Chapter V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of this study is to find an acceptable and good layout by considering its total cost. Thus, the moving distance and the productivity are used as the criteria for the selection including the cost for machine rearrangement. The process of layout generation and estimation is shown in Figure 5-1.

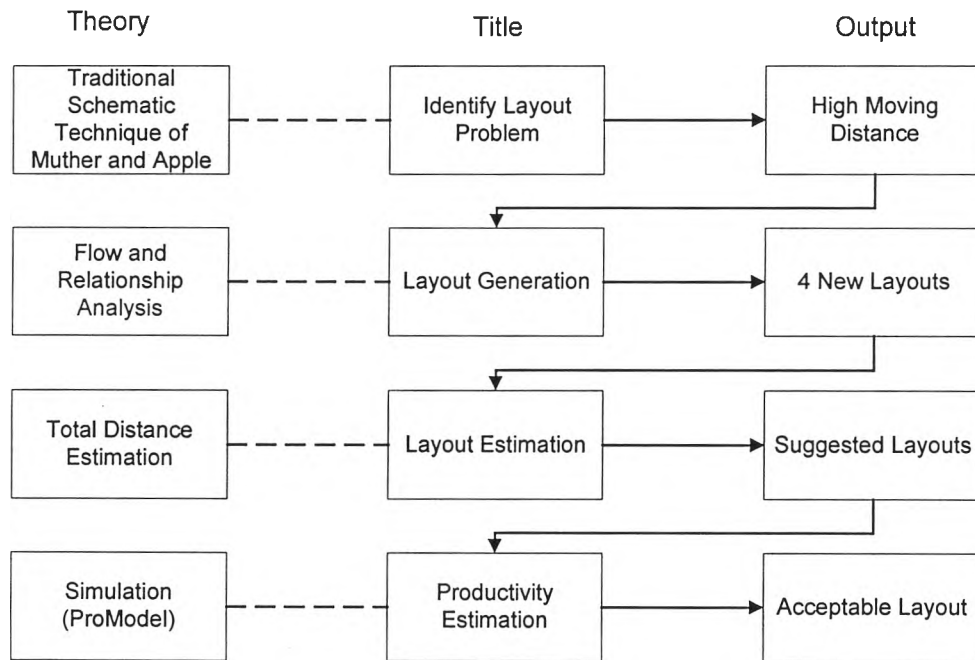| Theory	Title	Output
Traditional Schematic Technique of Muther and Apple	Identify Layout Problem	High Moving Distance
Flow and Relationship Analysis	Layout Generation	4 New Layouts
Total Distance Estimation	Layout Estimation	Suggested Layouts
Simulation (ProModel)	Productivity Estimation	Acceptable Layout

Figure 5-1: Summary Theory Used and Result of Study

The first step of study is to specify what's the problem by using the technique of Muther and Apple. It was found that there are a lot of moving between station and warehouse. Its causes are the difference of the production capacity and the characteristic of plastic production. From studying the alternative models, we found that the appropriate solution is the implementation of new layout. To generate the new layout, Flow and Relationship analysis is chosen. This method help make the constraints for design. That means the new layouts created are based on the moving distance and relationship between stations. From the experiment, there are 4 new layouts generated. These layouts and the existing layout are tested to find the shortest distance by using total distance estimation. The result is the 2nd and 4th design can have shorter distance than other designs and the current layout. However, this method can help design in term of distance only. In next step, the productivities from the suggested layouts are compared with the current layout. Simulation method is chosen

for simulation in this case because the cost is very high if we implement this in real system.

Simulation model had been built with actual data in the ProModel software. Input and output of this model are the orders and the number of the finished orders. The finished model is compared with the real system by using the statistical method. The result is the model can be used to substitute the real system. In experiment, the move times between stations of the suggested layout are the input and the number of the finished orders is the output. In this case, 2 suggested layouts (2nd and 4th layout design) are chosen as the input of experiment because their moving distance is lower than other designs. In the simulation process, there are 10 times for simulation. The output from simulation is compared with the current layout and each other by the statistical method. From the analysis and the statistical test, it's found that the new layouts can improve the productivity of product A (one type of the product).

In addition to the result of tests, we should also provide the cost for facility rearrangement and return investment period to management for making decision of rearrangement. The result of cost estimation is found that the cost for 2nd is cheaper than 4th design a little bit. When considering the return investment period, it is found that the period of 2nd design is 25 months but the period of 4th design is 18.5 months.

5.2 Recommendations for the Company and Further Study.

1. As known, the company is planning to expand the new factory. The management should use this concept to design new layout because it is the powerful tool and doesn't complicate to implement.
2. This model can be applied for other objectives of the study by changing parameter input. For instance, the objective is to study the productivity of the system from the expected order.
3. It is reasonable to apply this model to another production line or other factories. To make a better representation of actual system, collecting some more observation for data such as the processing time or the breakdown is needed.
4. In this study, the technique of layout generation seems to be the classical way. In the present, we have the software for layout generation called as Factory Package. This software