

CHAPTER I INTRODUCTION

I.1 Research Background

Losses to be incurred due to patent infringement is enormous. Compared with the other lawsuits, patent infringement lawsuits is extremely expensive. A patent infringement lawsuit normally will cost \$1 at least million in legitimate charges alone. It is normal for even straightforward patent infringement lawsuit to wind up costing an organization \$2 – \$5 Million (Neustel, 2017). In 2009, losses due to patents reached up to thousands of millions of dollars. Losses due to patent infringement reached the highest figure at \$ 1,673 million (Barry, Arad, Ansell, Meredith, & Lee, 2016). Entangled in patent infringement is also very time consuming for the company, the company can spend 10-20% in a case patent infringement (Neustel, 2017). On the other hand in addition to the harmful patent infringement, USPTO's statistical data indicates that there has been a decrease in the number of granted patents since 2014. It may indicate that the quality of the filled inventions is not much different from its prior arts or may be infringe the claim of its prior arts. Product-related patent also could become the major barriers in new product development for other designer or even a continuity of one enterprise on a certain industry (Hung & Hsu, 2007).

Realize that patent infringement affecting an enormous loss for the company, and coupled with the fact of patent ability reduction of failing patent. So the study of the application of design around to bring up new products becomes an important topic to be discussed. In order to avoid patent infringement, enterprises should pay attention to the related prior arts, when creating a new product. Patents have a very important role in product development, as long as patent has a big impact on a company in developing its new product, analysis on prior patent information is become important to be included into product development process. Patent-aspect in developing new product is also proposed by Ulrich & Eppinger (2015).

To avoid any infringement on new product, systematic methods should be used, Design around methods is one example of the systematic method (Chen & Chen, 2014). Recently designing around the existing patents will also become a task often

experienced by designer. New product should be developed by considering other prior patented-product or any circumstances around new product.

Design around means inventing an alternative to a patented invention that does not infringe the claim of certain patent. Design Around concept works based on the process and the rule of patent infringement judgment required to develop techniques that have substantial differences from the scope of claims of the existing patents (Hung & Hsu, 2007). In designing around the existing product, there are many variables that can be influenced and determine the final result of the new product. Assessing the existing technology is a common activity in the design around, this method also requires to define the boundaries and then decide the ideas and scoop of the next invention. Due to the absence of restrictions on the idea, it is necessary to have a mechanism to determine which ideas are eligible to choose. In determining the decision in the design around method, it takes a decision-making tool that will help in the process of making the right decision. Decision making tool used in this study is Theory of inventive problem-solving (TRIZ).

In order to reduce the risk of patent infringement in new product development (NPD), design around patents concept with information analysis (by TRIZ) can be one of the solution in new product development. As recommended by Kim & Cochran (2000), TRIZ is occupied by efficient and powerful tool that can be used in NPD concept generation. It can perform a technical engineering issue analysis, resolving contradictions and producing systematic innovation. (Kim & Cochran, 2000). Several studies on design around related TRIZ is compile as below.

Table I.1 Present Design Around Studies

No.	Author	Title	Case Study (Object)	Tools Involved
1	Kuang OuYang & Calvin S. Wang	A New Comprehensive Patent Analysis Approach for New Product Design in Mechanical Engineering	Armored vehicle	Contradiction matrix
2	Yung-Chieh Hung & Yeh-Liang Hsu	An Integration Process for Designing Around Existing Patent Through The Theory of Invention Problem-Solving	Portable Magnetic Impact Tool	IFR, Su-Field Analysis, and Inventive Principles
3	Alfred Chen & Rain Chen	An Innovative Measure for Corporative Design Strategies	Bicycle	Contradiction matrix

4	Si Chunlin & Lee King-Lien	The strategy of designing around existing patents in technology innovation; Case study of critical technology of OTFT	Organic Thin Film Transistor (OTFT)	Parameter Change (40 Inventive Principles)
5	Lee king-lien	New Prototype Design Process - Integrating Designing Around Existing Patents And The Theory Of Inventive Problem-Solving	Backlight Module	Contradiction matrix
6	Wang-Chih Chen & Jahau Lewis Chen	Innovative method by design-around concepts with integrating the algorithm for inventive problem solving	Power System on electric vehicle	ARIZ
7	Tien-Lun Liu & Shao-Ting Kuo	A Study of Applying TRIZ to Technological Patenting Deployment	Engine Oil	Contradiction matrix

In contrast to previous studies by Hung & Hsu (2007), Functional analysis will be involved after new product concept is generated. The result of the functional analysis is used as a comparison between new product and the prior arts. The use of functional analysis at the end of the process has the advantage of getting a better invention level. Functional analysis is also known as one of the TRIZ powerful tools which potentially can be utilized for designing around the existing patent.

In order to support the descriptive study on Design Around concept, example of redesigning a shipping container twistlock is used to illustrate the integration process of patent design-around. Twistlock is a fairly unique object, this object is one of the securing device that is important in transporting or storing shipping container which commonly used in logistics activities. The new design would have sufficient invention level to be filling as a new invention.

I.2 Problems Definition

The necessity of adding a study on functional analysis with descriptive studies about the use or implementation from functional analysis as one of the TRIZ problem solving tools in designing around with twistlock as an illustration object.

I.3 Research Objectives

Implement the use of triz in design around the patent based on the database resulting in a design that is patentable and has high invention level.

I.4 Research Limitation

This study does only concern with the generation of new twistlock concept by utilizing patent database.

I.5 Benefits of Research

Knowing the benefit of patents information utilization for designing around the existing patents.

I.6 Writing Systematics

Here is a systematics of research conducted as follows:

CHAPTER I Introduction

This chapter describes the background of the issue of the importance of avoiding patent infringement in a new innovation product. In this chapter is also reviewed a suitable method for generating a concept idea that can have a good invention but not infringe its prior arts.

CHAPTER II Literature Review

This chapter contains the relevant basic theories of the study in order to solve the problem. The basic theories consist of scientific literatures and published researches related to Design-around method and Container lashing process.

CHAPTER III Research Method

This chapter describe the study frameworks that consist of conceptual model and problem solving systematics. The conceptual model expresses the corelation of each variables that involved in this study, while the problem solving systematics expresses the eteps of conducting the research in devide stages.

CHAPTER IV Data Collecting and Processing

This chapter shows the data that has been collected. The data has been collected and then processed in accordance with the stages of data processing that have been described in research methodology.

CHAPTER V Analysis

In this chapter, an analysis of product design has been done. This analysis will cover functionality analysis on each product, either new product or prior art, and an analysis on improving operating procedure efficiency compared with prior art.

CHAPTER VI Conclusion

This chapter presents the conclusions of the research results, along with suggestions for further research.