CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Scheduling is commonly an important tool in manufacturing and production system environments. It may give major impact on the productivity of a process. In real production floor, scheduling is a continuously reactive process which face suddenly or unexpected of any new events. In manufacturing, the production mostly relate to the processing time, costs and quality. Scheduling do play important role to the raising of efficiency in any production system.

Nowadays, many approaches have been developed to resolve the real time events problem. It is more easy to use specific computational tools rather than doing manual scheduling. Most of job shop scheduling approaches focuses on the static environment (deterministic) which cannot react instantly to the problem, while dynamic job shop scheduling (DJSS) is usually intermittent and often stochastic and it can backup any incoming problems.

In DJSS problem, the production will experience high degree of randomness which caused by various forms of uncertainties such as due date changes, random job processing times, inoperable machines, rush orders, material shortage, and job cancellation at anytime. The problems may change over time and can change the system status and affect the performance.

Many companies get difficulties in scheduling their jobs as R2 Print Enterprise has no fixed scheduling system. They usually faced the problem of not delivering jobs on time. Therefore, the decision support tool will facilitate the use of data, models and structured decision process in decision-making to support the problems. The scheduling system is developed by doing simulation using Arena simulation software based on the real-time production.
1.2 PROBLEM STATEMENT

Job shop manufacturing system with facility of processing variety of jobs may encountered many scheduling problems. It is clear that ineffectiveness of production workflow resulting in longer cycle time of the production. Waiting time will be longer if the cycle time increase and will affect the customer. R2 Print Enterprise commonly receives new or rush orders from different customers instead of facing the problem of material shortage and due date changes. When the orders to delivery process are diagnosed, the printing firm may find one or more problem that contributed to the delay. Therefore, scheduling system is created using Arena simulation software to make sure jobs are delivered on time.

1.3 OBJECTIVES

i. To understand the job shop production in dynamic environment.
ii. To develop scheduling system based on real-time data in the R2 Print Enterprise.
iii. To implement scheduling system in R2 Print Enterprise.

1.4 SCOPE OF RESEARCH

The job scopes of this research are:

i. Limited to job shop type of manufacturing system.
ii. Production takes place in Small and Medium Enterprise (SME).
iii. Focus on the process and operation time.
iv. Jobs are dependent.
v. The dynamic of the job shop focuses on job arrival.
CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this literature review chapter is to provide the overall review of previous researches related to the job shop production (JSP), job shop scheduling problem (JSSP) and dynamic job shop scheduling problems (DJSSP). The reviews are based on the approaches and methods, performance measures, problem size, the sensitivity result of different methods and the simulation of dynamic job shop scheduling (DJSS).

2.2 JOB SHOP PRODUCTION

The character of job shop production are defined as manufacturing of one or few numbers of products that was designed and been produced due to the customer needs or specifications among prefixed time and cost. The typical feature of the job shop can be low volume and high kind of products. A job shop includes of general purpose machines organized into different departments. Every job demands unique technological necessities, demands process on machines in a certain sequence (Kumar & Suresh, 2008). Job shop production mostly describes a manufacturing environment which produces goods in small batches. The job shop production is a common manufacturing in small and medium-sized enterprises (SMEs). For example, job shop in the print shops and the machine shop.