

Chapter 1

Introduction

1. Introduction

Air conditioning market is a high competitive market which has many sellers and buyers in Thai business. Many industries in Thailand are concerned with air conditioning and refrigeration systems because Thailand is located in the tropical area so it has hot climate.

According to the global economic crisis in year 1997 which effected countries in Asia especially Thailand, it impacted customer's purchasing power which caused most manufacturing companies to collapse. Until today, the solution for surviving is competing with each other to maintain market share and kick rivals out of the business. The competition situation is somehow harsh and despairs.

In 1998 the growth rate of air conditioner market decreased by 20% from 1997. The total sale revenue of the market is 7,000 million baths with 350,000 selling units which decrease from 8,000 million baths (400,000 units) in 1997. The growth rate slightly increases in the present years shown in the additional quantity of domestic and import air conditioner figure below.

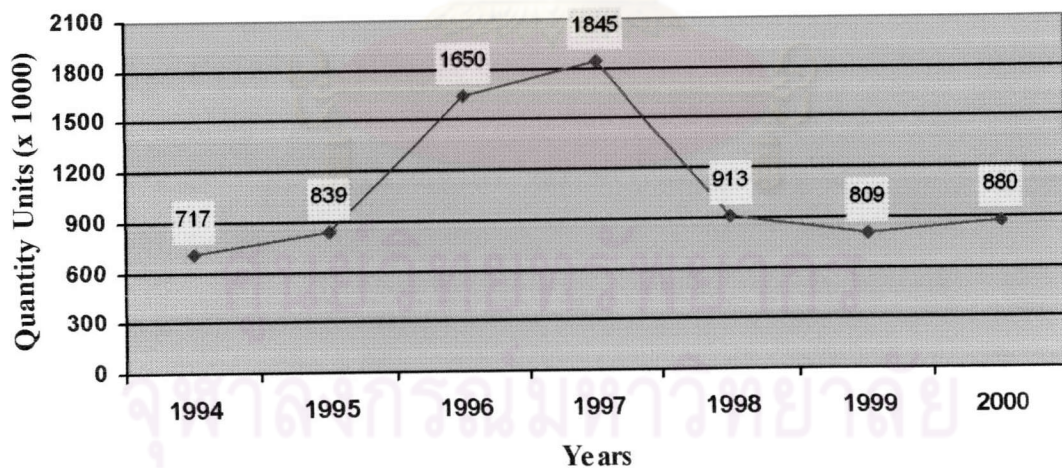


Figure 1-1; Trend of air conditioner quantity in Thailand

The market is divided into three segments which are industrial, commercial and residential. In 1998 the sale revenue in each market is 1,400 million, 800 million and 5,800 million baths respectively. The growth rate of industrial and commercial market decreased approximately by 20-80% while the growth rate of residential

market decreased by only 10%. There is an anticipation and expectation that the residential market trend might increase between 7-12% since its pitfall in years afterward while other markets still show low sign of recovery.

2. Rational of the Study

Since the situation of air conditioning business in industrial and commercial segments still vary unsteadily, and perhaps, the growth rate of those markets turn out dropping by uncontrollable factors. Companies that realize an opportunity will try to penetrate more investment in the residential segment instead because there are more than 70% of Thailand's households that still have no air conditioner.

2.1 Overall Business Picture

We must understand the global competitive business environment before emerging any further study to achieve business goals with our strategy. There is no exception in Thailand. The current business trends are listed as follow:

- Competition standard is no longer regional due to globalization and location independence (imports, oversea and foreign competitors, etc)
- Focus mainly on time-based competition
- Require new products and services with innovation, price, quality, agility and flexibility leadership
- Shorter product life cycle, increasing standard of customer's demand
- Decentralization organization structure
- Low transaction and communicating costs
- Collaborative work and team working
- Rapid sensing and responding to environmental changes
- Large manufacturer are outsourcing their manufacturing capability
- More relationship with suppliers, customers and inside employee

2.2 New Processes Design Adoption

As referred above, the air condition industrial competition is getting more seriously sophisticated. Traditional strategies for domestic producers, which usually are small and medium sizes producers, are competing mainly on cost issues. Competing by reducing product prices and only offer price promotions to attract customers alone need to be updated, revised and supported continuously with other systematic strategies for achieving the competitive advantage.

Most existing research literatures for manufacturing industries were offering improvements in some specific areas such as cost aspect, quality aspect, or time aspect by trying to justify its advantage among other aspect, eventually turned out by not emphasizing for the core competence of business. Traditional surveys within Thai air conditioner companies report evidences of how companies ignored their operational processes improvement as a critical success factors.

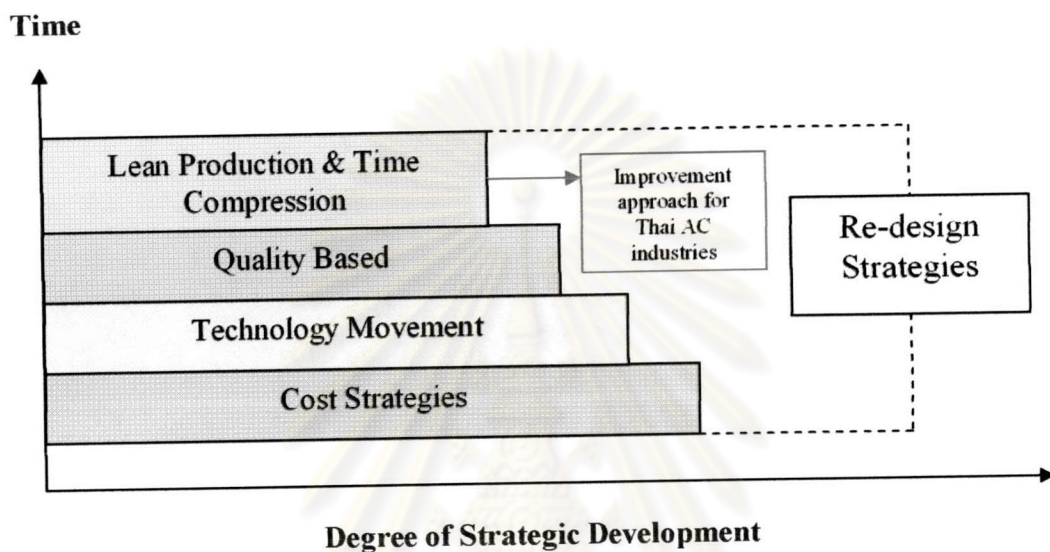


Figure 1-2; Appropriate strategy for current Thai air conditioner business

Figure 1-2 tend to represent the development of business strategies. Historically, companies firstly starts of with tight financial controls, competing on cost and price issues, then moving toward advance technology approach such as robotic and automation systems to facilitate the mass production. Quality strategy is the next target and further on, reduction in delivery, production time and system to improve an entire transaction chain is also getting more significant.

Today, new strategies are trying to develop everything together for the competition. Mastering high quality standard while having low cost and lead-time, thus, leading to practice lean production and approaching new operation and logistics management. Eventually, implementing design strategy for the appropriate product and manufacturing process for area of order winning competency might be the best solution.

'Design is the creation of new products, processes, systems, services, and business models.' (Daniel Steenstra, European Academy of Design Conference 1999)

It is rational enough to emphasize on the studying of household product in the current air conditioner business by specifying two outputs; for product

development and redesigning manufacturing processes to make productivity more efficient and effective to its full capacity and limited resources. For small-medium air conditioner providers' case, redesign means changing assembling sequences and workstation layout base on time compression approach in cellular environment. Otherwise, domestic producers will not be able to divide market share or stand a chance against giant distributors like Carrier, Mitsubishi, York and etc in any prospect.

3. Statement of Problems

The research has picked a Thai air conditioner company name "BNB Inter Group Co, Ltd" as a sample case for the thesis, focusing on spilt-type air conditioning product. The company was a new comer established by group of investors who are experts in air conditioning fields for decades. The company consists of it's headquarter office and the final assembling factory located in different place.

The manufacturing unit is a two-floor medium size factory with the approximate size of 2,940 square meters. The factory is responsible for assembling parts and components into finished goods then distribute directly for the customers. It uses labor intensive processes with a queuing system. The production volume is in moderate quantities depending on customer's demand.

So far, there is no questioning in the technical experiences and knowledge of the engineering teams and managers in the workshop but the factories still lack in its awareness of proper manufacturing management planning and control of its traditional system. The production decision and planning relied on mixture of personal intuitive experiences which lack of proper systematic analysis.

Among certain areas of inappropriateness observation since business until operating level, significant problems mostly occur in manufacturing section. This happens due to many causes and limitations conclude as follow:

3.1 Poor Factory Layout & Unidentified Process Environment

The factory does not locate in the industrial estate which provides manufacturing atmosphere incentive in the first place. It was surrounded by houses and crowded buildings. So it can not expand itself for better environment. Only 2,940 square meters area is very small compare with standard assembling factory. This causes congestion, accidents, and create pile of equipments, stocks and unfinished work all over the place, even hardly to walk and avoid knocking them off.

Unplanned layout is the consequence of unidentified process environment whether the process is batch, repetitive flow or jobbing. This provided turbulence and discontinuous work flow consuming more spaces. According to the limit capital and the expensive land cost it is nearly impossible to relocate or build new factory in other regions of the country.

For this matter, the company excuses that because of uncomplicated production processes, so the factory has setup very few machines and equipments for the operations line and then considered factory layout design as unimportant factors.

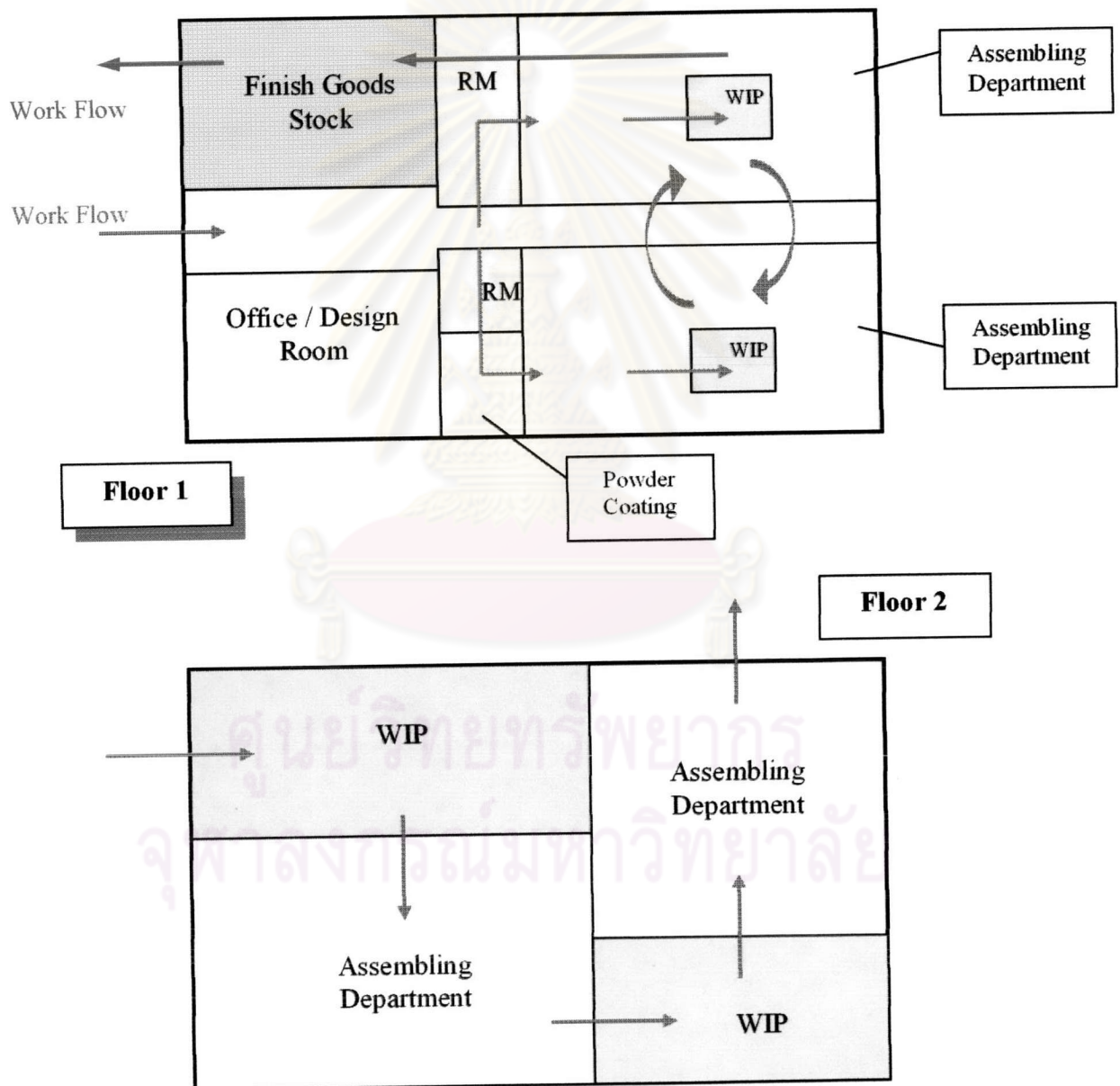


Figure 1-3; Overview sketch of the current factory layout

3.2 Hidden Manufacturing Problems

BNB is lacking for the whole system of operation management. Traditional production system is very inefficient and hard to be successful in coping with world-class manufacturing standards. It does not optimize the utilization of resources. Besides, there is no system to control or overcome the problems except for covering them.

Having high inventories shown in draft figure 1-3 to prevent defects incur in the assembly line makes people ignore sources of problems and errors. Problems are still left unidentified. Sensible perception and theoretical studies insists that when investigated to the root of problems and cope with them correctly, always giving continuous capability for better improvements such as less lead-time, bottle necks, inventories, etc.

Furthermore, the existing manufacturing activities are inefficient and provide low availability and flexibility for competitiveness, even in low-middle level domestic market results by number of customer's complaints in late production. Concerning with the limit spaces matter, here are the summarizations of the problems and areas for improvements:

- Inflexible manufacturing processes creates bottle neck and waste of time at some parts of the line, causes the company of loosing competitive advantage in agility, along with problem in suppliers delaying delivery.
- Sometimes the product runs out of stock in the purchasing season (summer) and dissatisfied customers.
- The factory ran out of space for expanding work extension and creates terrible working environment and undesirable efficiency.
- There is insufficient skillful workforce to replace when people in each workstation absent or requesting support. They also got some moral problems with boredom from repetitive activities and bad atmosphere.
- Handling paper work is a complicate job and requires greater attentive space. Because BNB have over 20 suppliers to contact so it requires a room containing paper works, design sheets, product specifications, documents, and invoices ready for the future. Still, the factory lack of proper manufacturing and production planning documents.

Fortunately, even the problems seem to spread everywhere around shop floor, but they align themselves in a pattern which can be solved directly by two solutions instead of capturing a scatter scope. The implementation issues are focused on creating suitable process environment and redesign together with the improper factory layout and also redesign assembly processes to replace traditional system.

4. Scope of the Study

The sample factory only performed a final assembly and minor task like spraying powder coating on the air conditioner frame body. There is no producing (making) activities concern. Parts and raw materials were all purchased from the suppliers as subassemblies using outsource strategy. Normally, air condition industries in Thailand almost walk in the same passage. There are plentiful of professional parts providers, so no need to make in-house.

This shallow the scope of study to concentrate directly on redesigning manufacturing processes in the workstation (and its related job). Thereby avoid touching the product design because the company already decided to implement the strategy and now it is in progress. The scope of study will influence necessary theories and techniques concerned with stated problems in final assembly which will spread into three following steps.

4.1 Understand an Environment & Characteristics

Initially, the redesign team use analyzing tools and techniques to recognize internal and external factors which affected on the company. Internal factors refer to environment inside the firm such as process type and facilities layout. External factors refer to sensitive factors outside the firm that might influence market position such as new concepts, knowledge, and political issues.

Eventually, the product needs to be revealed and analyzed to understand the natural of the products characteristics. What processes, system, methods and strategic implementation should be approach to achieve both operation and business objectives suitably with this product type?

4.2 Know What is Happening

The scope of study will be tackled in the working areas to identify ‘outstanding or obvious problems’ and ‘possible areas of improvement’ by applying fish bone diagram. In overcoming, the study and survey must clarify what is really happening in the factory under each procedure. It requires detail study about

production stage step by step since receiving materials until transforming into finish goods. The study should determine exact targets and areas for reallocation, readjustment and measurement results.

Powerful implements which are outside the problem areas or have minor impact will not be including in the thesis. The scope in this topic is covering about:

- Manufacturing processes sequences of the factory
- Detail about Split-type air condition product
- The current process environment and workstation layout
- Find problems that apparently hidden within the manufacturing stage
- Study about fish bone diagram applications
- Find improvement areas for competitive advantage
- The study will not include methods not involve with processes redesign

4.3 Theories & Approaches

Study on theories and suggest approaching methods or procedures that will help the company solving the problems to its full utilizations of man, machine, materials, and systems in shorter tact time. The study might require little knowledge of other subjects too.

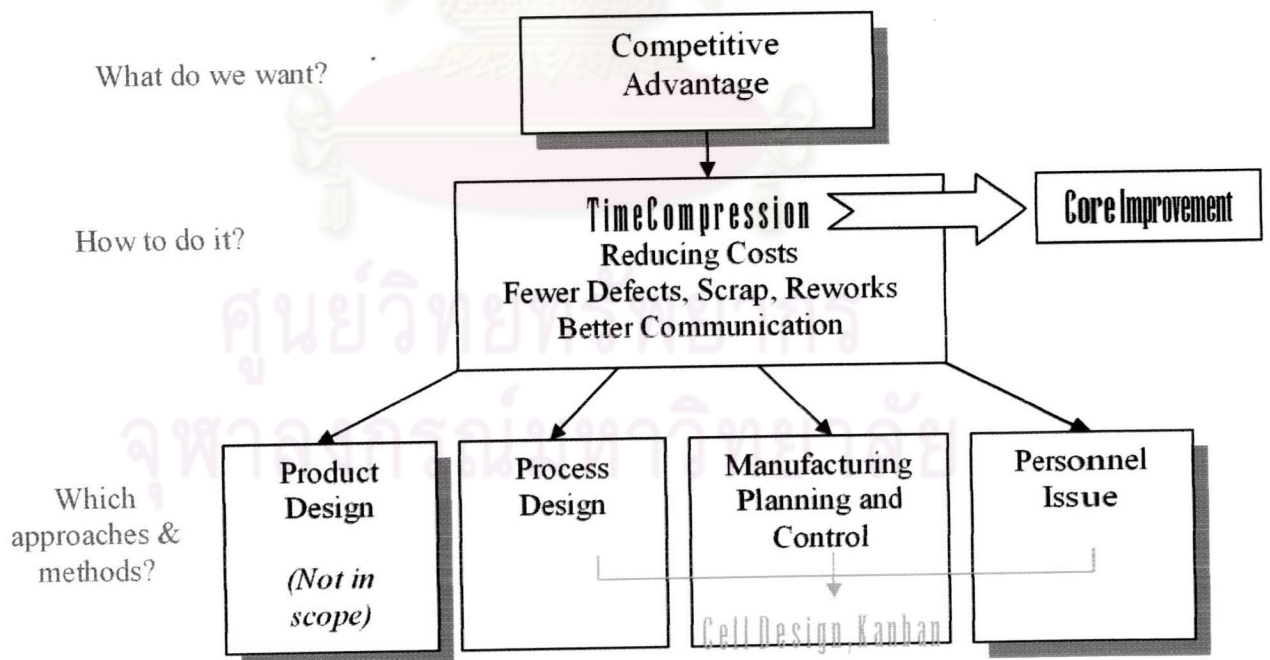


Figure 1-4; Scope of study must be able to answer these questions

5. Objectives of the Study

According to the statement problems and selected scope, the study objectives aim to pursue these following criteria to the company, which are:

- To construct a new manufacturing type (environment).
- Implement significant process improvements logically to replace an old system only for Split-type air conditioner final assembly factory base on redesigning method. Therefore, applying realistically suitable for the current problems and performing time-base competitiveness.
- Drafting a logical factory layout showing workstation blocks and work flow which integrate with replaced system for higher efficiency.

6. Expected Result

When completing in redesigning the whole new system, the consequence of implementation will create direct competitive advantage opportunities as expected, which are:

- Shorten processes and assembly lead-time (agility leadership)
- Reduce non value-added time
- Acquiring better working environment and more working spaces

After improvements to clarify hidden problems, there might be possibilities of benefiting the following areas, or maybe not, which are:

- Possibilities to reduce defects, scraps, and reworks received from suppliers and manufacturers in the shop floor (quality leadership)

7. Methodology

The study is carried out in the following steps that will take about five months of work. The learning and practice procedures are placed in these following orders:

1. Pick the interested thesis topics and find a sample factory for the case.
2. Study related literature, journals, textbook, Internet and existing research.
3. Survey the factory and collect data by interviewing face to face with managers and related documents.
4. Identify problems and point out area of improvements from gathered information.
5. Examine methods and concepts to achieve the system objectives and compare them with previous system.
6. Write up, making final checking and summarize the study.
7. Prepare and making final thesis examination.

Table 1-1; Thesis working schedule

No.	Method	October	November	December	January	February	March
1	Find a sample factory	←→					
2	Study related literature	←→	←→	←→	←→		
3	Survey the factory and collect information	←→	←→	←→	←→	←→	←→
4	Identify problems and point out area of improvement		←→	←→	←→		
5	Find methods and compare with previous results		←→	←→	←→	←→	←→
6	Write up, final checking and summarize			←→	←→	←→	←→
7	Prepare and final exam						←→