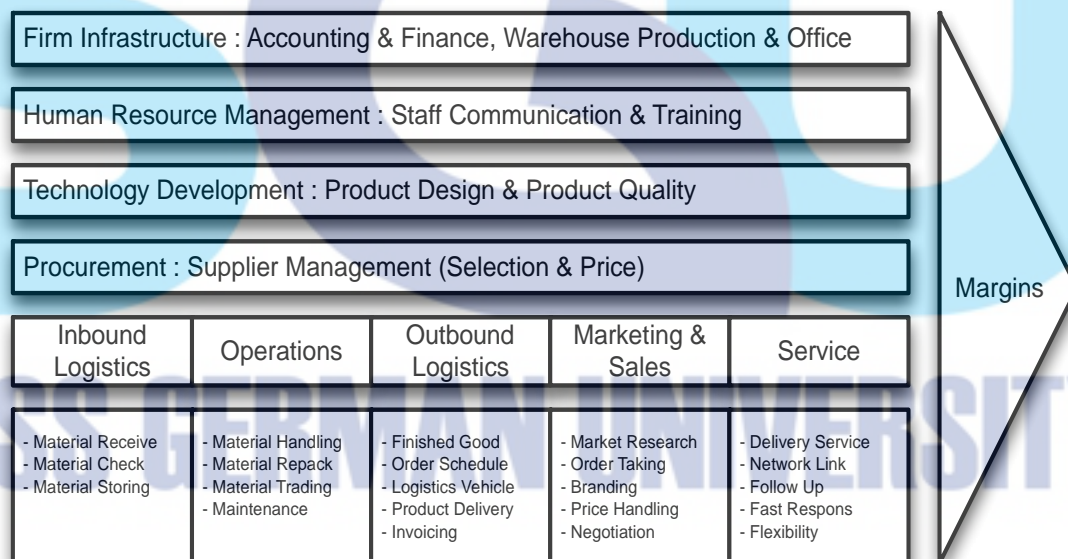


Figure 4.1 CV. Indo Surya's Value Chain

Figure 4.1 shows the core business processes at CV. Indo Surya. CV. Indo Surya main business is to receive raw material, repack the raw material into finished goods with the branding aspects from the marketing & sales point of view, and having good customer relationships by giving a fast response for them and provides a better flexibility in doing business. The company's infrastructure, supplier management, product management and human resource management activities support all those primary activities.

4.3.1.2 Organizational Structure

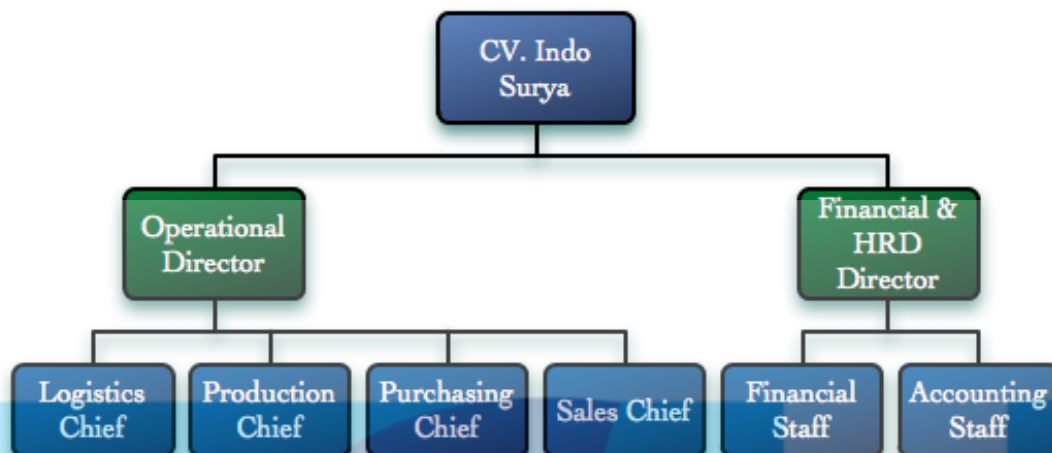


Figure 4.2 CV. Indo Surya's Organization Structure

At CV. INDO SURYA, the departments are divided into operational and financial & human resource department. This is because the ownership of CV. INDO SURYA is by those two directors. The job description of each department and the subordinates are described as:

1. Operational Director

At the company, the operational director is responsible for all operational activities in the warehouse and operational activities for purchasing and selling products.

2. Financial & HRD Director

The responsibility of this director is to handle all accounting & financial jobs. Controlling the company's cash flow and invoices are some of the main work for this director. This director also does the Human Resource Department job. Such as payroll and staff recruiting.

3. Logistics Chief

The logistics chief are in charge of the in and out activities within the warehouse. Shipment scheduling and material receiving are some examples.

4. Production Chief

Scheduling production quantity each day and collaborating material requirements with purchasing department, are the job of the production chief.

5. Purchasing Chief

Even though the operational director makes most of the purchasing decisions, the purchasing chief sometimes is allowed to make purchase order from the approval of the director.

6. Sales Chief

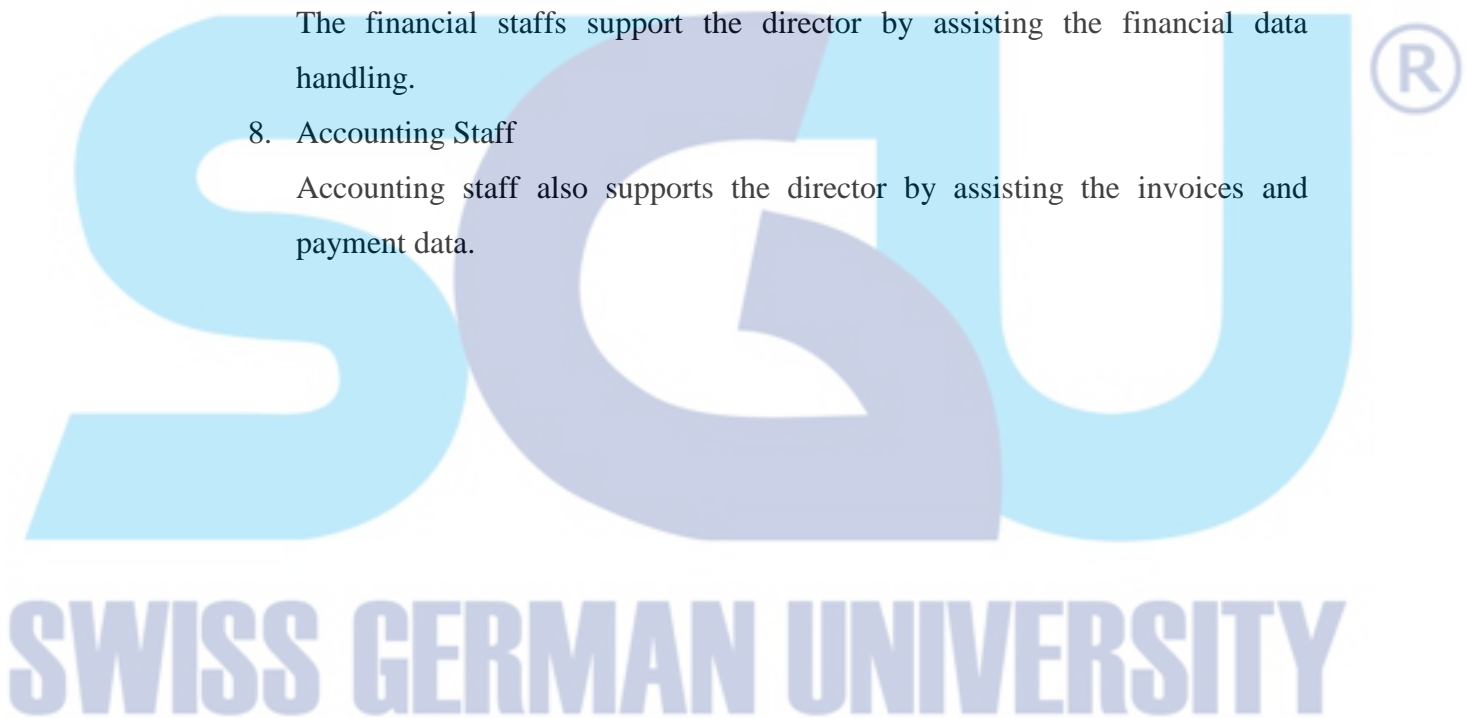
Again, the operational director handles the customer-sales relationships with customers of high-level quotation. Sales chief maintains the market growth and customer situation daily.

7. Financial Staff

The financial staffs support the director by assisting the financial data handling.

8. Accounting Staff

Accounting staff also supports the director by assisting the invoices and payment data.



4.3.1.3 Company's Business

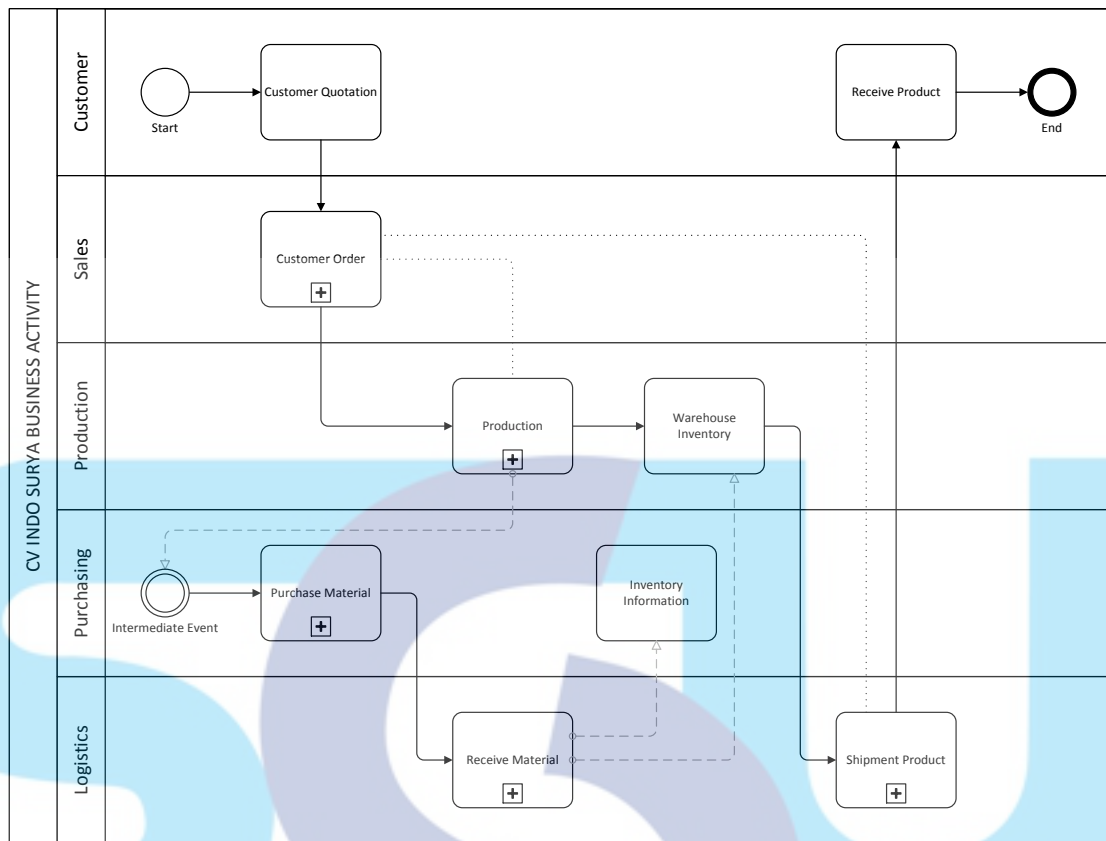


Figure 4.3 CV. Indo Surya's Business

Figure 4.3 shows the business activity at CV. Indo Surya. The business model was created using Business Process Modelling Notation tool, Microsoft Office Visio. The business activity that was documented only covers the material flow activity, not including invoicing and accounting finance activities. And the sub-processes in the Figure 4.3 will be explained in the next subchapter.

4.3.1.4 Business Processes

At the company, there are 5 main activities or sub-processes based on the main business activity. Those are:

- Customer Order
- Production
- Purchase Material
- Receive Material
- Shipment Product

Further detailed explanation for each process will be explained in Appendix.

4.3.1.5 Business Location

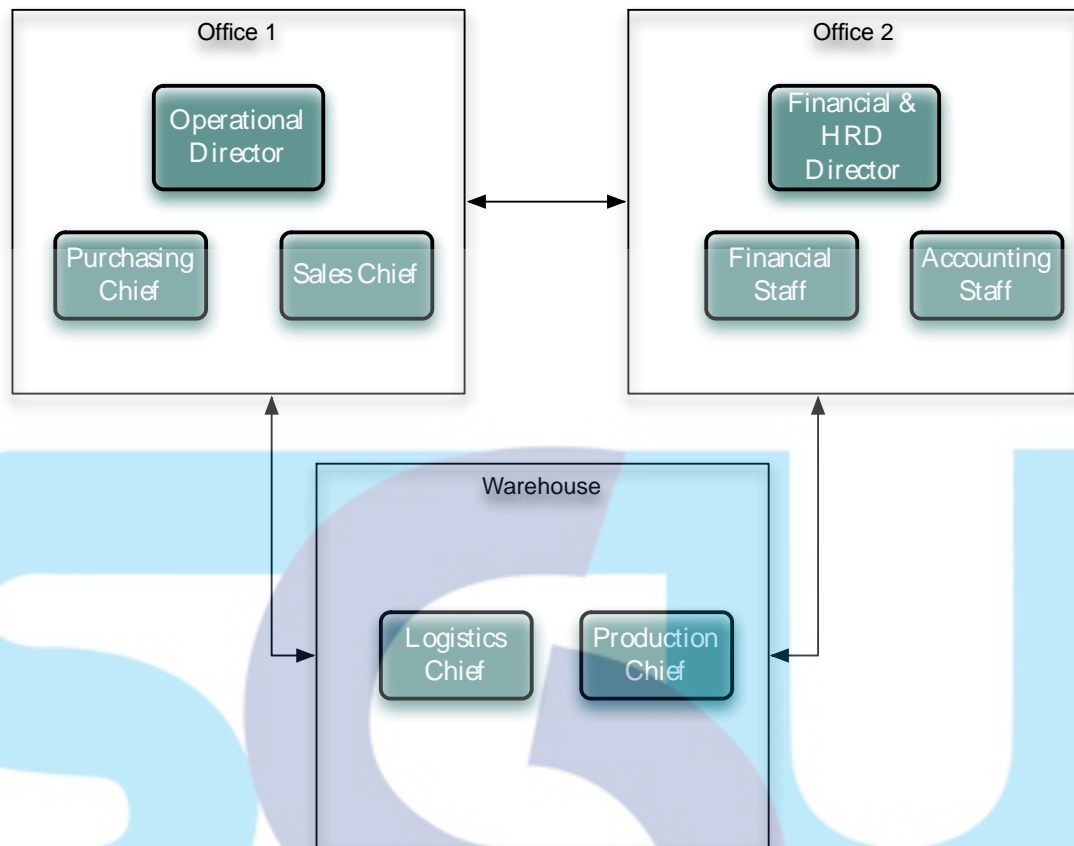


Figure 4.4 CV. Indo Surya's Business Locations

There are 3 locations of offices and warehouse for running CV Indo Surya business processes. As explained in Chapter 1 about company background, CV Indo Surya serves as a new factory from the main company, CV Surya Agung. Because of that, the sales and purchasing person is located at the main company, or in Figure 4.4, at Office 1. This situation complicates the business processes and data reporting, which strengthened the reason why the company should have an integrated system.

4.3.1.6 Data Flow Diagram

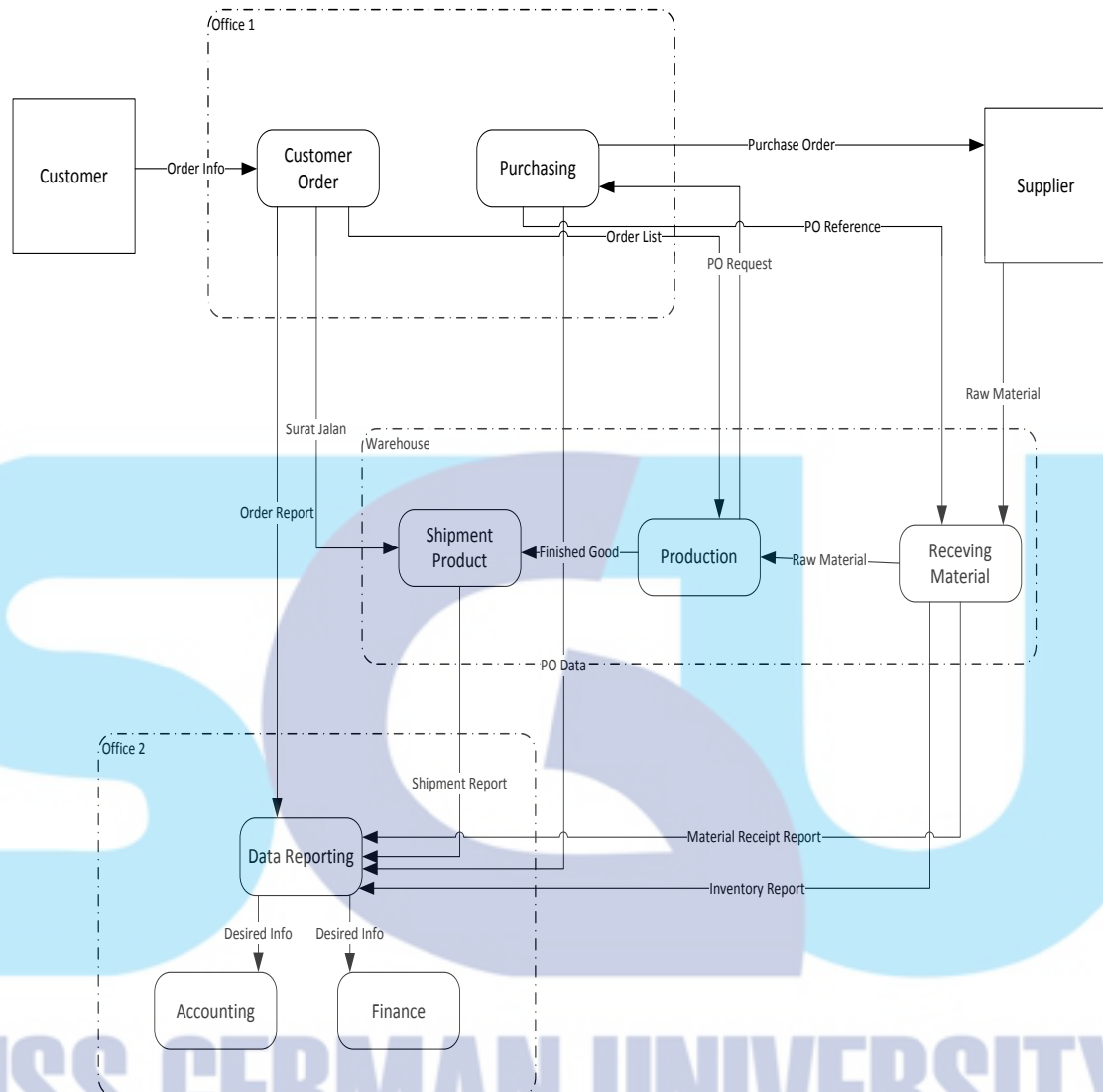


Figure 4.5 CV. Indo Surya's Data Flow Diagram

The data flow diagram above shows the sequence of data flows between processes that take place at CV Indo Surya. The notation used was Gane & Sarson's data flow diagram, modified with business locations in order to show which data that travels between different locations.

Table 4.2 CV. Indo Surya's Data Flow Diagram Table

Data	Data Path	Transmission Method	Storage Method
Order Report	Office 1 - Office 2	Delivered by USB	Import & Export
PO Data	Office 1 - Office 2	Delivered by USB	Import & Export
Order List	Office 1 - Warehouse	Delivered by Courier	Paper Notes/Books
PO Reference	Office 1 - Warehouse	Call/Text Messages	Paper Notes/Books
Surat Jalan	Office 1 - Warehouse	Delivered by Courier	-
PO Request	Warehouse - Office 1	Call/Text Messages	Paper Notes/Books
Inventory Report	Warehouse - Office 2	Delivered by USB	Import & Export
Material Receipt Report	Warehouse - Office 2	Delivered by USB	Import & Export
Shipment Report	Warehouse - Office 2	Delivered by USB	Import & Export

Table 4.2 explains about how the data are transferred and stored between business locations. By looking at the Table 4.2, it is obvious that there are a lot of data transferring tasks, which are delivered manually, when all of it should have been integrated automatically with a system. The storage method also show that there are too many importing & exporting activities just to store one single data, meaning there are a lot of duplicate files within the organization.

4.3.2 Gap Analysis

Gap analysis was done by a detailed interview with the company's high executives and employees. Using the gap analysis template shown in the previous chapter, the current and expected capability was explained. From the gap analysis data, business process selection was made about how ADempiere ERP can benefit the company by increasing productivity. The business process that were selected are:

- Customer Order
 - Generating order
 - Customer List
 - Generating Surat Jalan
- Production
 - Product Availability
 - Creating Production Line
- Purchasing
 - Generating Purchase Order
 - Purchase Order Approval
 - Supplier Data
- Logistics
 - Receiving Material Document
 - Receiving Material with PO Reference
 - Shipment Product
 - Product Availability Check

The result of this Gap Analysis will be explained in Appendix.

4.3.3 Define New Business Process

The current business blueprints and gap analysis results shows the gap of improvement within the company. By comparing ADempiere business process and the company's business process, a new business process was created.

- New Customer Order Process
- New Production Process
- New Purchasing Process
- New Receive Material Process
- New Shipment Product Process

4.4 Realization

This phase concentrates on implementing all of the requirements (New Business Process, Software, & Networking) into a one system, which is ADempiere ERP. The system installation activity consists of 2 parallel activities done at the same time, Software Installation & Networking Configuration.

4.4.1 Software Installation

The result of this activity was the installation of:

1. CentOS 6

CentOS was chosen as the operating system for the information system architecture. CentOS is a free clone of Red Hat Enterprise Linux. The main advantage that CentOS was chosen as the operating system was that Linux-based operating systems are virus free.

2. Postgresql Database

In ERP system, database is required to store all the data. And for ADempiere, Postgresql Database is one of the choices for storing data in the ERP. PgAdmin was also installed to assist the admin to directly handle the database from the server.

3. Java

The technology used for ADempiere language is java-based language.

4. ADempiere

The ADempiere version that was installed is ADempiere 361LTS.Final

5. Real Vnc

To access or remote control the server locally, real vnc was installed to assist this task.

6. TeamViewer

Teamviewer is another software to remote control and desktop sharing the server, publically.

4.4.2 Networking Configuration

Networking configurations and setup were necessary in order for the server to be accessible from the Internet. Such networking configurations that were done are:

1. Set up CentOS network configuration

CentOS automatically enabled the Internet connection after the operating system is installed. The next thing to do was configuring the server's dynamic address into a public static address. This is in order for the network to read or know the server's ID.

2. Enabling Ports on CentOS server

ADempiere has a web server feature, meaning that the ADempiere can deliver the web content through the Internet using port 80. Enabling port 80 by editing the iptables in ADempiere was the task done for this.

3. Port Forwarding using CCTV host (suryaagung.titancyber.net)

Since the internet connection at the company has no static IP address, the other thing that can be done was using the CCTV host of the company to port forward the web port, which is port 80.

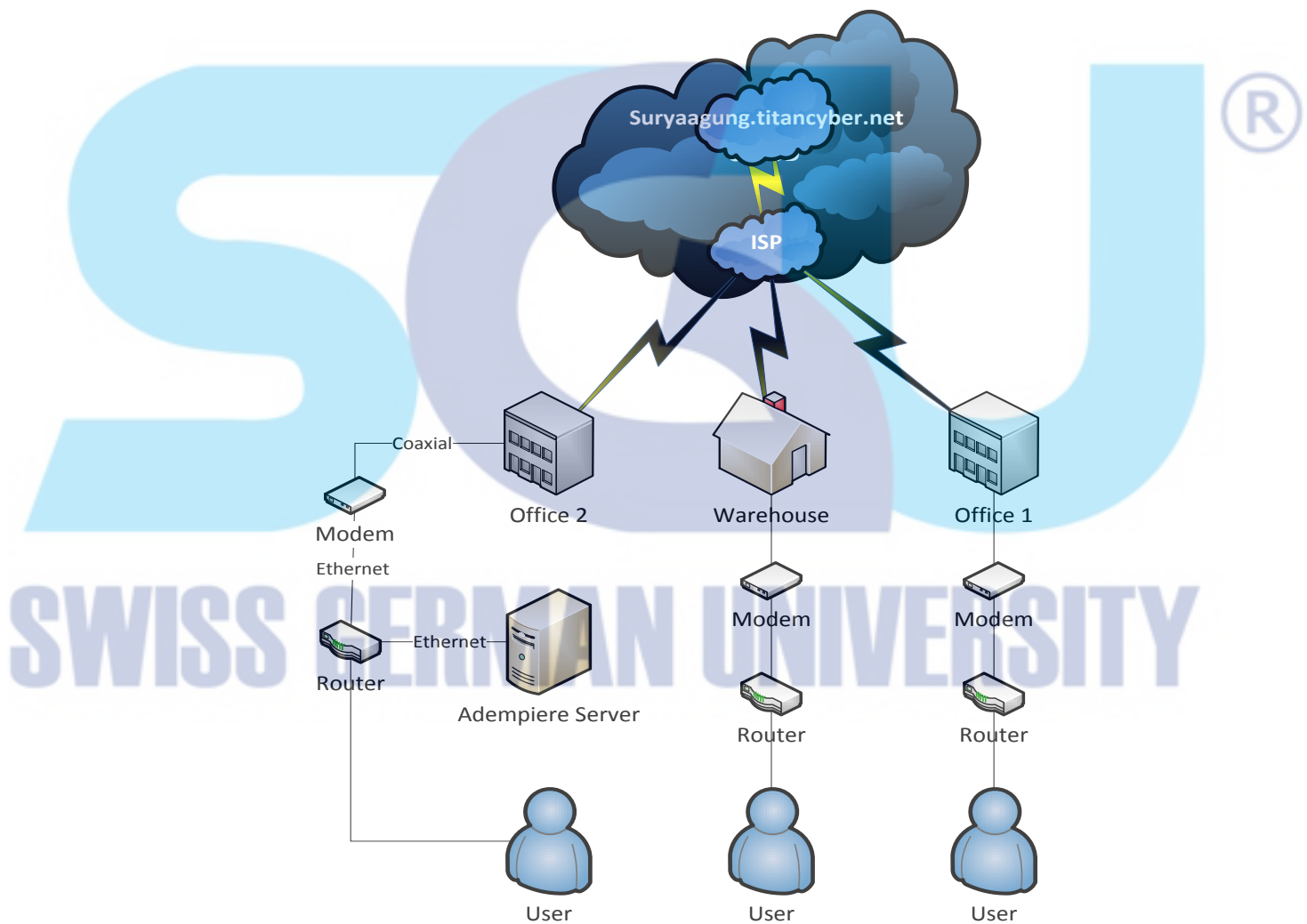


Figure 4.6 CV. Indo Surya's ERP Network Diagram

The Network Diagram gives a brief illustration of how the server connection was configured and how organizations will connect to the server.

4.4.3 ERP Package Configuration

ADempiere package has been installed. Now the next activity is to configure the software based on the business blueprints. While the configuration steps are based from Fastrack ADempiere Implementation. All the steps are:

1. Initial Client Setup

The first step to do was to create a new client in the ADempiere by logging in to the system with the ID System and System Administrator as the role. In the initial client setup process menu, all the required information of CV. Indo Surya was entered. In this phase, a Chart of Account was also imported because of the mandatory field.

2. Warehouse & Locators

By logging on as IndoSuryaAdmin, the next step is to create a new warehouse & locators for CV. Indo Surya. ADempiere already created a default warehouse, which is Standard, but a new name is still needed. Since there is only 1 warehouse of the company, just one warehouse was created. No specific locator was configured because the actual warehouse system does not have a specific locator location.

3. Re-import COA

Even though a Chart of Account was imported during Initial Client Setup process, it is necessary to re-import the COA in order to have a certainty that the COA was surely imported.

4. Import Loader Format

In ADempiere mechanism, to import anything that can be imported, it is necessary to create a template using the Import Loader Format feature. This is in order for the ADempiere to read the data that is imported with the specific type of templates. The format that were created are:

- Product Loader Format
- Inventory Loader Format
- Business Partner Loader Format
- Order Loader Format
- Price List Loader Format

5. Setup Business Partner Group

Business Partner Group distinguishes of how the client wants their business partner to be categorized. The groups that were created are customer and supplier. This is based on the company's information about how the categorize their business partner.

6. Import Business Partners

After creating the Business Partner Group and Business Partner Loader Format, the next step was to import all the business partners. The business partner data was prepared in excel format and then imported. Total of the business partners are 223 customers and suppliers.

7. Setup Unit of Measurements

Unit of measurements need to be setup before creating or importing a new product. For the company's product, the units of measurement that were inputted are:

- Box (Number of Box)
- Cm (Length of Plastic for Pillow Type of Products)
- Kg (Weight of Cooking Oil, Converted with Tons)
- Tons (Weight of Cooking Oil, Converted with Kg)
- Lbr (Number of Carton Boxes)
- M (Length of Plastic for Pillow Type of Products)
- Pc (Number of Piece for Pouch Type of Products)
- Roll (Number of Roll Plastics, to be Converted with Cm & M)

8. Setup Product Category

The company distinguishes their product into Finished Good, Raw Material, and Packaging Material. And so those categories of product was created in the ADempiere

9. Import Products

Based on the project scope, there are 59 selected types of product that was imported, and the total will be 60 types including the default product from ADempiere, Standard.

10. Setup Price List Schema

Schema of the price list was necessary for ADempiere to distinguish the types of price list. The price list schemas are Purchase Schema and Sales Schema.

11. Setup Price List

The Price List that were created are:

- Purchase PL Karton
- Purchase PL Plastik
- Purchase PL Minyak Goreng
- Sales PL

Also for each price list, the product price was inserted in this activity.

12. Setup Bill of Material

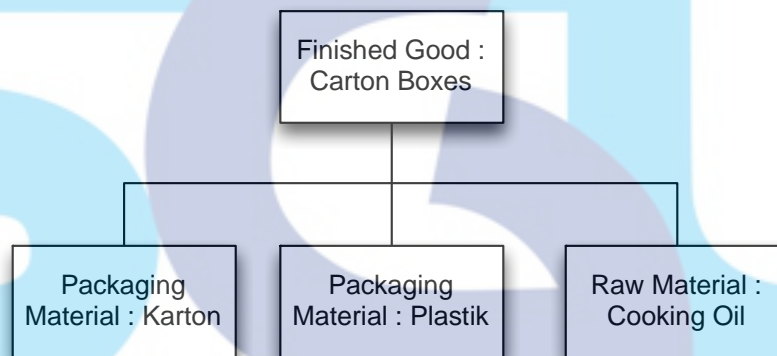


Figure 4.7 CV. Indo Surya's Bill of Material

Figure 4.7 above shows the Bill of Material for all products at CV. Indo Surya. And so, each type of finished good products was configured with the respective requirements of bill of materials. For example, a finished good Resto 1800 (P) x 6 consists of:

- 1 Piece of BOM Quantity of Karton Resto 1800 (P) x 6
- 12 Piece of BOM Quantity of Plastik Resto 1800 (P) x 6
- 9.276 Litre of BOM Quantity of Minyak Goreng Lokal

13. Setup User & Role

User in ADempiere is the ID of the real person that will use the ADempiere software and Role is the access that a user can have. Since one person only handles one business process, there is no need to complicate the User & Role configuration. Table 4.3 will give a brief explanation about the User & Role that was created.

Table 4.3 User & Role Relationship

User	Role	Process Access
Nashita	Manager	All Process
Agung	Sales	Customer Order
Sanusi	Production	Production
Nining	Purchasing	Purchase Material
Erwin	Logistics	Receive Material & Shipment Product
Invanos	Advisor	Data Information

4.4.4 System Check & Validation

In the last step of realization phase, the project manager checked the ADempiere configuration & validate whether it consists of the business requirements or not. Networking system is checked if the server is accessible from the Internet.

4.5 Final Preparation

4.5.1 End User Training

The training was done in 5 days, participating the managers and users from each necessary department. The evidence of this training will be proven in the Contact Absence Report.

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Table 4.4 End User Training Material Schedule

No	Training Material	User	Day
1	User Interface	All Users	1
2	User & Password		
3	ADempiere Workflow		
4	Business Partner Info	All Users	2
5	Product Info		
6	Order Info		
7	BOM	Manager	3
8	Price List		
9	Material Receipt	Logistics	3
10	Generate Shipment		
11	Production	Production	4
12	Physical Inventory		
13	Purchase Order	Purchasing	4
14	Sales Order	Sales	

4.5.2 Cutover

The cutover phase was done in order to have the transition from the old system to the new one. The cutover plan & activities are stated below:

- Parallel Running

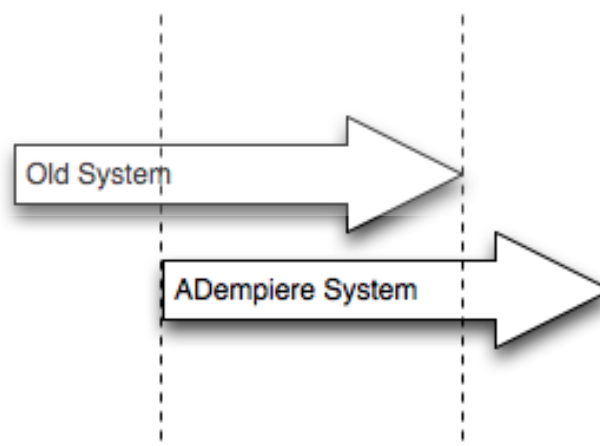


Figure 4.8 Cutover Plan

The changeover plan used parallel running method. By using the parallel running, the company input the same data and perform the same processes, comparing the old system and new system. The duration of running the system will depend on the company's decision. If the new system is accepted, the old one will be replaced.

- **Import Last Inventory**

From the parallel running plan, the started date was on 19th May 2014. And the activity needed was importing the last inventory on that date. The data imported were the Finished Good, Raw Material, and Packaging Inventory.

- **System Lock Down**, the project manager ensured that there were no more changes in the ADempiere system.

4.5.3 Go Live Readiness

The final step is to check every the readiness of every resources such as the readiness of users, network, and software. One of the methods was using the ADempiere implementation checklist shown in Appendix.

4.6 Go Live & Support

In this Go Live & Support phase, CV. Indo Surya started to use the ADempiere ERP system for these activities:

- Making Purchase Orders
- Making Sales Orders
- Receiving Materials
- Shipment of Products
- Create Production Line

4.6.1 Provide Live Support

Started from the date of parallel running, there were several problems regarding the server availability and processing issues. The result of this activity is shown in the Table 4.5

Table 4.5 Live Support Data

No	User	Problem Found	Solution	Date Occurred
1	Nashita	SOP	Live Support	19-May
2	Agung	SOP	Live Support	19-May
3	Nining	SOP	Live Support	19-May
4	Sanusi	SOP	Live Support	19-May
5	Erwin	Server Down	Reboot Server	20-May
6	Nashita	SOP	Live Support	20-May
7	Agung	SOP	Live Support	20-May
8	Sanusi	SOP	Live Support	20-May

Surprisingly, after running the ADempiere ERP system for 2 days (19th & 20th of May), the company's directors decided to stop using the ERP system due to the busyness of the company. The directors accepted the prototyping of the ERP in which they already understand how the ERP ran their business processes and they will consider using it in the future.

4.6.2 Project Review

A review of the implementation project was conducted. A review about what the ERP gave to the company such as providing a live information preview and giving better security issue. Benefits are shown by analysing the measurements from the productivity lead time. Comparison of the data flow aspects between the old and new system is reviewed. Significant problem are shown and questionnaires were given to point out what conclusions can be made. The results of conclusion and recommendations of this implementation thesis work are shown in Chapter 5.

4.6.2.1 Live Info & Security Issue

Beforehand, it is very hard for the company to get the information about which documents are in process and those that are not. There was not any live information about the product availability and the reserved quantity. Managers could not manage the security issue about who are authorized to perform specific activity and process.

After using ADempiere ERP, managers and employee are able to see an online view of product info and orders info, which is a huge benefit for decision-making. Managers are also able to see who are responsible for processing each document. Such security issue that was implemented is the authorization of each business processes. An example, a sales person is only authorized to do the customer order processing. He/she is not able to purchase a raw material from the supplier. Such information for live info & security issue are:

- Purchase Order Info
- Sales Order Info
- Product Info
- Documents Record Info (Purchase Orders, Sales Orders, Shipment/Receipts)
- Security Issue (User & Role Authorization)

Provability of this benefit will be shown in Appendix.

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4.6.2.2 Productivity Measurements

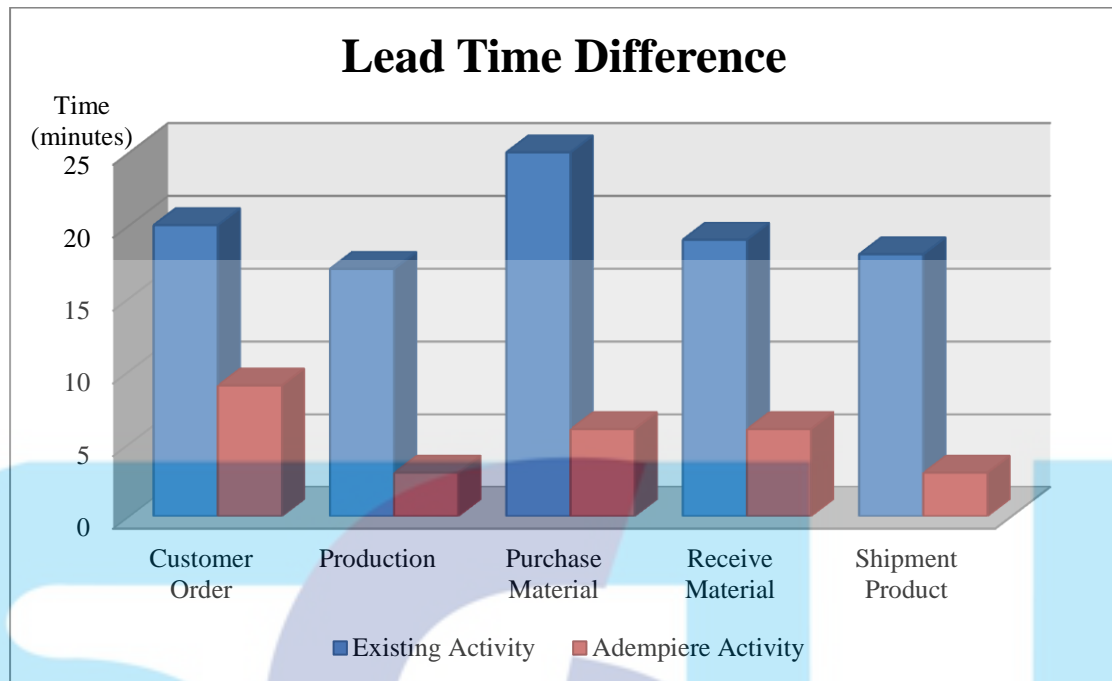


Figure 4.9 Lead Time Difference Measurements

One of the objectives of the ERP implementation was to increase productivity in the business processes. The measurements were done by calculating the lead time of each processes and sub-processes taken from the gap analysis, with the assumptions that the lead time that is taken, is the average lead time that happens for each processes. By looking at the Figure 4.9, it is clearly shown the huge difference in lead time by using ADempiere compared to the existing activity. Table 4.6 shows the lead time calculation of each processes. If we look at the Table 4.6, the margins between current and ADempiere lead time is very huge. If the lead time assumptions are correct, then 73% of efficiency (Lead time difference divided by current lead time) can be done by using the ADempiere ERP system. The detailed number of the sub-processes will be shown in Appendix.

Table 4.6 Lead Time Difference Measurements

No	Activity	Current Lead Time (min)	ADempiere Lead Time (min)
1	Customer Order	20	9
2	Production	17	3
3	Purchase Material	25	6
4	Receive Material	19	6
5	Shipment Product	18	3
Total Lead Time (min)		99	27

4.6.2.3 Data Flow Analysis

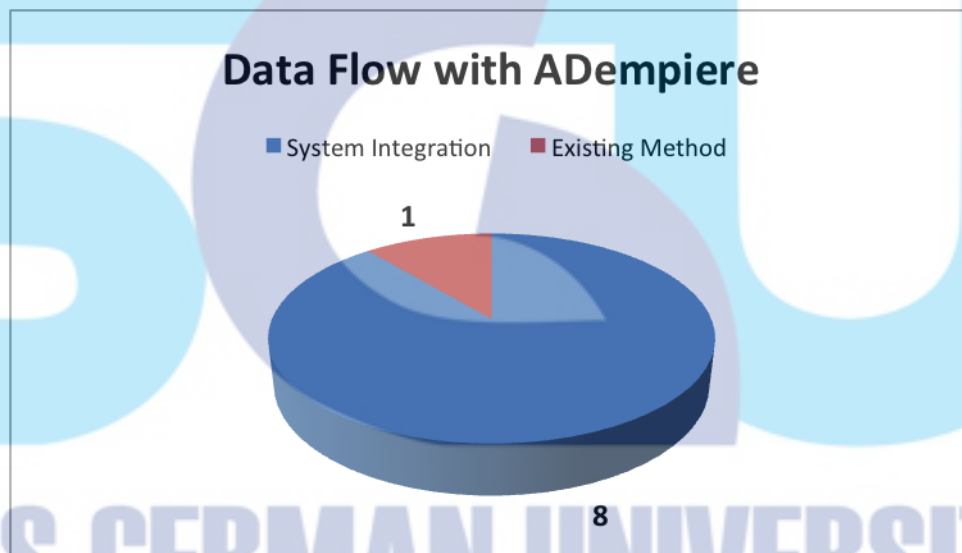


Figure 4.10 Data Flow with ADempiere

Beforehand, the company used to transfer the data information between departments and locations manually. Most of it is done by delivering the data with a courier, transferring with usb disk, or even calling for data reference. After implementing ERP for the data flow management, 8 out of 9 of the data are now integrated with a system in a stored database. Taking an assumption that delivering data manually between each location takes 30 minutes and with system integration is 3 minutes, in ADempiere it is 10 times faster compared to the existing system.

4.6.2.4 Problem Found

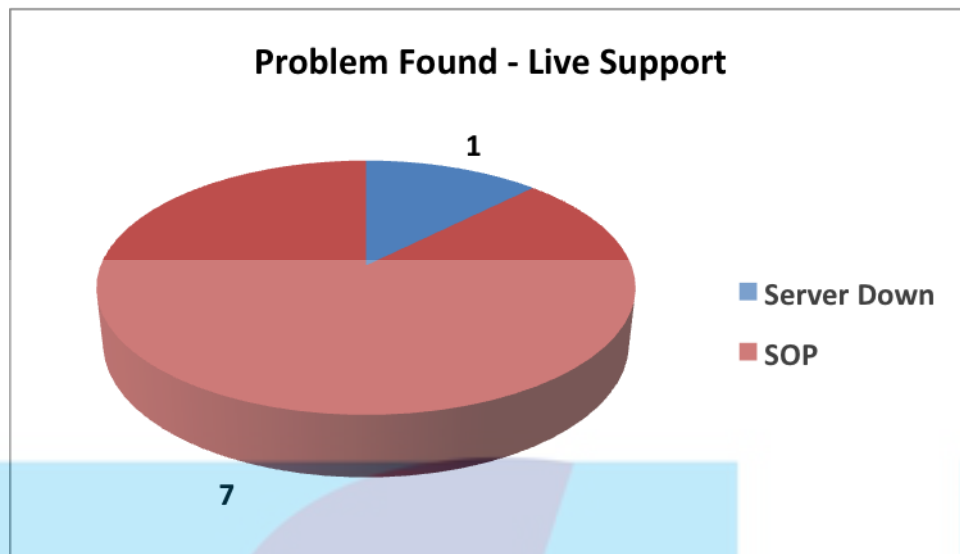


Figure 4.11 Problem Found

At the going live & support phase, problems that were occurred were noted and it was discovered that 7 out of 8 of the problems are the user's SOP (Standard Operating Procedure) for using the ADempiere software and the other problem was an error in the server system which causes a server breakdown. By looking at this problem, there can be a lot of factors that can give the reason why the end users were having difficulties running the ADempiere software even though a brief training was given.

A research of this will be conducted by giving a questionnaire to each end user, which will be discussed in the next subchapter.

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4.6.2.5 User Questionnaires

Table 4.7 User Questionnaires

Questions	Manager	Sales	Production	Purchasing	Logistics
Years worked	>5 years	>5 years	>5 years	>3 years	<3 years
Company workflow	Fully Understand	Fully Understand	Fully Understand	Confused	Confused
IT usage	Sometimes	Never	Never	Sometimes	Frequent
ERP insight	Just a glimpse	No	No	Just a glimpse	Just a glimpse
ADempiere UI	Confusing	Confusing	Confusing	Acceptable	Acceptable
Usage difficulty	Yes	Yes	Yes	Rather	No
Lead Time Difference	Yes	Not Really	Not Really	Yes	Yes
ERP or Old system	I'm adaptable	Old system	Old system	ERP	ERP

Table 4.7 shows the answered question by each end user. The detailed information about the information is shown in Appendix. The questions were made to make a conclusion for each user, a conclusion to explain why the director decided to stop using ADempiere after 2 days of running. The explanations of each user is stated as:

1. Manager

The manager, who has worked more than 5 years at the company, has no problem running the company's business. Since the manager is also is the director of the company, of course the manager is adaptable if the organization decides to change into the ERP system because ERP system has shown a huge benefit to the company. The only issue is that the manager has some problems using the ADempiere ERP software, this may happens due to lack of IT skills.

2. Sales & Production Chief

Both of them have worked more than 5 years. Both of them have a great decision making for running the company's business. But none of them have the interest of using the ERP system. This may comes from a lot of reasons, whether they don't have the necessary IT skills, or just because they have worked at the company for a long time, so it is hard for them to adopt the new system.

3. Purchasing Person

The purchasing person is still confused with the company's workflow. Whatever the reason behind this, the purchasing person is still adaptable when it comes to changing to a new system. Because he/she is not to attached with the current company's system. What the purchasing person needs is more training about the ERP concepts.

4. Logistics Person

A new employee, who is still confused about how the company works, is clearly the perfect condition when it comes to changing a person's behaviour or mindset. The purchasing person has good IT skills, which makes it easier for him/her for using the ERP software.

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