# CHAPTER 2
## THEORITICAL CONSIDERATION

## 2.1 Literature Survey

### Engamornrattana, Thanagorn - 1997

This thesis developed model in order to assess level of success in quality management system of Telecommunication Company in Thailand. He referred to international quality standards: ISO9000 and Baldrige Award by making questionnaire to let interviewee give mark on the importance of that topic. Then he brought that data to analyse and define the level of success in the company's quality management system. In addition, the technique of making questionnaires to let interviewee give mark on the importance of each topic is applied to the step of surveying the importance and satisfaction of customer requirement in the planning stage of QFD phase 1 in this thesis.

### Uthayanaka, Tanin - 1996

This thesis studied the possible use of information technology to improve business processes of a Thai securities firm. The firm had several information systems that allow trading of securities, billing of customers, payment of debt and reconciliation of accounts, but none are integrated. This brought some kinds of duplicated manual and tasks such as keying data. He introduced Intranet and central database in the system. The result was positive. Customers are delighted with the ability to access information faster and more accurate. Management is pleased with cost savings of not making multiple photocopies of manuals. This showed that information technology was involved in improving business process. For this thesis, the researcher has taken the advantage of information technology into the Mobile Type Approval process. Intranet mail has introduced to be used in support information such as list of mobile that has passed type approval and list of mobile that support services.

### Ros Sokha – 1999

This thesis studied the factors that had influenced consumer-buying behavior and his/her motivation. He aimed to describe and find out how consumers perceive mobile phone by in-depth interviewing with 400 consumers, and meeting with some experts in the filed and collect their views. He concluded the research in two perspectives: short term and long term. Both of them are classified into Product, Price, Place, Promotion, and Market Segmentation. This thesis helps the researcher to understand more in consumer-buying behavior and his/her motivation. This is useful in developing question in the questionnaires.

Nge Nge Shein – 1993

This thesis studied on analysing the customers' perceptions and preferences of mobile telephones in order to identify suitable bases for segmenting the market. People are asked to fill information in the questionnaire. The author segmented the customer based on demographic criteria; Income, Age, Occupation, Sex, and Education. She made questionnaire and sent to employees who were at the executive level of trading and distribution companies in Bangkok; totally, 574 executives from about 200 companies. There were 147 questionnaires returned (25%). And she used the software package "SPSS" to develop 'T' test and analysis of variance (ANOVA) for significance. The conclusion of this study are: (1) Thai consumers pay their highest attention to 'quality of the product' in purchasing mobile phones. (2) The proper after-sale service will definitely help a company to satisfy its customers and increase its sales. (3) Predominant reasons for purchasing mobile phones are 'Time saving' and 'Business opportunity'. (4) Thailand's mobile telephone market is homogeneous for all practical purposes; not segment on demographic variables. For this thesis, the way to collect information by using questionnaire helps the researcher in developing and analyzing questionnaires to get the customer requirement in phase 1 of QFD methodology.

Dr. H. J. Harrington - 1991

This book focuses on improving business process. It proposes steps for company to develop the concept of BPI into five phases. First phase is preparation step for changing such as building leadership, understanding, and commitment. Second phase is to understand the process by defining process scope and draw flow diagram. Third phase is to streamlining the process by many methods such as simplify process and eliminate no-value-added activities. Forth phase is to measure and get feedback of improvement. Last phase is to qualify and review the process. All of these steps aim to make the company get more profits and competitive in the market. In addition, BPI methodology in this book is very important to this thesis. The researcher has followed and applied the steps of each phase into Mobile Type Approval process as a case study.

Lou Cohen - 1995

This book explains about QFD process since stage one to stage four. It shows how to make QFD work for your company either manufacturing or service company. It suggests the company to do and prioritize the thing since the first step of planning. It also describes about gathering the voice of customer in order to build and analysis House of Quality (HOQ). These data will be useful in making decision to develop product and process further. In the beginning of this research, the researcher has followed the steps of this book to gather the voice of customer and create House of Quality (HOQ).

Balle, Michael - 1995

This book concludes that Re-engineering mostly needs radical organizational changes. Normally, producing products or services to the customer, it has to pass through many processes and departments. So it is not easy to manage. Re-engineering is the method that keeps the previous process but manages it to have only the major step in the workflow. They will be classified into workgroup and process sequence. And they can divide into 3 major parts: (1) Organization – create function in each procedure to get highest benefit, (2) Function – develop and establish training center for training and acknowledging, (3) Individual – determine function clearly. In addition, this book has implied the concept of reengineering the process. The researcher has realized this book when developing BPI methodology to improve the Mobile Type Approval process.

Born, Gary - 1994

This book concludes that we can use Quality Process Language (QPL) to explain process by using 3 basics: information, process and links between processes. And QPL is used in many forms such as Data Flow Diagram (DFD), Flow Charts, Flow process charts and performance/programme evaluation review technique charts (PERT). Generally, QPL consists of 6 parts: process, information, process owners, authorities, control and links between processes. In addition, this book is helpful to the researcher when creating the flow diagram of the process in the phase 2 of BPI.

Shigeru Mizuno and Yoji Akao - 1994

This book describes about the significance of quality to the customers and company. Customers or buyers have responsibility to check the quality of product; fish, for instance. They may observe the fish's eye color to determine whether it is fresh. And in the case that the product is typically prepackaged, the company or seller must assure the quality of product. This brings the thoughts on Quality Control. So there are many methods and techniques used since designed to manufacturing stage such as standardization, quality assurance activities for post manufacturing phases, and conventional quality control. However, it is not enough to meet requirement of the new era of quality. Quality Function Deployment (QFD) is the powerful tool need. Moreover, the concept in this book makes the researcher to give important not only to standardize the test method in checking quality of mobile phone, but also to meet the customer requirement. This brings to develop the House of Quality (HOQ) in QFD methodology phase 1.

Eugene H. Melan - 1993

This book describes about fundamentals of process management; initializing, defining, and controlling the process. It also said about method for process control in Service Company. Those are using complaint and comment forms, customer opinion surveys, and audit. This book also suggest the steps to manage process in practice: (1) establish ownership (2) establish boundaries and interfaces (3) define the process (4) establish customer requirements (5) establish control points (6) measure and assess the process (7) perform feedback and corrective action. In addition, this book makes the researcher understand more on the process management, and helps the researcher in developing the new process for Mobile Type Approval.

Patrick G. Brown and Paul V. Harrington – 1994

This journal describes about applying QFD method to define network capabilities of AT&T's Switching System Business Unit (SSBU). QFD is used with team-based approach (cross-functional team) for gathering the voice of customer and converting it into deployable product and service attributes. It allows the team to determine what customers need, provide a framework for prioritizing customer needed, and provided a technique to correlate specific customer needs with specific technical capabilities required for a successful product. Besides, management support is an important factor to develop QFD. It is needed to allow team members to focus their energy to accomplish this goal. In addition, this journal implies the researcher to pay more attention on team-based approach and management support in order to develop QFD in this research.

William M. Pratt – 1991

This journal describes that customer-based metrics is the heart of system that employs quality improvement techniques. It should not be only to understand all customer expectations, but also to have a measurement and quality assurance. As a result of lacking service quality measurement system, the service quality gap is occurred. It is the gap between customer expectation and customer perspective, Therefore, five key steps are suggested to close this gap: (1) Understand the drivers of customers' perception of the quality of the service (2) Develop a set of customer-based measures that reflect the customer perception drivers. (3) Establish a formal defect capture mechanism (4) Develop a root cause process for defect analysis (5) Align internal performance metrics with customer-base metrics. In addition, this journal makes the researcher play more attention on creating measurement and control in the phase 4 of BPI methodology.

## 2.2 Theoretical Consideration

### 2.2.1 Business Process Improvement

*Business Process Improvement (BPI)* is a systematic methodology that is developed to improve efficiency and progress of operation and process in organization. It stresses on eliminating waste and bureaucracy. This BPI method can make the work be simpler and improve to be more efficient.
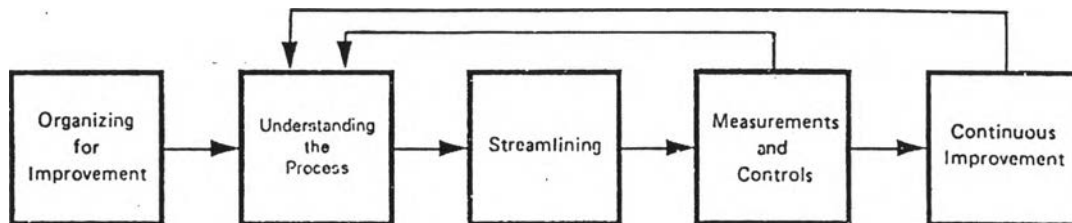
*5 phases of BPI*



*Figure 2.1 The five phases of BPI*

Phase I. *Organizing for improvement*

*Objective*:   to ensure success by building leadership, understanding, and commitment.

*Activities*:   *1. Establish Executive Improvement Team (EIT).*

- Consist of business unit head.

*2. Appoint a BPI champion.*

- Find the way that makes the process be better.

- Determine the scope of BPI activities as they relate to the organization.

- Develop procedures that define how BPI will be implemented within the organization (under the business unit leader's signature).

*3. Provide executive training.*

- EIT should meet every 2 weeks initially, and one month later on.

- EIT should understand about BPI concept and be able to coach others.

- EIT should be aware of what will happen within the organization, not just what could happen.

- Open group discussion to gauge people reactions to BPI.

*4. Develop an improvement model.*

- Visualize the process, identify the sequence of events, and determine the resources necessary to implement the changes.

- Detailed plan of the steps that will be undertaken as the organization goes through the BPI cycle.

*5. Communicate goals to employees.*

*6. Review business strategy and customer requirements.*

*7. Select the critical processes.*

- Answer the questions, "What do we do as a business?" and "How do we do it?"

- Break down complex processes into their subprocesses.

- Select process for improvement; i.e. long cycle time processes, or complaints.

8. *Appoint process owners.*

- Business processes seldom improve because there isn't anyone who really feels that he or she owns them.

- EIT must give the process owner authority and responsibility for the total process.

- Monitor the effectiveness and efficiency of the process.

9. *Select the PIT members.*

- Each department should be represented on the PIT.

- PIT member will facilitate implementation of the necessary changes to the department's process.


*Phase II* Understanding the process

*Objective*:  to understand all the dimensions of the current business process

*Activities*:  1. *Define the process scope and mission.*

2. *Define process boundaries.*

- Where the process begins and ends.

- Establish upper and lower boundaries to limit the complexity of the process and to clearly define basic assumptions.

3. *Provide team training.*

- To work as a team, understand the process, collect and analyze data, and improve the process.

4. *Develop a process overview.*

- To ensure that there are no inconsistencies or gross omissions.

- Help the PITs to understand the interface between each process so that they can understand "big picture" and coordinates with other PITs.

5. *Define customer and business measurements and expectations for the process.*

- A single process can have as many as five different types of customers: primary customers, secondary customers, indirect customers, external customers, and consumers.

- Establish measurements and targets for the overall process in term of effectiveness, efficiency, and adaptability.

6. *Flow diagram the process.*

- Represent the activities that make up a process.

- A key element in business process improvement (BPI).

7. *Collect cost, time, and value data.*

*8. Perform process walkthroughs.*

- PITs physically follow the process as documented in the flowchart from beginning to end.

- Gather additional information about existing problems and roadblocks to change and to make suggestions for improvements.

*9. Resolve differences.*

*10. Update process documentation.*

**Phase III.** *Streamlining*

*Objective*: to improve the efficiency, effectiveness, and adaptability of the business process.

*Activities*: *1. Provide team training.*

*2. Identify improvement opportunities: errors and rework, high cost, poor quality, long time delays, and backlog.*

*3. Eliminate bureaucracy.*

- Long delays in processing as documents go through multiple channels and level of review.

*4. Eliminate no-value-added activities.*

- Ensure that every activity within the business process contributes real value to the entire process.

- Find activities that do not contribute to meet customer requirements, and eliminate it without degrading the product or service functionality.

*5. Simplify the process.*

- Reduce complexity wherever feasible.

*6. Reduce process time.*

- Look at the present process to determine why schedules and commitments are missed, then reestablish priorities to eliminate these slippages, and then look for ways to reduce the total cycle time.

*7. Error proof the process.*

- Make it difficult to create errors.

- List the things that can be done wrong and then use error-proofing methods to eliminate or minimize the possibility of making an error.

*8. Upgrade equipment.*

*9. Standardize.*

- Ensure that all current and future employees use the best way to perform activities related to the process.

- Address the accuracy and adequacy of the documentation covering the process.

- Require documentation to show how the process is to be carried out, what training of personnel is required, and what is acceptable performance.

10. *Automate.*

- Sometimes it has opportunities to apply office automation; i.e. computer network, barcode.

11. *Document the process.*

12. *Select the employees.*

13. *Train the employees.*


Phase IV: *Measurements and controls*

*Objective*: to implement a system to control the process for ongoing improvement

*Activities*: 1. *Develop in-process measurements and targets.*

2. *Establish a feedback system.*

- Measurement without feedback is worthless due to no opportunity to improve.

- Relate the feedback to the feedback to the individuals performing the tasks.

- Make the feedback an obligation.

- Encourage positive and negative feedback.

- Use continuous feedback for continuous improvements.

- Avoid the old proverb "no news means good news".

- Encourage customer complaints.

- Give responsibility to take immediate action.

3. *Audit the process periodically.*

- It is nonsense to blindly accept data generated without proper checks and balances.

4. *Establish a poor quality cost system.*

- Measure the success of the company's efforts to improve.

- Provide a tool to change the way management and employees think about errors.


Phase V: *Continuous improvement*

*Objective*: to implement a continuous improvement process.

*Activities*: 1. *Qualify the process.*

2. *Perform periodic qualification reviews.*

3. *Define and eliminate process problems.*

4. *Evaluate the change impact on the business and on customers.*

5. *Benchmark the process.*

6. *Provide advanced team training.*

2.2.2 Quality Function Deployment

*Quality Function Deployment (QFD)* is the method to plan and develop products and services by using Development team to determine some details according to the customers' need. It assesses the products and services that have already launched in the market whether they have responded to customers' need.

Phase I. House of Quality

1. *Collecting data (voice of customer or customer requirement)*

   ● Market research report, customer surveys, and focus groups

   ● To understand who customers are, what they want, and why they want it

   ● The customer requirements as the what items we want to accomplish

2. *Translate 'What' into 'How'*

   ● Be objective measurements that are testable

   ● Not technical solution for the customer requirements
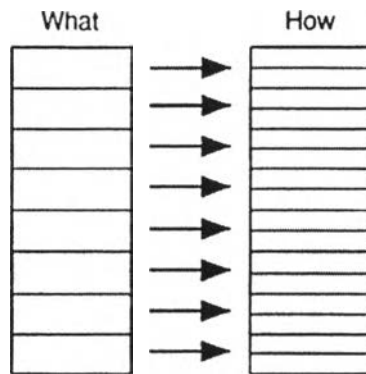


*Figure 2.2 Translated 'What' into 'How'*

3. *Depict the strength of 'What' and 'How' relationship*

   ● Show 'How' items affect with one or more 'What' items
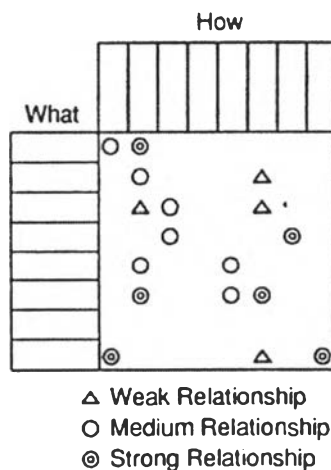
   ● Use symbols (double circle, circle, and triangle)



△ Weak Relationship
O Medium Relationship
◎ Strong Relationship

*Figure 2.3 Strength of 'What' and 'How' relationships*

*4. Measure 'How' items based upon the voice of customer*

● Provide objective mean to ensure that customer requirements have been met

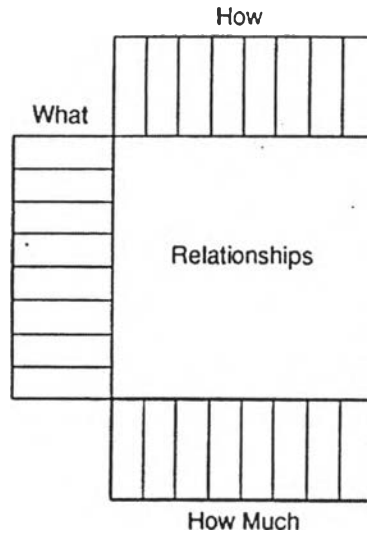● Establish targets for further development



*Figure 2.4 How much items provide targetable measures for 'Hows'*

*5. Establish correlation matrix*

● Determine correlation between each 'How' items

● Use symbols (double circle, circle, X, and double X)

● Establish potential conflicts early in the planning process

● Resolve them through trade-off decision making

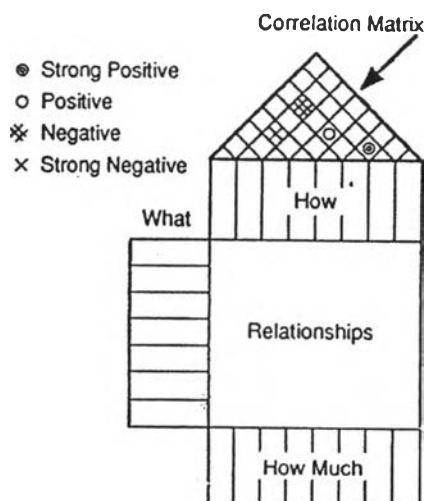● Develop new service technology that eliminate bottleneck



*Figure 2.5 Correlation matrix*

6. *Establish competitive assessment graph on 'What' and 'How' items*

- Compare performance of our 'What' and 'How' items with competitors

- Straighten the inconsistency between customer perception and technical evaluation

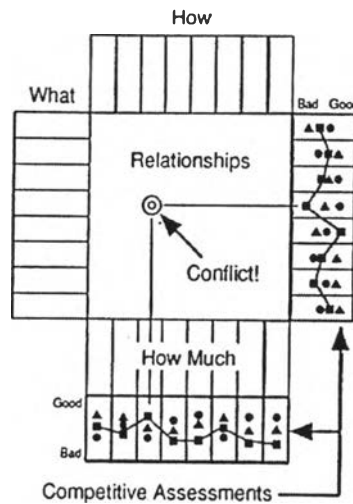- Establish company's strategy for improvement



*Figure 2.6 Competitive assessment graphs*

7. *Establish relative importance ratings of each 'What' and 'How' items*

- 'What' important rating is based on customer assessment, express as relative scale (1 to 5)

- 'How' important rating is based on the relationship symbols; double circle = 9, circle = 3, triangle =1

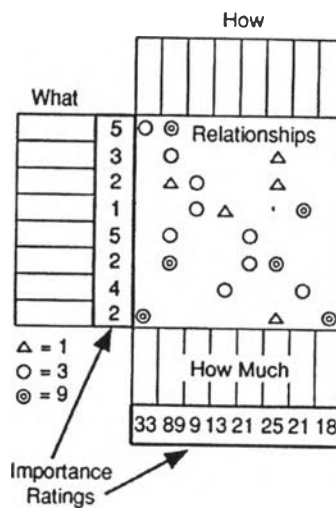- Calculate relationship value can help us to prioritize and work on the greatest level of customers' satisfaction



Figure 2.7  Importance Ratings