

# CHAPTER 1 INTRODUCTION

## I.1 Background

Based on Industrial Statistic of Export Development Ministry of Industry Indonesia, textile industry's performance had decrease 4,79% on 2015 as the effects of global economic crisis. This is followed by the textile performance decreased on 2016. But this industry still has a good growth opportunities. This is supported by seeing the ability of Indonesia Industry to respond the global crisis appropriately and Indonesia has already begun to show the improvement on the national economy.

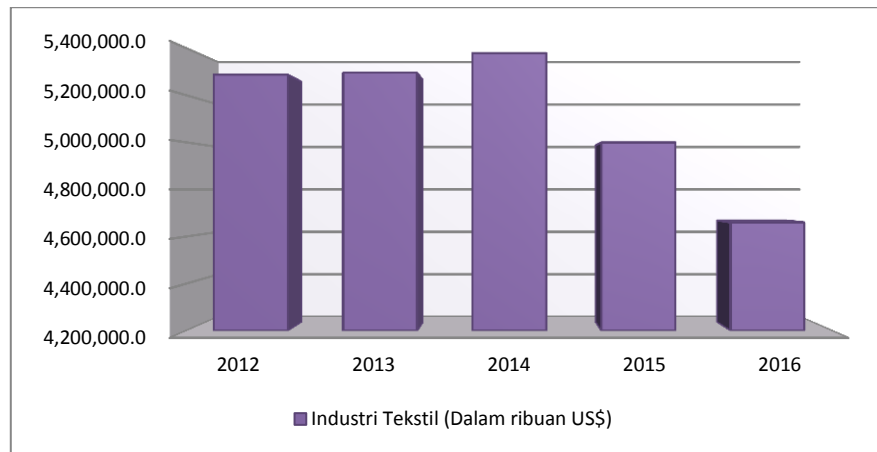


Figure 1. 1  
(sumber: Badan Pusat Statistik,2012)

Every company is required to survive in a highly competitive global economy. Applying the lean manufacturing approach can help companies not only stay alive and survive too but it can compete by gaining more profit. Lean manufacturing offers methods to eliminate non-value-added activities in a production process in order to achieve high quality and productivity by lowering the lowest possible cost. This is in line with the opinion of Gaspersz & Fontana (2011), lean is an ongoing effort with the goal of eliminating waste and increasing the added value of products or services to deliver value to customers. He also conveyed 7 waste that includes: Overproduction, Inventory, Waiting, Motion, Transportation, Rework, and Over processing.

PT. XYZ is one of the industries that play role on the textile and garment industry in Indonesia. Located Kab. Bandung, this company has a capacity 1.5 million yds/month of dye machine and printing machine. The demands not only come from local market but also exported into Europe, Middle East and United States markets.

The company produces fabrics, which are originally made of polyester or better known as synthesis material. PT. XYZ does not produce woven fabric, but they transform the woven fabric into colored fabrics. There are 3 types of coloring process in this company, they are dying, printing and PFD/PFP. On the other hand, there are more than 30 types of fabrics that will be proceed. The raw fabric, which has no color yet, or the raw material used by the company called as *grey*.

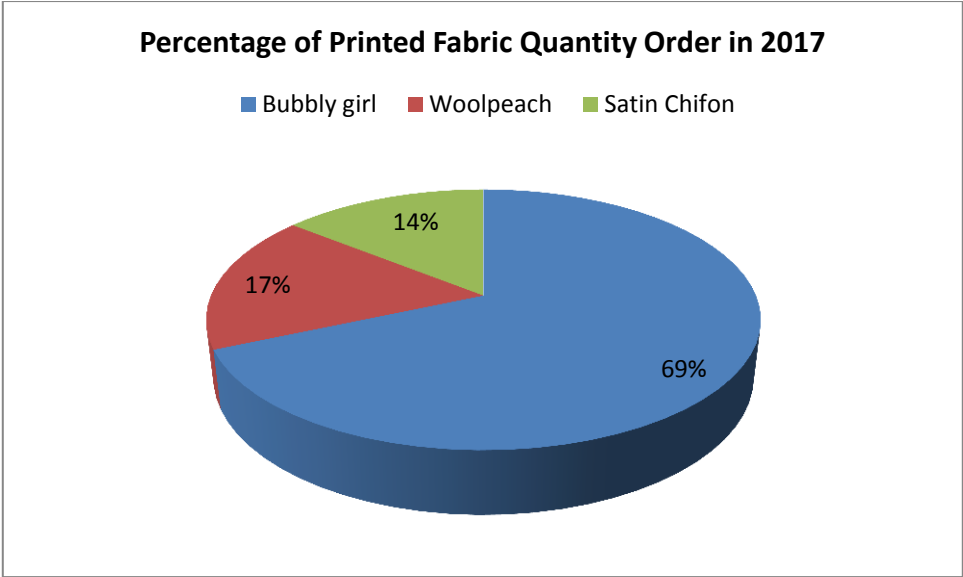


Figure 1. 2 Percentage of Printed Fabric Quantity Order in 2017  
(sumber : PT.XYZ)

Figure 1.2 describes 3 types of printed fabric which have the highest percentage of order quantity in 2017. They are *bubly girl*, *woolpeach*, and *satin chiffon*.

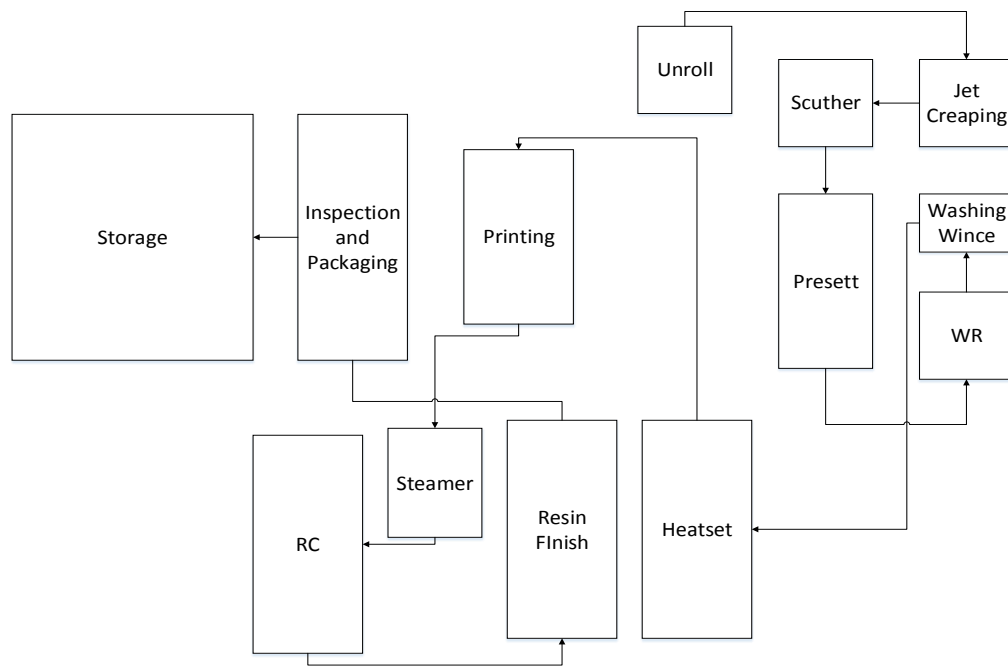


Figure 1. 3 Flow Process of Printed Fabric

In General, there are 3 main processes in producing the colored fabric:

a. *Preparation*

This step is the preparation stage before grey proceed to the next step. There are several processes in this stage, there are :

- Unroll is process of opening the grey from rolled-grey into folded grey.
- Endless is process of opening the rolled grey into hexagonal machine form grey.
- Toji is sewing the edge of grey after endless process with a certain size so the fabric's size will not change in the next processes.
- Jet Relax or Rotary Washer. These processes are process of removing the grey's residual dirt from weaving process and restore the grey's fibers form.
- Scutcher is physical process of tidying up the grey that has been through the creaping process into folded fabrics.
- Presett is process of stabilizing the fabric using high temperature is close to fabric's melting point so this process can stabilize the fabric's condition.

-WR process of reducing weight of fabric by grinding down the surface using NaOH and other alkaline concentrate at boiling temperature.

b. Coloring Process

The coloring process of fabric consist of 3 different processes. It depends on the desired color and pattern of the fabrics. To produce a plain color cloth without any pattern, fabric should through some dyeing process they are dying, scutcher and resin finish.

-Dying is process of coloring the fabric by using the disperse dyes with high pressure and high temperature system.

-Resin Finish is the last process to give the desired handfeel and adjust the physical fabric such as width, weight and its density based on the customer's order.

To produce fabric with some patterns and colors or commonly called as printed fabric, the fabric should through some process. They are heatset, intermediet, printing, steamer, RC, and resin finish.

-Heatset is stabilizing the fabric using high temperature

-Printing is dyeing process which has pattern or many different colors in different shapes into a fabric permanently

- Steamer is fixation process of dye stuffs used in printing process using heat.

-RC or Reduction Cleaning is process of reducing the coloring material that still exist in the fabric's surface

And the last finished product in PT.XYZ Textile department is the PFD/PFP. PDF/PFP is a white plan fabric. To produce this product, from preparation process will continue directly into heatset process only.

c. Finishing

Finishing is the last stage before the products will be delivered to the customers. In this stage consist of two process, they are:

-Inspect is checking the quality of finished product based on quality standard.

-Packing is process of wrapping, packing and identifying the qualified-finished product and ready to be delivered to customers.

Production strategy applied by the company is MTO (Make To Order) system where the production process begins only when the order from the customer has been received in the order form. Order form describes the detail specification of fabric ordered such as the pattern, the colors, the packaging types, the date when the product will be delivered and other details. Production planning need to consider the quantity of orders and production capacity. Company has its own target for each product. Dyed-fabric targeted to finish in 10 days while printed fabric targeted finish in 14 days.

Graphic below shows the comparison of actual data time and target time in the process of producing bubbly girl printed-fabrics. This actual time starts when the customer order form received by the production department until the finished product ready to be sent to the customer by the logistics section.

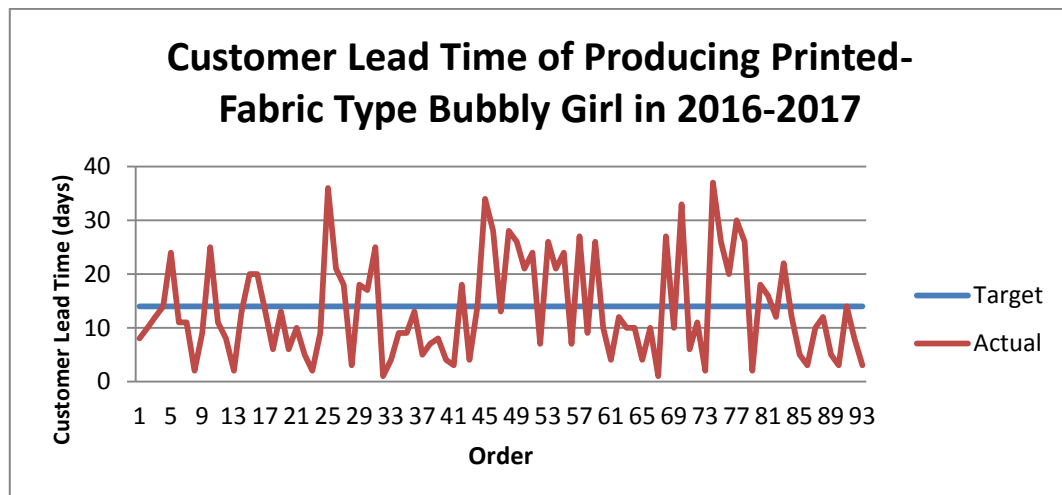


Figure 1. 4 Customer Lead Time of Producing Printed-Fabric Type Bubbly Girl in 2016-2017

Based on the graphic above, it shows that the time needed to produce the printed fabric type bubbly girl that will be sent to customer still below the target. As explained above that the target time to produce the printed fabric is 14 days. From 93 printed

fabric orders, there are 34% of the orders below the production target. There are many factors that can affect customer lead time both from external and internal factors. External factors such as waiting the customer's approval and raw material availability from supplier. Internal factors such as machinery, quality of product, raw material procurement are also some of factors that affect to the customer lead time.

As mention in (Russel & Taylor, 2011) says that The American Society for Quality (ASQ) defines quality as “a subjective term for which each person has his or her own definition. In technical usage, quality can have two meanings: (1) The characteristics of a product or service that bear on its ability to satisfy stated or implied needs and (2) A product or service free of deficiencies. To reach a product without deficiencies, PT.XYZ has quality checks in some processes to maintain the final product quality before fabrics sent to the customer. Before the fabrics go to packaging process, there is a final inspection. In the final inspection there are two main activities, inspect and classify the fabrics into two grade based on their quality. Quality of the fabrics divided into 2 grade, Grade A and Grade B. The quality levels classified by the number of defect points on the fabric. Scoring points of the quality levels can be seen in Table 1.1 and Table 1.2 as follows.

Table 1. 1 Quality Classification Based On Scoring Point

Grade	Total Defect	Point
A	8	14
A-	7	18
B+	13	26
B	22	>26

Table 1. 2 Quality Classification Based On Quantity Of Defect

Point	Defect Quantity
1	0 - 2.5 cm
2	2.5 - 12.5 cm
3	12.5 - 25 cm
4	>25 cm

Fabrics with grade A quality is the only fabric that feasible to be sent to the customer. Fabric with grade B quality cannot directly sent to customer. Grade B fabric can be upgraded into grade A, but additional activity called as reworks are required to upgrade the quality. The rework activities done based on the types of defect found on the fabric. Because not all the defect types can be upgraded into grade A. Inspect and classify activities are done manually by the inspection section called quality control section. With the grade classification, it can be seen that there are some problems that the quantity fabric with grade A quality is still below the fabric quantity of ordered.

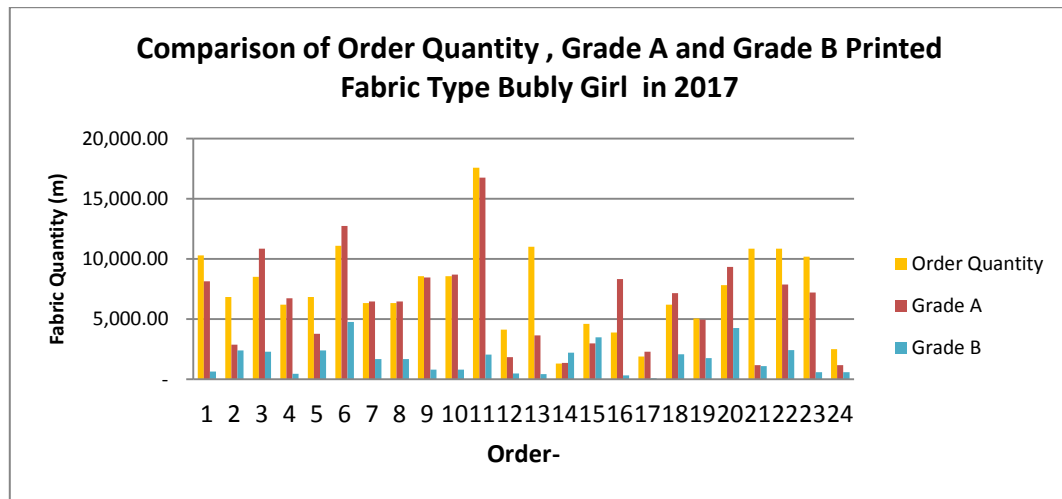


Figure 1. 5 Comparison of Order Quantity , Grade A and Grade B Printed Fabric Type Bubly Girl in 2017

Based on the graphic above, for 24 orders of printed fabric type bubly girl, there are 58% of order have to be upgraded because the quantity of grade A does not fulfil the quantity of order. The quantity of fabric delivered should be the same as the quantity order in the order form. But the actual quantity sent to customer not always same with the quantity order. Customers have their own standard of tolerance to the quantity of fabric that delivered. The standard tolerance of the quantity sent is 3-10% of the fabric ordered.

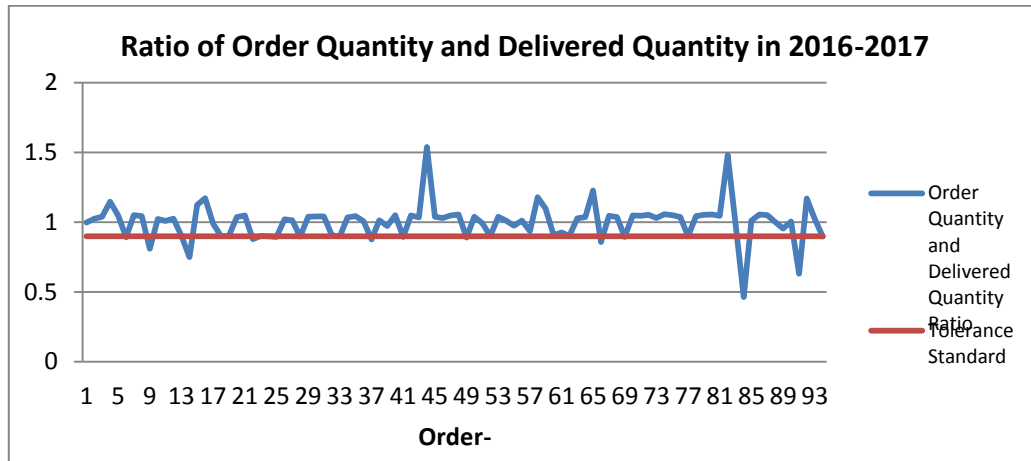


Figure 1. 6 Order Quantity and Delivered Quantity Ratio in 2016-2017

Based on Figure 1.6 from 94 orders of printed fabric type bubly girl in 2016-2017 there are 19% of the order didn't fulfil the order quantity. Unfulfilled order quantity may cause the customer penalty payments and loss the customer loyalty to PT.XYZ.

Customer lead time that higher than the targeted time can be minimize by reducing the waste that does not give added value to the product. By seeing the production process of printed fabric, it can be seen that there are some wastes in several process as explained previously, the lack of quality fabric can cause rework activities that can lead into higher customer lead time. Table 1.3 and Figure 1.7 , both presents the types of defect that mostly appear while inspected in the final inspection. Table 1.3 presents 5 types of defects based on the frequency of defect. While Table 1.4 presents 5 types of defects based on the quantity of defect.

Table 1. 3 Major Defects Based On The Frequency Defect

Defect Code	Defect	Frequency
64	Nilep	37
80	White Dots	14
63	Flex benang	11
37	Benang ketarik	11
82	Handfeel	8



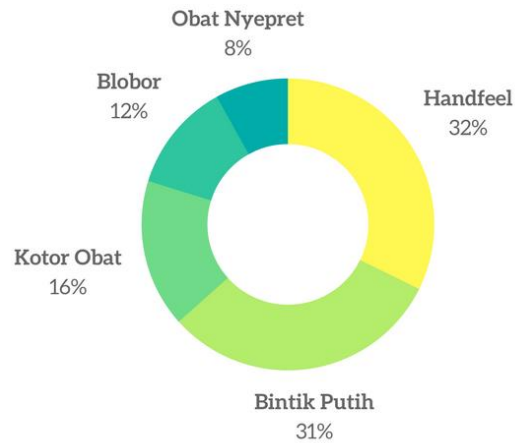


Figure 1. 7 Major Defects Based On The Quantity Of Defect

To reduce the risk of waste defect, Lean Manufacturing is one of method can be done . Lean manufacturing is a systematic approach to eliminating waste. To meet the goals of lean manufacturing, this should be done by identifying and reducing waste with continuous improvement. With Lean Manufacturing, it is expected to increase the knowledge of production processes and flows, minimize costs, minimize the chance of defect so the quality will be increase, and the main goals to reduce the lead time so as to improve the efficiency and effectiveness of the company. Therefore, this Lean Manufacturing approach will be used in this research to reduce the defect waste on printed fabric so that the company can produce the right quantity of fabric based on the order quantity and delivered on time to the customer with the high qualified fabric according to customer requirements.

## I.2 Problems Statements

Focus of the problem in this research are:

1. How is the material and information flow in making process of printed fabric at PT.XYZ?
2. What are the factors that affect the defect waste in making process of printed fabric at PT.XYZ?
3. How to minimize the cause of defect waste in making process of printed fabric at PT.XYZ?

### **I.3 Research Objective**

The objective of this research are:

1. Describe the material and information flow in producing printed fabric at PT.XYZ.
2. Identify the factors that causing waste defect in in producing printed fabric at PT.XYZ.
3. Identify the proposal improvement to minimize the causes of waste defect in in producing printed fabric at PT.XYZ.

### **I.4 Research Boundaries**

The boundaries of this research are:

1. This research conducted only in producing printed fabric type bubbly girl.
2. The data used only orders from garment which has targeted finish the production process in 14 days.
3. Research conducted only until the stage of giving the proposal improvement

### **I.5 Research Benefits**

The benefits of this research are:

1. Give the proposal improvement to the company so the company can increase their production process.

### **I.6 Writing Systematics**

This research in systematics of writings, as follows:

#### **Chapter 1 Introduction**

In this chapter contains a description of the background research, problem statements, research objectives, research boundaries, research benefits, and systematic writing on research conducted in PT.XYZ in order to identify waste that may occur in the process of fabric products.

## **Chapter II Literature Review**

This chapter describes the literature that relevant to the problem in this research. This chapter discuss about the introduction of lean manufacturing and its tools that can support the research.

## **Chapter III Research Methodology**

In this chapter describes the steps of research starting from the stage of problem formulation, data collection until the data processing process for further analysis. This chapter is a framework to make sure that the research done properly by following the steps to achieve the

## **Chapter IV Collecting and Processing Data**

In this chapter describes the company profile and data needed for the research. The data collected are primary and secondary data. The data obtained through interviews, directly observation and company historical data. This chapter also processes the data that have been collected before.

## **Chapter V Analysis**

In this chapter explains the analysis of the data proceed in previous chapter. This chapter also describes the proposed improvement that suggested by the writer and also analysis the strength and weakness of the proposed improvement.

## **Chapter VI Conclusion and Suggestion**

This chapter will give the conclusion of the research that has been done. This chapter is the answer of the problem

formulation that mentioned in the first chapter.  
Suggestion for the company and further research also  
added in this chapter.