

# **TQM implementation in Taiwan**

## **— A Field Study with Taiwan Top 500 Companies**

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### **ABSTRACT**

Currently, Asia Pacific area has suffered economic decline due to financial crises. By contrast, Taiwan, however, is able to stand apart from its regional competitors and is able to manage and turn the crises into opportunities. Besides the financial factors discussed by economists, quality management should also be considered as a major factor in this development. This study investigates how Taiwan's industry implemented the quality issues, especially TQM, within the last decade. Questionnaires are generated for gathering information from Taiwan top 500 companies. Statistical analysis is performed to evaluate the effects of TQM, and suggestions are also made for further improvements.

**Keywords:** Total Quality Management (TQM). Customer-Driven Quality. Customer-Supplier Relationship.

## **INTRODUCTION**

Quality has been an important issue since the industrial revolution. In the age of mass production, to produce a large number of interchangeable parts is one of the major requirements which a company should hold in order to satisfy the tremendous demands from the production lines. However, to ensure the interchangeable parts can really be “interchangeable” during the manufacturing processes, and ultimately be assembled to final products, how to make consistent and reliable interchangeable parts is of major importance. In this regard, quality control plays a vital role for discovering defects that occur during manufacturing processes and eliminating the problems that cause defects. Not until the end of the World War II, the quality management concepts were introduced to the Japanese by Drs. Deming and Juran to aid them in their rebuilding efforts for conquering the shortages of civilian goods and human resources. To that point, instead of a technique oriented approach for dealing with the lower level production problems, quality management then upgraded to a management oriented approach which regarded all organizational wide business process could be improved continually. However, it was until the 1980s, after Japanese products had run over the United States, western countries started to notice that the Japanese-made products were so competitive, and they had even created a higher level in quality for globalization. From then on, quality management received major concerns for enterprises all over the world.

The issue in quality is overwhelming since 1980s. The companies in western countries have implemented the quality management concepts for more than a decade. The impressive and convincing effects kept encouraging the companies to perform the changes, either incremental or radical, in their organizations for gaining better quality and competitive advantages. Eastern countries, except Japan, though lagged almost one decade

behind western countries in implementing the quality management philosophy, also had vast improvements with their market shares in the global product market in 1990s. Especially, the countries in Asia Pacific region show tremendous potential competitions, and will also play important economical roles for the next century. Taiwan, as a part of the global village, needs to capture the trend in quality management for seeking an opportunity to survive in the world market or even beat the competitive competitors. Recently, Asia Pacific area was suffered with economic decline due to financial crises. In order to manage and turn the crises into opportunities, some economical policies were proposed by economists. However, besides the financial factors, quality management should also be worthwhile to consider as a major factor.

This study is facilitated to investigate how Taiwan's industry implemented the quality issues, especially TQM (Total Quality Management), within the last decade. Questionnaires are generated for gathering information from Taiwan top 500 companies. Statistical analysis is performed to evaluate the effects of TQM, and suggestions are also made for further improvements.

## **THE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT**

Feigenbaum [1] recognized that the full involvement of the entire workforce is the key factor for the success of quality control, and therefore the term total quality control was coined to reveal his thoughts. The Japanese adopted Feigenbaum's concept and renamed it as compnaywide quality control. Juran [2] mentioned that three key reasons for the success of total quality control in Japan: top management commitment, all level employees involvement, and continuous improvement. Along with Deming, Juran, and Crosby's philosophies of quality management, the concept of total quality management

(TQM) was then developed to convey the total, organization-wide effort, which involves the entire workforce to concentrate on continuous improvements for the satisfaction of customers (Bounds [3]).

TQM, more than a technique for dealing with the quality problems, is a philosophy to management and decision making. The goals of TQM are to satisfy the needs of customers, prevent poor quality rather than correcting problems after the fact, develop an attitude of continuous improvement, understand the value of measuring performance to identify opportunities and maintain improvements, and eliminate chronic sources of inefficiencies and costs (Evans and Lindsay [4] and Burr [5]). In order to achieve these goals, as well as to gain the competitive advantages, the three core principles of TQM should be fully understood and committed by the entire company workforce before implementing TQM. First, a focus on the customer needs to be developed. Customer-driven quality is initiated by customer's needs and expectations. Only by satisfying the needs of customers (either internal or external customers) during the manufacturing process, the company can produce the products that truly possess the quality which the customers will agree with, and therefore uphold or even enlarge the market shares. Secondly, A full involvement of entire workforce needs to be attained. Participation is important for implementing TQM, since TQM needs both the commitments of employees and the creative ideas from employees. Teamwork is also a vital element for TQM, especially the cross-function teams for dealing with customer-supplier relationships. Finally, An attitude of continuous improvement needs to be maintained. All systems and processes should be integrated as a part of the management work. Through continuous improvement, the cycle time of products can be reduced, errors and defects can also be eliminated, and therefore the productivity is improved.

Deming pointed out in his 14 points that taking action is important for making

organizational change for quality. However, A successful TQM implementation requires the whole workforce to be ready for change, a strategic planning to be guidelines for execution, and an effective quality organization to be channels for communication. Goetsch and Davis [6] developed a twenty-step approach for TQM implementation which can be divided into three phases: preparation, planning, and execution, embody the infrastructure and core principles of TQM, and present a fully comprehensive procedure for organizations to implement TQM smoothly. Our study of surveying the implementation of TQM in Taiwan is based on the concepts of implementing TQM established by Goetsch and Davis [6] and Evans and Lindsay [4]. The questionnaire is designed to represent their notions of implementing TQM. By analyzing the responding questionnaire, we can learn how the theoretical TQM is implemented in industry, and understand what are the key problems for implementing TQM in practice in Taiwan.

## **FIELD BACKGROUND**

This study is facilitated to investigate the following questions:

- (1) What is the current status of the implementation of TQM in Taiwan's enterprises?
- (2) How do the companies implement TQM in Taiwan?
- (3) How do the efforts be put in implementing TQM in Taiwan's enterprises?
- (4) How successful are Taiwan's enterprises in implementing TQM?
- (5) Is there any relationship between the successful implementation of TQM and the competitive advantages for Taiwan's enterprises?

The top 500 companies, which are ranked by China Credit Information Service Index (China Credit Information Service [7]), are used as the population of subjects. The

demographic distribution is shown as Figures 1, 2, and 3. Note that in Figure 1, the government own companies are defined for those companies with government shares exceeding 50%. Similar definition is made for the foreign companies in Figure 2. Note also the exchange rate for the currencies in Taiwan (NT\$) and U.S. (\$) is recently approximate 34.5 to 1.

Due to budget and time constrains, we randomly select 300 companies from the top 500 companies. Within the 300 selected companies, 13 of them are government own companies, 96 of them are service companies, and 191 of them are manufacturing companies; and also, 253 of them are Taiwanese companies, and 47 of them are foreign companies. The companies classified by annual sales are shown in Table 1.

**Table 1.** Sample Distributed by Annual Sales

Annual Sales (NT\$ Billion)	>100	50~100	25~50	20~25	15~20	10~15	8~10	6~8	4~6	<4
Number of Companies	3	4	15	7	16	28	23	36	73	95

The randomly selected sample seems to be reasonable to represent the population. We then ask the 300 companies to answer the questionnaires that are mailed to them. The questionnaire was designed to investigate the implement status of the companies in Taiwan. However, beside the main questions, some other questions are also asked to ensure that the subjects understanding the true meanings of the TQM concepts as well as the questionnaire itself. Therefore, the questionnaire was divided into eight parts, and the brief descriptions are as follows:

- (1) The status of the TQM implementation. The question is about how long do they implement TQM. If they have not implemented TQM yet, then the questions about do they heard about TQM before, do they think TQM will be helpful for them, and

do they plan to implement TQM some time in the future will be asked.

- (2) The basic understanding of TQM concepts. In order to ensure the questions in the questionnaire are correctly answered, we used some basic concepts of TQM to test the subjects and see if they really know what they are answering. The questions include TQM core principles, TQM misconcepts, and the reasons for implementing TQM.
- (3) The corporate culture and organizational change due to the implementation of TQM. It is necessary for the cooperate culture and the organization to prepare for the changes when implementing TQM, since a successful TQM implementation need long-term strategic planning, top level management commitments, customer-driven ways of thinking, employees involvement, and good financial management.
- (4) Self-assessment for implementing TQM. The efforts which are put in implementing TQM should be assessed, since we need to know the strong and weak parts of our implementation plan. The questions include: the management of the problems in quality, the role of the top management, the responsibility of quality problems, the customer-supplier relationships, the expenditure for solving the quality problems, and the training of the employees. The questions in this part are refined from Coopers and Lybrand quality maturity matrix (Coopers and Lybrand, [8]).
- (5) The participation and teamwork. The involvement of the top management, the middle management, and the workforce are all vital for implementing TQM
- (6) The organizational structure is also important for implementing TQM. The line organization is a functional form, with departments that are responsible for each different function. The line and staff organization includes the line department for the business functions as of the line organization, and staff personnel assist the line managers in carrying out their jobs by providing technical assistance and advice.

The matrix type of organization is designed to handle complex projects. In a matrix-type organization, each project has a project manager and each department that is providing personnel to work on various projects has a technical or administrative manager. The quality organization is also important. A quality council and support team is a key factor for successfully implementing TQM. In Implementing TQM, the development of procedure and documentation are vital for control and improvement.

- (7) The difficulties for implementing TQM. In implementing TQM, many difficulties need to be overcome which include: lack of consistent top management support, inadequate knowledge and understanding about TQM, fear and resistance to change, lack of a long-term focus, politics and turf battles, employee apathy, and inadequate planning (Whalen and Rahim [9]).
- (8) Performance evaluation of the implementation of TQM. The indicators include the degree of cost reduction, the degree of sales increment, the degree of company images improvement, the self rating for the total satisfaction for implementing TQM, and finally, the relationship between the implementation of TQM and the survivability from Asia Pacific financial crisis.

## **RESULTS**

The response rate of the survey was 25% (75 out of 300 questionnaires). Two questionnaires are invalid due to the answers are not properly applied in the questionnaires. Therefore, totally, 73 questionnaires are used for analysis.

Among the 73 companies, which validly replied our questionnaires, 39 of them have already implemented TQM. It implies that more than half of the companies currently has

adopted the TQM approach to improve their performance in quality. Furthermore, 15 out of the 34 companies which have not implemented TQM yet indicated that they will adopt TQM in the near future, and believed that TQM will bring them significant improvements in quality as well as market shares. While responding the TQM implementing time for the companies which have been implementing TQM, 18% are more than ten years, 33% are within 5 to 10 years, 36% are within 1 to 5 years, and 13% are less than 1 years. Figures 4 and 5 shows the implementation status of the respondent companies.

In part 2 of the questionnaire, we presented some basic ideas from the TQM philosophy to test the subjects for their understandings with TQM. The results are encouraging, since most of the respondent companies answered this part promisingly well. About 85% of the respondent companies know the three core principles of TQM. There are some misconcepts about TQM (e.g., TQM needs to do lots of works on collecting data and organizing teams) which might still confuse the respondent companies. However, this will not affect our study and are worthwhile for doing the further investigation. Therefore, all the 39 respondent companies which have implemented TQM are used to investigate the implementation status of TQM in Taiwan.

While responding the readiness for TQM implementation, more than 75% of the respondents knew that the implementation of TQM would require organizational changes, and about 82% of the respondents knew that the organizational culture should be changed as well. Also, for the categories of long term strategies, top management commitments, integrating customer satisfaction into TQM, and emphasizing employee involvement and training, most of the respondent companies have positive experiences which implies that they are fairly ready for implementing TQM. Table 2 shows the readiness for TQM implementation for the respondent companies. As shown in Table 2, more work needs to do for the degree of combination of financial management and TQM, since there are still

about half of the respondent companies did not combine TQM and financial management together, and which might cause the companies to implement TQM inefficiently.

**Table 2.** Readiness for TQM Implementation

Number of Companies	YES	NO
Ready for Organizational Change	30	9
Ready for Organizational Culture Change	32	7
Had Long Term Strategies	35	4
Had Top Management Commitments	36	3
Integrated Customer Satisfaction into TQM	36	3
Emphasized Employee Involvement and Training	37	2
Combination of Financial Management and TQM	20	19

For the efforts that the companies put into for implementing TQM, most of the companies had put significant efforts for implementing TQM. Figure 6 shows the self-assessment of TQM implementation efforts for the respondent companies. As can be seen from Figure 6, quality responsibility appears to be the most remarkable effort that the respondent companies put into for implementing TQM. It needs whole workforce to understand that quality is the responsibility of everybody in the organization. However, training seems to be less notable currently for the respondent companies, only moderate efforts were put into for implementing TQM.

The involvement of senior management, middle management, and the workforce are measured by likert scale from 1 to 5. Results show that most of the companies indeed gain the commitments from the top management, middle management, and workforce; however, the degree of involvement for the middle management is relatively higher than for the top management and for the workforce. Figure 7 shows the role of employees in

TQM implementation.

When implementing TQM, the line and staff organization and matrix type of organization are commonly more efficient than the line organization. In our survey results, 41% of the companies are structured by the line and staff organization, 31% of the companies are line organizations, and 28% of the companies are matrix type of organizations. Also, the quality steering team is essential for a company to implement TQM. Most of the companies (about 85%) have steering teams for planning, directing, and managing. Furthermore, almost all the companies have detail procedures and documentations for the implementation of TQM. Table 3 shows the distribution of the respondent companies with organizations and procedures for implementing TQM.

**Table 3.** Organizations and Procedures for TQM Implementation

Number of Companies	YES	NO
Had a Specific Organization to Direct, Plan, and Implement TQM	33	6
Had Procedures for TQM Implementation	38	1
Preserve a Documentation for TQM Implementation	39	0

Different company will encounter different difficulties when implementing TQM. In our survey, we have found that most of the difficulties are from inadequate knowledge and understanding about TQM, resistance and disregard of the employees, and lack of consistent top management support. Within these difficulties, lack of consistent top management support appears to be the most difficult problem to resolve. Table 4 shows the Frequencies and rank of difficulty of the TQM implementation barriers.

**Table 4.** The TQM Implementation Barriers

Implementation Barriers	Frequencies	Rank of Difficulty (Frequencies)
Inadequate Knowledge and Understanding about TQM	19	2 (7)
Fear and Resistance to Change	15	2 (7)
Lack of Consistent Top Management Support	14	1 (11)
Employee Apathy	10	4 (6)
Politics and Turf Battles	9	6 (3)
Inadequate Planning	8	5 (5)

When evaluating the performance of implementing TQM, liker scales are also used for representing the degree of success for the companies. Figures 8 and 9 show the results for quantitative and qualitative performances for the companies. As can be seen in these figures, by implementing TQM, the companies indeed improved in every concern, such as cost reduction, sales increase, product image, service quality, and overall reputation. Self-assessment for the overall performance of TQM implementation is also asked in our survey. In other words, after the quantitative and the qualitative improvements have been recognized, 88% of the companies believe that they have been implementing TQM successfully. Among the 12% of the companies which do not implement TQM successfully, some think that TQM does not provide strategic management and problem diagnose program, some think that their organization has some limitations which might hamper the TQM implementation, and some think that the benefits brought by TQM are still under expectation, ... etc. Finally, around 70% of the companies believed that, by implementing TQM, they had survived from the recently financial crisis in the area of Asia Pacific.

Crossover examining the results, we have found that the degree of success of the companies for implementing TQM is positively correlated to the studied factors in every

part of the questionnaire. As can be seen in Table 5, the effort for implementing TQM and employee involvement is relatively more positively correlated to the TQM implementation performance than other factors.

**Table 5.** Correlation between the Studied Factors and TQM Implementation Performance

	Correlation with the TQM Implementation Performance
Time Period for Implementing TQM	0.06
Basic Understandings of TQM Basic Concepts	0.03
Readiness for TQM Implementation	0.20
Effort for Implementing TQM	0.30
Employee Involvement for TQM Implementation	0.45
Specific Organization for TQM Implementation	0.11
Survival from Financial Crises vs. TQM Implementation	0.32

## DISCUSSION

From the field results, we can show that the TQM implementation status for the top 500 companies in Taiwan is only mildly mature, since just over 50% of the companies have implemented TQM, and about half of the 50% companies have been implementing TQM for more than 5 years. However, Among those companies which did not implement TQM, most of them believe that TQM can help them to improve their performance. This indicates that TQM philosophy is gradually accepted by the enterprise in Taiwan, and will be an improving factor for global competition in the future. However, since there are still many median and small sizes of companies in Taiwan which have neither structured organizations nor enough utilizable capitals (not listed in the Top 500), the deductive

description that TQM implementation status for the whole industry in Taiwan is mildly mature is questionable and needs to be further investigated. Another phenomenon of interest is that service industry seems to implement TQM less frequently than and also not as well as for manufacturing industry. This could be explained by the fact that TQM philosophy is relatively intangible in service systems.

Most of the companies knew what the core principles of TQM are, and how the infrastructure needs to be changed. They gain the support from the top management and the involvement from the middle management and the workforce. But the idea of internal and external customers is still confusing. They tend to overemphasize external customers but neglect internal customers. This can be seen by the fact of commonly less cost spending on training and educating programs. For the customer-supplier relationships, the concept of strategic alliance are not fully accepted by the companies in Taiwan. They still prefer procedures of getting materials with the lowest cost instead of keeping steady partnerships with quality suppliers. Since the subjects are from the top 500 companies in Taiwan, the sizes of these companies are relatively large. This explains the findings that these companies tend to be formed by the line and staff organizational structures instead of the line structures which are more suitable for small companies. The matrix type of organization, though more efficient for TQM, is somehow too complicated and less loyal, and hence is less favorable for these companies. Nevertheless, the companies indeed have steering teams for planning, directing, controlling, and managing the implementation of TQM. The steering teams are organized by members with different specialties, from top management to functional department workforce, and play an extremely important role for the implementation of TQM.

General speaking, most of the companies tend to be positive when reply to our questions about how successful they are in implementing TQM. This might be explained

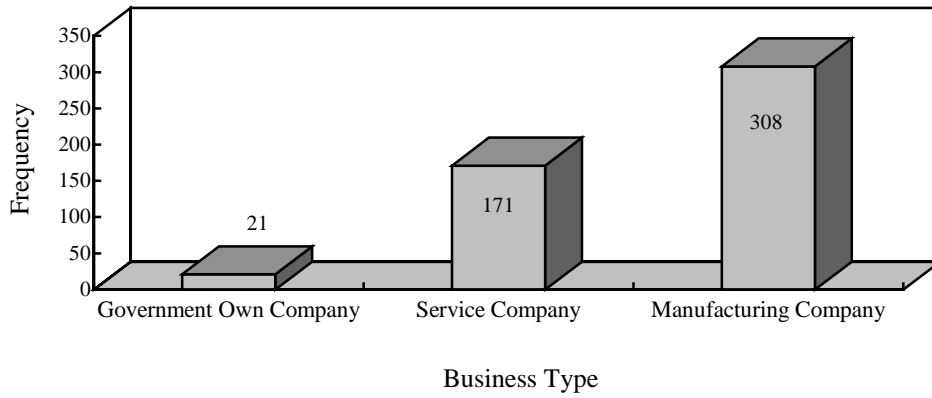
by two different ways. First, the company is truly improved, and the effects can be identified in terms of cost reduction, sales increase, performance enhancement, and product image promotion. Secondly, the company does not actually experience improvement, and the effects are not significant in terms of those quality-related indexes mentioned above. However, since the company has been already implementing TQM for quite a while, the company mentally believes that its implementation of TQM is successful, and will payback in the near future. This really happened in our analysis of data, since about 10% of the companies declared that they are successful in implementing TQM, but no significant indications confirm their declaration (i.e., they answer the questions in Part 8 of the questionnaire with low degree of satisfaction). The results also show that the degree of success for implementing TQM is positively correlated to the studied factors, especially the readiness for TQM implementation, effort for implementing TQM, and employee involvement for TQM implementation. This is obvious and reasonably true, since as long as a company is well prepared and more efforts are put in for implementing TQM, and also gains the involvement of the whole workforce, the success of TQM is expectable in every sense.

Most of the companies believed that their implementation of TQM had helped them to stand apart the recently financial crisis in the area of Asia Pacific. The arguments can be explained by the fact that TQM can actually improve the physical and financial status of a company. TQM forms a more efficient, effective, flexible, and reliable organization which can deal with any type of change (Niven, [10]).

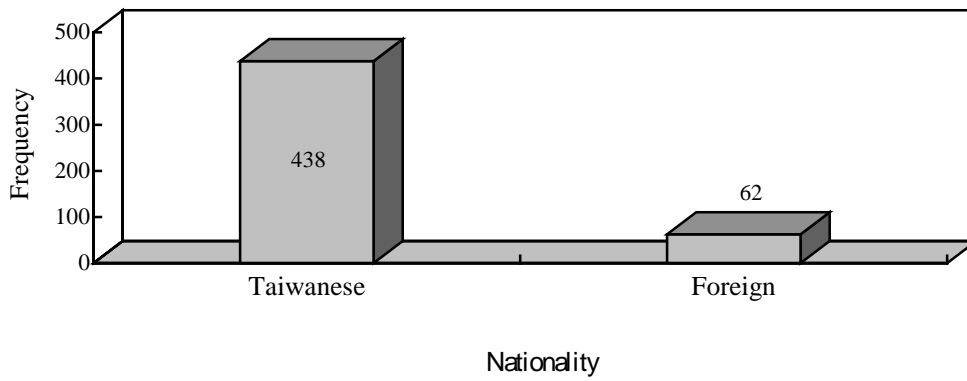
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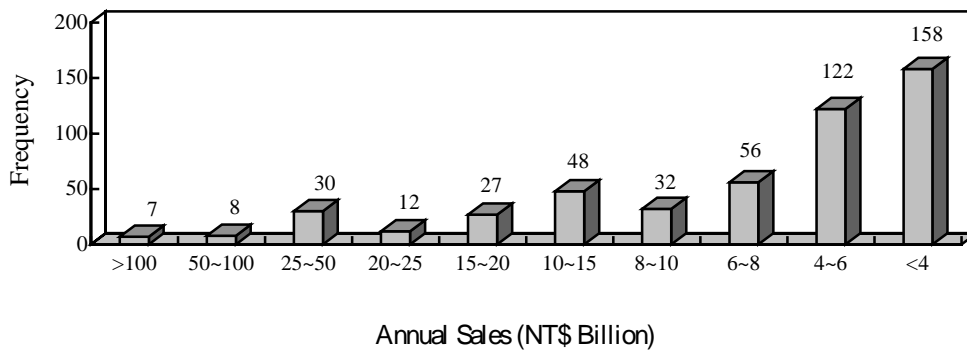
**Figure 1. Population Distributed by Business Type**



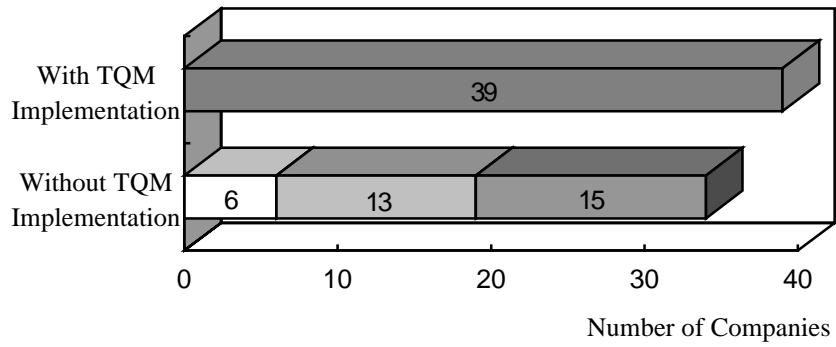
**Figure 2. Population Distributed by Nationality**



**Figure 3. Population Distributed by Annual Sales**

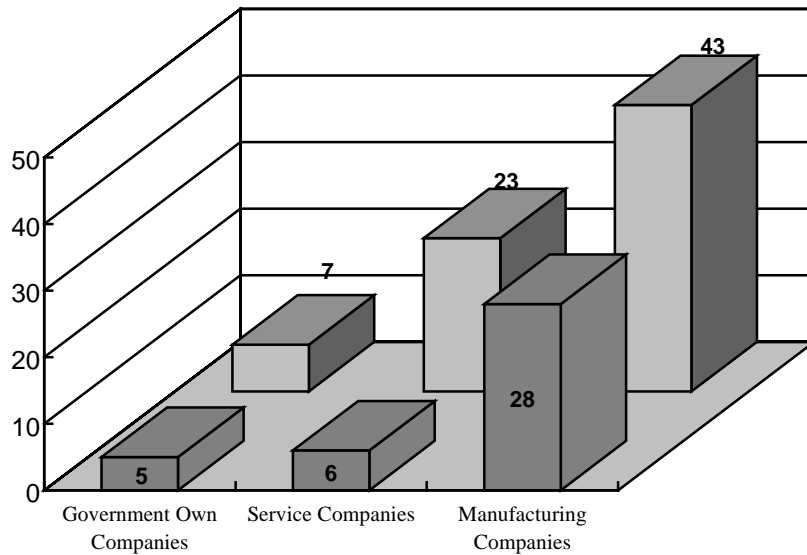


**Figure 4. TQM Implementation Status in Taiwan**



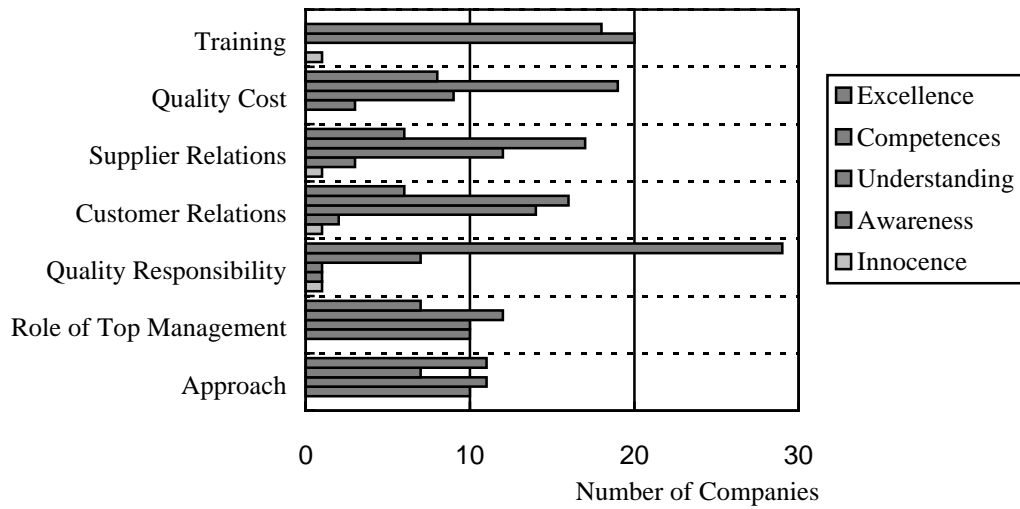
- Never Heard about TQM
- ▒ Heard about TQM and Believe TQM is Helpful
- Heard about TQM, Believe TQM is helpful, and Will Implement TQM in the Future

**Figure 5. Business Types of Responed Companies**



- Responed Companies with TQM Implementation
- ▒ Total Responed Companies

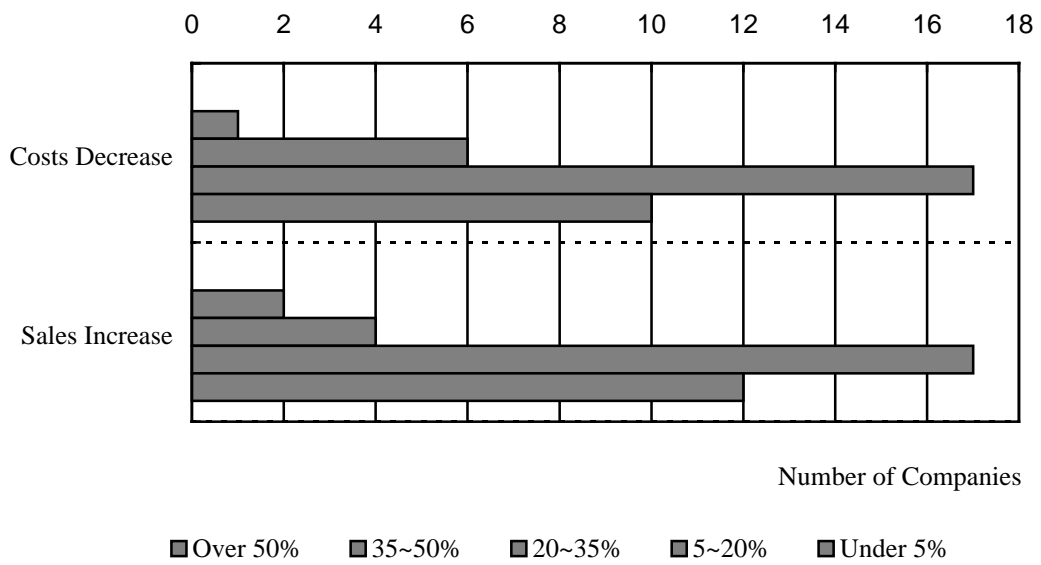
**Figure 6.** Self Assessment of TQM Implementation Efforts



**Figure 7.** The Role of Employees in TQM Implementation



**Figure 8.** The Quantitative Evaluation for the Performance of TQM Implementation



**Figure 9.** The Qualitative Evaluation for the Performance of TQM Implementation

