CHAPTER 2

PROBLEM DEFINITION AND RESEARCH METHODOLOGY

2.1 STATEMENT OF THE RESEARCH PROBLEM

Based on the discussions in chapter 1, it is inferred that overall equipment effectiveness (OEE) is basically focusing on the losses pertaining to manufacturing equipments and is used as an equipment improvement measure. But the effectiveness of manufacturing system depends on the manufacturing resources such as Man, Machine, Material and Methods. Hence, it is necessary to address the losses explicitly, associated with the manufacturing resources and the method of overall equipment effectiveness requires appropriate modifications to address the losses explicitly, associated with manufacturing resources.

In this context, it is required to develop a methodology to address the losses explicitly, associated with manufacturing resources. The current research aims to investigate the following major issues prevailing in a manufacturing system.

- To study, investigate and develop a methodology to address the losses explicitly, associated with manufacturing resources and evolution of metrics to measure the effectiveness of manufacturing system.
• To develop a Business Process Mapping (BPM) and application for enhancement of manufacturing system effectiveness (metrics) with a case study.

• To study the impact of effectiveness of manufacturing system on Cost-time profile (CTP) and Cost-time investment (CTI) with a case study. Also, to study the effect of effectiveness improvement on Cost-time profile (CTP) and Cost-time investment (CTI).

• To investigate the impact of reduced effectiveness of manufacturing system on cycle time and thereby impact on takt.

Conclusions can be drawn from the above discussions that there is a need to develop/apply the methodology/metrics which address all the losses explicitly, associated with manufacturing system. This research work attempts to address the losses and development of metrics which can clearly portray the losses, development of Business Process Mapping (BPM) for enhancement of effectiveness, to study the effect of manufacturing system effectiveness on Cost-time profile (CTP) and Cost-time investment (CTI), to investigate the effect of manufacturing system effectiveness on cycle time/impact on takt time and to improve the cycle time to achieve the takt time.
2.2 RESEARCH METHODOLOGY

The research was carried out by following a systematic study of published literatures as discussed in section 1.6 of chapter 1 in the field of overall equipment effectiveness (OEE) and subsequently on business process mapping (BPM), cost-time profile (CTP) and takt time.

A methodology and metrics were developed to address all the losses explicitly, associated with manufacturing system. Then a business process mapping (BPM) was developed to enhance the effectiveness of manufacturing system in the case study. The impact of manufacturing system effectiveness on cost-time profile (CTP) and cost-time investment (CTI) was studied with the case study.

Finally, the impact of reduced manufacturing system effectiveness on cycle time and takt time was studied and impact of enhancement of effectiveness was also illustrated with a case study. A detailed research methodology formulated is presented in Figure 2.1.
Figure 2.1 Research Methodology

The first issue in the hierarchy, is the development of methodology/metrics to address the losses explicitly, associated with manufacturing resources is discussed in the next chapter.