
Title: TQM Key Success Factors: A Case Study of Two Companies

Course: EMGT 520
Term: Fall
Year: 1996
Author(s): M. Testa, D. Wahlstrom, K. Alkahtani, K. Vivitvorikit and S. Alyan

Report No: P96057

ETM OFFICE USE ONLY
Report No.: See Above
Type: Student Project
Note: This project is in the filing cabinet in the ETM department office.

Abstract: Identifies six Key Success Factors for implementing Total Quality Management.

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M. Testa, D. Wahlstrom, K. Alkahtani,
K. Vivitvorikit, S. Alyan

EMP-9657

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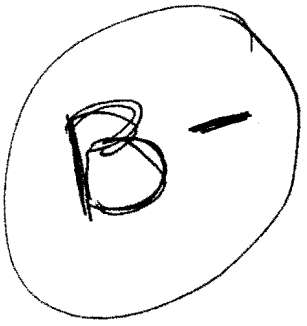
*From:* Team #5
Martina Testa
Dan Wahlstrom
Khalid Alkahtani
Kittipong Vivitvorikit
Saleh Alyan




*To:* Dr. Kocaoglu
EMGT 520
Portland State University

December 9, 1996

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**Abstract**

A large percentage of companies engaging in Total Quality Management (TQM) activities are not satisfied with the results. This paper surveys literature to identify common elements and derives six (6) Key Success Factors (KSF) for TQM implementation. These are management philosophy, cultural values, empowerment and trust, relevance of projects, motivation, and planning and methods. A hierarchical model on the interrelationship between these factors is developed. In this study, two small companies with TQM activities are examined, individually rated and gaps analyzed. It is shown that the six KSF's can adequately describe the strengths and weaknesses of a company with regard to TQM implementation. However, the six-element hierarchical model is of limited scope to understand the interrelationship of KSF when individual companies are examined. The model should be expanded to include other variables, such as environmental factors.

**Keywords**

Total Quality Management (TQM), Key Success Factors (KSF), Affinity Diagram, Interrelationship Diagram, Gap Analysis

## I. INTRODUCTION

TQM seeks to improve quality and increase customer satisfaction by restructuring traditional management practices. This general definition of TQM encompasses all functions of an organization and the application of TQM is unique to each organization that implements it. The use of statistical quality tools, along with a wide variety of supplemental guides, make the heart of TQM. Just how, when, and where those tools are applied varies from one organization to another. What matters is ,each department in the firm, or even each different organization must implement these tailored tools to best tackle the problem of inefficiencies.

TQM has different definitions but on a basic level, TQM is a philosophy that seeks continues improvement in the quality of performance of all processes, and customer satisfaction as well. It is sometimes most successful in large companies because the end product or customer is a distant consideration The smaller the company, the less relevant becomes the crude interpretation of TQM's ideal of doing everything as well as possible the first time around. [5]

TQM is associated with many recognized generic TQM elements. They are listed here:

Baldridge Criteria (Self-assessment)

Benchmarking

Communication

Competition

Compensation (Cash awards)

Corporate Citizenship

Cross-Functional Collaboration

Customer Focus

Fact-based Decision Making

Integration of Quality into Work

Innovation/Continuous Improvement

Leadership

Measures/Quality Metrics

Participation/Empowerment

Plan/Direction

process Management/Improvement

Quality Control (Inspections)

Recognition (Noncash awards)

Supplier Development/Certification

Systems Thinking

Teamwork

Training/Learning

Vision [6]

## II. LITERATURE SEARCH AND HYPOTHESIS

Much of past research has focused on TQM implementation plans and instructions for start up operations. Our research focuses on what differentiates a successful from a non-successful TQM process. The literature is widespread in its coverage of TQM. We have collected a cross section of information to give a broad basis in which to study. The literature search is comprised of examples of why TQM is considered a success or failure, along with information on pitfalls of unsuccessful TQM efforts as well as attributes of successful TQM efforts.

*Is TQM a success or failure?*

There are numerous examples regarding the overall success and validity of the TQM movement as a whole. First, only 20 percent of Fortune 500 companies are satisfied with the results of their TQM processes. Second, seventy percent said that performance is driven more by internal needs than customer needs. Third, a survey of 300 electronics companies by the American Electronics Association found 73% had quality programs in place, but of these 63% said they had failed to improve quality by even as much as 10%. Finally, the " balkanization" of TQM spreads on an almost daily basis as TQM splinters into ever-smaller spheres of influence like ISO9000 and re-engineering. These are the new saviors of capitalism as we know and are not much different than zero defects, quality circles or management by objective. [8]

The critics fall into two groups: the next wavers who are usually consultants, eager to be ahead of the curve on the next trend to beat the market. So TQM becomes reinventing, re-engineering or high performance work teams. The second group is the naysayers, they could be consultants, managers, or

journalists. They never liked this newfangled , warm and fuzzy management style. They advanced to their present lofty positions by using hierarchical, command and control approaches to leadership or by catering to people who did. [11]

Several factors may influence the assessment of TQM in industry. Most companies believe that monthly measures of customer satisfaction and quality are too expensive and that a yearly "Do you love us?" survey is sufficient. While financial and sales data are reported regularly, most companies believe that quarterly or yearly reviews are sufficient. This approach has three weakness. First, management attention to satisfaction is sporadic. Second, when quality initiatives are implemented , their impact cannot be evaluated for a long period of time, and causality is lost. Third, the front-line staff are forced to fall back on internal measures which are not as credible. The lack of frequent monthly customer based measurements cause companies to focus on internal measures instead of on customers needs. [2]

The debate in the media over TQM's success or failure only encourages misunderstanding. TQM always works after the right methods to implement it have been found. However , the success or failure of the methods has been mistaken for the success or failure of the philosophy. Organizations that are effectively using TQM employ different tools and techniques, which might change from time to time. [4]

Many times TQM may be reported as a failure due to an inherent misunderstanding of the costs. The costs of TQM are often very high in terms of time, human and financial resources, and the results are not always sufficiently rapid, with the impact on employees severe. Companies must realize that TQM will not give sudden results when compared with the investment. [9]

Many companies see TQM as having a impact on internal needs. The organizations intangible relationships with suppliers and joint venture partners are not always highlighted because TQM is sometimes too inner-directed. Ideally TQM should be interested in both internal and external relationships and as a result the suppliers and joint venture partners will not be ignored. [7] TQM programs become overburdened with measuring organizational activities and developing an internal focus rather than an outward-looking focus on customer needs.[16]

*Pitfalls of unsuccessful TQM Efforts*

A preoccupation with internal performance measurements, conformance indices and technical specifications, inevitably may diminish a managers attention from external factors. [5] TQM programs attempt to standardize the routine internal processes with a carefully developed set of measurements and methodology. This is fine if the world outside is routine and standard. But it is not because customer preferences and choices are constantly evolving and changing, therefore, product and service offerings must be constantly evolving and changing too. [12]

TQM attempts to make quality happen via an analytically detached, sterile mechanical path. Frankly, emotion and soul, is often missing.[12] TQM assume that quality is an orderly, sequential, linear and predictable process. Actually

what occurs is a bureaucracy, a formal hierarchy of councils and committees, a plethora of meeting and techniques that must be adhered to, and a steadily growing staff that does little but monitor it all. [5]

When TQM fails because of lack of constancy of purpose, the senior executives usually display one or all of the following traits: 1) Overdelegation of TQM responsibility, 2) Great initial enthusiasm quickly followed by impatience, 3) Unwillingness to change their own behavior, and 4) Lack of personal participation in the TQM effort. [3] TQM frequently delegates quality experts rather than real people. The problem with quality departments, quality directors, quality councils, and the like is that they slowly become isolated from the realities of company strategy and from day-to-day operations while simultaneously taking on the brunt of responsibility for the destiny of quality. [12]

TQM may focus too much on just the idea of minimum standards. Yet actually quality means offering your customers products, services and personal experiences with your company that they will find easy, useful, intriguing and even fun. In customers' definitions of quality, zero-defects is merely one small part of that package, and it's a given.[13]

What mainly happens in companies is the use of TQM in the wrong way. Actually the concept of the TQM is good but the failure of implementation is misunderstood in using TQM. [7] They forget the cross-disciplinary, cross-departmental efforts with customer and supplier involvement, interdisciplinary collaboration and empowered, self-contained cross-functional team.[5] TQM generally divorces itself from the compensation issue which made an audio of TQM and a video of pay that do not match up to each other. Moreover, many companies should not use TQM in order to find the way of satisfying the customer need for the sole purpose of selling products and making profits.[16]

*Attributes of Successful TQM Efforts*

Organization of all types and sizes, from $5 billion international organizations to $5 million local organizations are implementing the TQM process. Many firms are ecstatic with the results of their TQM processes, reporting significant improvements in customer satisfaction, employee satisfaction, supplier relationships, and return on investment. [1]

Senior management commitment is one of the main factors in TQM implementation. For example, commitment problem arises when senior management views TQM as an event, not a process. [17] Merely including some quality training in this year's budget or naming a quality director and providing some training programs are insufficient signs of commitment . Senior management must actively champion the TQM process and participate in the process contiguously to communicate commitment to employees. [10]

Successful TQM processes demand a flattening of the hierarchical structure, the liberation of line management from control, the liberation of front line people from line management, and the breakdown of the functional foxhole. Deming has said, and most have ignored, the essence is a belief in the capability of the front-line employee meaning empowerment. [16]

Recognizing that TQM is not a quick fix for problems that exist in organizations will help ensure its success. TQM requires time to identify current conditions and

patience to achieve results. Deming suggests that TQM is intended to reduce the risk of the critical problem and to stress that inspection at the end of the process is too late and too costly. His approach is a shift from detection to prevention. [5]

Another important factor in TQM successes is a implementation plan. Many organizations go directly from senior management awareness and education to implementation, omitting planning altogether. What is meant by planning is considering every component in the organization such as employees, customers and suppliers. If the plan does not include all these components then, TQM may be unsuccessful. [15] One of the key elements of a effective plan is proper training. In organizations that have failed in TQM implementation, they indicate there was not enough training for their managers and employees. Skipping time for training in the TQM implementation gives little chance of success. Training for managers and non managers must be highly interactive and experiential. Presentations on the TQM philosophy alone are not enough. Every one in the organization should participate in workshops where they can determine how they integrate the TQM process into their daily activities. [14]

*Paper Objective*

Our objective is to use the results from the literature to develop a case study on the characteristics of a successful TQM process. We will develop a case study on the Key Success Factors (KSF) of TQM by collecting information through interviews of two local companies. We will compile the results of the company interviews and use GAP Analysis to identify and discuss the areas of biggest discrepancy , or greatest opportunity. We will compare both companies to each other and offer any generalizations if found. Furthermore, a recommendation will be given how to improve the TQM efforts at each company and any future work necessary to continue this study.

***Hypothesis***

1. There exists certain Key Success Factors (KSF) that must be addressed for a TQM implementation program to be successful within an organizational system.
2. We propose a hierarchical model which ranks the relative importance of the KSF in relation to how successful a TQM implementation program is within an organizational system

## III. RESEARCH METHODS

There are several methods we will use to develop and rank the KSF's.

### *A. Affinity Diagram (Gathering & grouping ideas)*

Why do we use it?

To allow a team to creatively generate a large number of ideas/issues, followed by organizing and summarizing them into natural groupings to understand the essence of a problem and any breakthrough solutions.

What does it do?

1. Encourages creativity by everyone on the team.
2. Breaks down communication barriers.
3. Encourages non-traditional connections among ideas and issues.
4. Allows breakthroughs to emerge naturally.
5. Encourages "ownership" of results that emerge because the team creates both the detailed input and general results.
6. Overcomes "team paralysis," which is brought on by an overwhelming array of options and lack of consensus.

From the literature search, our team identified ,any ideas that are necessary for TQM success and failure. The ideas were grouped into the natural categories and we defined each category, of one through six, as the Key Success Factors.

I. Planning/Methods
   - A. Availability of Facilitator/Team leader
   - B. Training and experienced understanding of TQM leaders (key persons)
   - C. Existence of measurements
   - D. Success of pilot program
   - E. TQM implementation plan
   - F. Allowing enough time for TQM to show improvement
   - G. Training (sufficient and relevant/adequate)
   - H. Using the right tools
   - I. Providing resources/time (By middle management)
   - J. Balance of the application of TQM to people, processes and technology

II. Relevance of TQM activity
   - A. Improvement of key business processes
   - B. Key leverage points
   - C. Ability to analyze key business processes

III. Cultural Values
   - A. Have TQM believers
   - B. Cultural values = TQM principles
   - C. Using TQM as marketing tools, quick fix, profit improvement (short term)
   - D. Integration of TQM vision and values into organization

IV. Management Philosophy
   - A. Management commitment
   - B. Long term vision of TQM as a philosophy
   - C. Adequate leadership
   - D. Constancy of purpose
   - E. Integration of TQM into mission of company

V. Motivation
   - A. Performance management appraisal
   - B. Customer satisfaction feedback
   - C. Recognition and awards

VI. Empowerment and Trust
   - A. Empowerment participative management
   - B. Clear and good communication between management and shop floor
   - C. walk the talk (Management behavior)
   - D. Management wins employee confidence to get employee commitment

Figure1: Affinity Diagram List

Therefore, hypothesis one is substantiated by the following six (6) Key Success Factors:

1. Planning/Methods
2. Relevance of Projects
3. Cultural Values

4. Management Philosophy
5. Motivation
6. Empowerment/Trust

***B. Interrelationship Diagram (Id)*** *(Looking for drivers & driven factors)*

Why do we use it?

To allow a team to systematically identify, analyze, and classify the cause and effect relationships that exist among all critical issues so that key drivers or outcomes can become the heart of a effective solution.

What does it do?

1. Encourages team members to think in multiple directions rather than linearly.
2. Explores the cause and effect relationships among all the issues, including the most controversial.
3. Allows the key issues to emerge naturally rather than allowing the issues to be forced by a dominant or powerful team member.
4. Systematically surfaces the basic assumptions and reasons for disagreements among team members.
5. Allows a team to identify root cause(s) even when credible data does not exist.

After we organized the KSF, we used a Interrelationship Diagram (ID) to identify, analyze, and classify the cause and effect relationships. The relationship were established by using the graphical exercise. Arrows *out* indicate the KSF as a driving factor and arrows *in* indicate the KSF as a driven factor.

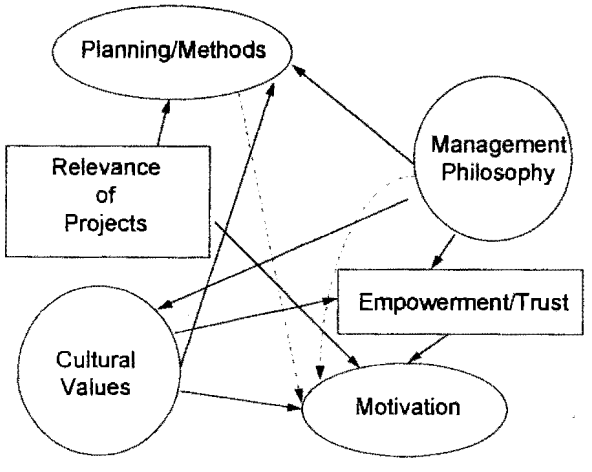


Figure 2: Interrelationship Diagram

From the chart, the impact of relationships are compiled into a spreadsheet format to assign numerical values. Solid lines are given a value of one and dashed lines are given a value of 0.5.

| Key Success Factors | Driver | Driven |
|---|---|---|
| Planning / Methods | 0.5 | 3.0 |
| Relevance of Projects | 2.0 | 1.0 |
| Cultural Values | 4.0 | 1.0 |
| Management Philosophy | 3.5 | 0.0 |
| Motivation | 0.0 | 4.0 |
| Empowerment / Trust | 1.0 | 2.0 |

Figure 3: Driver/Driven Chart

### C. *Hierarchy Model*

The results of the interrelationships are used to establish hypothesis two. The model takes the weighted values in the spreadsheet and displays them graphically in order of importance. The model states that both management philosophy and cultural values are parallel in importance and also are primary drivers. On the left side, Management Philosophy drives Relevance of Projects which drives Planning/Methods. On the right side, Cultural Values drives Empowerment/Trust which drives Motivation.

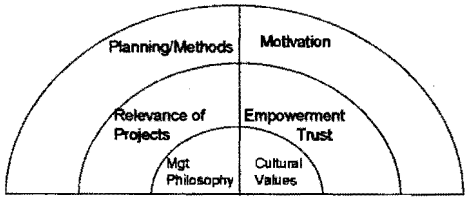


Figure 4: Hierarchy Model of TQM Key Success Factors

From here we move into the data collection phase of the project. Interviews were carried out to assess the nature and status of TQM within two local companies. The information will be used to analyze the companies on the basis of how well they perform in relation to the KSF and the Hierarchy model.

### D. *Data Collection Criteria*

The following criteria were used in the data collection:

1. Interviewees are involved with TQM implementation on a management level.
2. Interviewees have management decisions making capabilities relating to TQM.

## *E. Data Collection Methods*

Company executives were interviewed by a team member. The interviews were taped with their permission and transcribed at a later date. Interview methods included introducing yourself, explaining the purpose of the interview, setting a time limit of 30 to 60 minutes, explaining what will happen to the information and assuring the confidentially of the responses, and offering a executive summary of our findings. Also, the interviewees were given the questionnaire prior to the interview session and asked to study the questions. See Appendix A for a copy of the interview questions.

The interview responses have been paraphrased and grouped into the KSF categories. The translation process was carefully prepared not to lose the valuable perceptions and opinions of the interviewees. Our team evaluated the responses for which category the information best fit into. Any confidential information was not printed here as to protect the interest of all parties involved.

## *F. Company "A" Interview*

### HISTORY

Company "A" is a small machinery manufacture located in Vancouver, WA. The company has been in operation for approximately 60 years, growing from a two man machine shop to a worldwide company of over 400 employees. The company is considered a world leader in its industry, which spans a customer base of 85 countries. The business operates essentially in functional divisions that range from sales, marketing, service, design engineering, manufacturing and administrative support.

About three years ago, outside executive management was brought in to replace the family-operated business approach. The Total Quality movement in this company began in this company about that time. TQM began with hiring a consulting firm to train approximately 100 employees and to organize 10 teams. The teams were chartered to use TQM principles and solve business problems. As of now, three teams are still active and participating in traditional TQM activities. A number of other improvement teams have been formed parallel to this original activity. i.e. Set-up Reduction, Mold Cells, and Mapics to name a few. The current state of TQM is a shift away from the traditional TQM team approach to a more versatile, cross functional task force type scenario, and to permeate the TQM principles into the every day functions.

The following is the results of the interviews, paraphrased and grouped in the Key Success Factor categories:

### MANAGEMENT PHILOSOPHY

Company "A" consider TQM as a process, not a project. It emphasizes TQM is total quality management, using total as a measure of scope thereby applying it to all areas and issues within a company. The concept of the customer-supplier relationship is central to management's view on TQM. While the company might have individual projects, the overall customer satisfaction is a process. The idea

that every person in the company is involved in a personal transaction or interaction and Total Quality means that every interaction results in a high quality interaction or transaction. Everyone in the organization is a part of the process, from sales to engineering to service who installing the equipment. A slogan that the company uses to describe this type of customer satisfaction is "customer delight". "At the end of the day, is the customer delighted with the transaction?". In addition to "customer delight", TQM is identifying critical external customers, those essential to meeting our strategic goals and responding to their needs. The measure of this customer response process is tracking the progress of customer satisfaction in terms of not only quality but also the time in which it takes to produce the product, the end value of the product and as a results the financial success of the company. TQM improves the customer satisfaction level, causing the customer to look upon us as their preferred supplier.

There are two responsibilities of management toward TQM 1) focusing on developing the individual people behaviors, thoughts and involvement towards a TQM mindset 2) developing the processes used within the company to build a high quality relationship with the customer. This involves "assessing where are we today, where do we want to end up, or where do want to be at some point down the road, how to get from A to B and leading the organization down the path". The long term vision is a "commitment to process improvement thereby customer satisfaction as perceived by the customer because that's the only thing that counts".

## CULTURAL VALUES

Company "A" believes the culture that management is trying to promote is summed up in the company mission statement. "Company A is committed to global leadership in the concrete products and materials handling industries, we will lead the markets by providing the market with innovative products of the highest quality". However, a barrier to any significant philosophical changes is the historically legacy of the company. Past history is personified by a benevolent dictatorship with a small group making the majority of the decisions, thus little Empowerment. A prevailing behavior pattern developed to "do what you can to curry favor and avoid being blamed for failure". The company union was disbanded in 1982, however, the heritage of business structure still exists. Wholesale cultural change from a attitude of "I come in and run my mill all day long" to employee Empowerment is considered a long term project. Management cannot just go out to the shop and tell the employee he is empower, now go at it. There must be process of moving people down a path to build respect, trust, knowledge. The process that is most effective of permeating TQM through the business is to involve the people who's jobs are being affected in a way that is very visible. The key is get to the people who are doing the work everyday over a long period of time, work with them, develop them to carry out the TQM philosophical in their day to day jobs. Any time the change process is implemented in a company that has the culture that this company has, its going to be very tough for people who have been in the company for many years to adjust to the changes. The desired change process to the methods of Kaizan - small incremental improvements are necessary rather than large projects that carrying with them a lot of change.

## EMPOWERMENT AND TRUST

Management's believes in trust and respect regardless of position and responsibility. the questions raised are "does management have a level of trust and respect to empower and does everyone in the company have the trust that true empowered decisions won't get crucified after the fact". This requires mutual respect between all parties within the company. The issue of full Empowerment was challenged with the results of a recently completed employee survey. Only 16% of employees responded that the company meets the need of its external customers and similarity low rankings were found in trust of the management of the company. This snapshot in time says we are not doing very well. However, high rankings were found in knowing how your job affects customer satisfaction and how well do you do your job. management views these contradicting responses is an example of separation, a lack of understanding and Empowerment. This is the main problem with the classical TQM approach, it allows this separation. If everyone's goal (Perfect scenario) in all tasks during the day was to delight the customer, regardless of systems, processes and procedures, then the mindset would be different. Management doesn't see this happening yet. They believe that if we consider every interaction as important, we can't have management directing every transaction. Their vision is fully empowered employees delighting the customers. If they could be in this position, this would be Total Quality.

In some cases, management assumes persons have the training necessary to implement changes and thus empowers them to do so. But are these assumptions valid? Management must know if the individuals who have a TQM idea possess the necessary training to accomplish the task. One proposed method to determine this is two-way dialogue instead of directives to discuss training and responsibilities required. They feel communication is a area of Empowerment and that there is a need to communicate the importance of company-wide involvement in the total quality process. Understanding of this importance that their work counts was given the analogy like going to the poles and voting - your vote counts. Anything that people do in the organization either good or bad is affecting the TQM success or failure. Management believes that in the implementation phase of specific TQM type projects, there are many good ideas that need to be implemented. It is common to say "we need to do this" yet don't empower people to implement.

## RELEVANCE OF PROJECTS

An example of management relating a TQM project to a key business process is found in the area of its Mold sales and manufacturing areas. They identified this portion of the business as crucial to the overall success of the company. The company re-engineered the business from top to bottom, implementing state-of-the-art computer tools and cellular manufacturing to name a few. It has been a successful project, making a positive impact both on customer satisfaction and on company profits.

Another example occurred back in mid 1980's, when they targeted several major customers for developing relationships with. For two years, they worked with them to determine their particular problems in as effort to produce a machine that

best met their needs. This collaboration was particularly effective in that it resulted in a contract for over 100 machines.

In the sales area, the company hired a consulting firm to train the sales force in techniques of value selling. At first, there was resistance to the idea from the salespersons themselves. They talked to sales staff, some of whom have 30 years experience and felt that this was totally unneeded. They couldn't see any other way of somebody teaching them how to sell. But it was a very different picture after a week of training and workshops, sales force left pumped up.

## MOTIVATION

The primary rewards are in terms of visibility to the organization. Management assesses who is helping and who is being a roadblock. Annual merit increases are tied to TQM type activities, yet not based directly on the success or failure of projects. There never has been a true pay for performance process. Due to the union heritage in this company, pay is a historical legacy which follows a derivative of union pay scale, yet has many arbitrary job classification with considerable variation in individual pay scales. Basically, who you knew not what you knew was the prevailing attitude. Within the Mold cellular manufacturing project, management set out to change pay scales procedures. When posting the cell jobs descriptions, we communicated the requirements of Empowerment, much broader duties, participation in scheduling and the monetary incentive programs based team performance on quality, schedule and cost performance. Thus a significant portion of cell operators pay is now linked to performance.

In addition, annuals monetary rewards or bonuses are awarded based on individual performances. Management qualifies a person for these awards based in part on the persons involvement in total quality projects or how well a person possesses the TQM attributes.

## PLANNING AND METHODS

Original teams were not given specific projects, yet were organized into company process areas, i.e. Engineering TQM, Administrative, Machine Shop TQM, etc. The TQM plan was to start off small, get them off there feet, start working together, develop trust and respect, they were not directed to go off and do some major project. At that time, management considered this to be the most effective approach due to the culture within the company. Currently, there is mixed opinions among management as to actually whether this was most effective. Many of the original teams are now defunct or have spawned other specific projects outside the traditional TQM framework. However, there is a consensus that the company has broken down some culture barriers and there has been progress and successes in some areas. There is now a sense of we do have the power to get things done. One of the keys to effective TQM methodology 'time to pull out of the day to day fray and go focus on what are we going to change, to do differently to improve ourselves". One problem with the traditional TQM team activity is a failure to envision how the team can actually implement a idea. The TQM training was very effective in teaching people meeting skills, brainstorming, team dynamics, yet failed to delineate how to

integrate the idea transfer process. Currently there are two ways to convince someone that this is a important process: 1) convince a manager to champion the cause 2) sell the idea to the organization and get buy-in support, which usually takes a lot of time and support.

Implementation planning for the Mold cell manufacturing process was a perfect embodiment of a TQM activity. The project was a result of quantified market studies indicating what type of restructuring that was needed. The methodology involves continuing with daily and weekly meetings to assess where we are in terms of our original goals. Driving this cultural change has taken a lot of planning and funds along with a high degree of communication.

### *G. Company "B" Interview*

#### HISTORY

Company B is a medium sized electronics manufacturer, with several sites in the US, and headquarters and a major manufacturing plant on the east coast.

The history of B at the local site goes back 20 years, when a business was founded by an engineer, and built up from a garage operation to about 55 employees 5 years ago. The family-run business grew conservatively, based on never risking the existence of the company or the employees by aggressive growth. As in most small businesses, decisions needed to be made by all employees on the manufacturing line. Supervisory jobs arrived later in the history of the family business. Quarterly profit-sharing provided employees direct feedback how well everyone had achieved the objectives of the company: to build quality products, to ship them when they were needed by a customer and to find better ways to do things whenever possible. As the market took off, customer demand rose, and a more aggressive growth strategy became unavoidable.

Five years ago, company B bought out it's smaller supplier, and replaced the outgoing former president and owner by a Director of Operations, also an engineer. All other employee structures remained intact. At the same time, a then 1 year old corporate re-started TQM program was introduced at this newest "child" of company B.

For company B in general, a previous attempt in 1988 that had died off, had been revived. It had been conceived at the level of the North American headquarters of the multinational (French) parent company. The task of bringing TQM to the divisions was carried out by a corporate champion and two other individuals, starting with a two-day meeting for managers. One year later, the corporate champions went on to do other things, so the task of carry-through moved to the divisions themselves.

In 1992, headquarters' management focus shifted from TQM to ISO9000 certification to be able to continue to sell product to Europe, an effort that culminated in the certification of local company B as the last site. Subsequently, corporate headquarters decided to implement a six-sigma program, as "strongly suggested" by a major customer of B.

TQM has several different meanings to their management at company B, with respective visions : The pervasive consensus is that TQM as a management philosophy establishes the ground rules for a business culture, putting the customer in center of all activity, doing the best possible job, using statistical tools and quality methods. This is a mindset that exists in many companies that have never heard of TQM, because it builds on the natural process, that any motivated individual will track their output and seek to improve it.

While TQM provides a framework for a culture to develop a quality mindset, it does not provide specific guidelines about how to run a business day-by-day. Managers are called upon to give their employees a definite road map. Examples may be, how to deal with suppliers, or how to solve interdepartmental conflict.

Differences exist of manager's own views when it comes to the role of employees in TQM: do you train them to take care of the customer in whatever they are doing, and treat them with respect and honesty, or do you empower them, let them use their training to make the best decisions, use teams, and give up position power awarded by the established hierarchical management structure? In the words of one individual, " you can't replace 'trusting your employees' with a TQM program".

Interestingly, when "TQM" was introduced to employees, the format ( formal training, binders, banners and so on) was foreign to them, as they had been used to a small company environment. New managers were hired in, as previous "homegrown" supervisors left the company to find employment in smaller scale businesses. But the new managers did not come from an electronics manufacturing background, and had not heard of TQM. New employees that were brought in rapidly after the buyout took easiest to TQM, and became involved in the first "Quality Improvement Team". As TQM started to take hold in the ranks of the company in spite of little support from the east coast headquarters, the focus shifted.

The local site of company B needed to achieve ISO9000 certification, and in such rapid order, bringing in a quality manager from another, already certified site, to make the goal more achievable. The following avalanche of work instructions, formalization of organizational structures, created a kind of schizophrenia: while on one hand employees should be empowered, on the other hand, they needed to follow written rules stiffly. If something was not on paper ( such as a better process of doing something ), it was not permissible to use. Fear started to set in, as auditors came and checked for "compliance".

In the eyes of most management, however, the role of the ISO9000 certification process, was an adjunct program to TQM as the underlying philosophy. While some see it as a step towards defining the details within the TQM framework, making measurement easier through established guidelines and procedures, others see it as a separate program.

Both corporate management and local management feel they are committed to "TQM", but closer inspection reveals a large spectrum of interpretations about what TQM means, and the depth of understanding of the underlying principles and their impact if fully harnessed. If local managers don't understand TQM very

well, and are more committed to the slogans than to the essence, the reasons may be a lack of formal training, a lack of prior experience, and thin corporate support. The absence of a corporate champion who believes in the power and long-term success of TQM in company B , as well as little support to secure the needed resources, time and training, send the unmistakable message that corporate headquarters does not care very much about TQM, and does not expect great returns from the implementation. . "The company spent a lot of money to bring a consultant in, but when all the fanfares were over, many felt that it was back to business as usual, as nobody had the resources to do anything."

## RELEVANCE OF PROJECTS

The selected projects were two product related work-flow projects, the redesign of two processes (change order, customer service returns), and the design of a vendor certification process. All were facilitated by an outside consultant, and served more the demonstration of the principles than impact on the bottom line.

A defect-reduction project started by the local management , faltered as the team lacked a charter, clear goals, and a facilitator. The absence of a champion bogged down the team, and communication with management was largely absent. The case was discussed within the management staff, and the errors identified. The plan is to develop and train local facilitators during the coming year.

## PLANNING AND METHODS

The original TQM implementation plan, established 10 years ago by the multinational corporate headquarters was top-down, and ill-conceived. A second start involved senior level managers, but the average worker was not given an opportunity to voice an opinion about the concepts.

Company B is now in the third major step of quality-focused changes, starting with TQM, ISO9000, and now six sigma. Local management knows there is a plan for implementation of the six sigma program ( the continuation of TQM ), but has not been part of the construction of that plan. An outside consultant, hired by headquarters, usually makes arrangements several weeks ahead to plan out a one-week segment. An overall timeline, if it exists, has not been seen by local managers.

"TQM has opened doors": It is management's belief that TQM, and the following ISO9000 certification filling the gaps, has enabled the company to grow 200% in the last five years, a feat that may have otherwise been unachievable. This view is not shared by those who believe the already existing quality culture should have been strengthened, and employees involved in developing the plan to formally adopt TQM principles.

The lack of numeric goals ( such as a reduction of the cycle time by half) is bothersome to some managers. To quote one interviewee, " even if we saved money, we didn't know how much we saved". Efforts are being made to establish a scorecard for cost of quality, to be able to discern the general trend. Some

believe that "TQM makes it easier to design and produce good products for a good price." But finally, as the company's ( and any businesses' ) mission is to make money, if any activity does not at some point positively affect the bottom line, it is the wrong thing to do.

## CULTURAL VALUES

One of the reasons why the local site of B seems more dedicated than other sites to hanging on to the TQM idea, attempting to plan annual training for new employees, and refreshers for others, can be found in the company history. Current management agrees that the original family business applied TQM principles without calling them that. The commitment to quality permeated the business, and every employee saw a share of the success coming to them at the end of the quarter. Since the buy-out, profit-sharing has been discontinued. Still, the original owner's personal commitment to quality, and sharing of pride in a job well done, permeates some areas of the company.

While line workers change, culture stays, because culture starts with management. And here may be the weakness: if management does not exhibit proper culture, such as respecting the customer, workers won't do it either. And it appears that the "new" management does not have the same interpretation of how to view employees, how to view the customer, and how to add value. This in itself sends mixed messages to employees, which are more powerful as a "central communication path" for TQM as the all-permeating philosophy is absent.

In general, the company does put much emphasis on training, starting with a formerly 2-day, now 1-day TQM seminar, for every employee. Headquarters on the East coast, and the other national plants have dropped TQM largely out of their training plan, but efforts continue at the local plant where the company TQM trainer resides. Over the years, enthusiasm has waned, and principal training for new employees has not been offered in a year.

Outside of TQM, starting last year, 60 of 235 workers received 2400 hours of training, in problem solving, SPC tools, process mapping and redesign ( all as part of the newly adopted six sigma program), in addition to many hours of skills training dependent on the job. Corporate headquarters targets 2 % of sales to be spent on training, and this local plant exceeds that goal. While the average worker receives a lot of training, half of the managers went through the whole training series, and the other half through the first segment only. The director did not attend any of the training sessions.

## EMPOWERMENT AND TRUST

Communication from management to employees and vice-versa lacks official channels, and depends largely on the skill, training and personal style of each functional manager. Accordingly, much communication serves the purpose of getting the job done, and not much room is left for critical discussions or input from line workers. Employees feel that management is not listening very well, for example in meetings, where they tend to monopolize the time.

The personal framework of each manager strongly influences their perspective on empowerment. While some see it as the center of TQM, as the expression of trust towards employees that have received the proper training to be able to make decisions, others view teams as a threat to their personal ability to be responsible for a function. The organization is hierarchical in the traditional sense, with functional departments. Teams (in the true sense) do not exist, but groups of
equal hierarchical levels meet frequently to solve problems and set new goals and priorities.

For several years, the "QIT" ( Quality Improvement Team ) had been considered as the central organ for (hourly) employees to make their needs and ideas known, along with a system of "CARs" ( Corrective Action Request ). The Director of Operations puts much emphasis on addressing these requests in staff meetings, but communication of the results to employees is not very effective. The turn-over in the QIT has now lead to a situation whereby only half of the members have received the formal TQM training.

#### EMPLOYEE MOTIVATION

The company does not have an official employee recognition system. As one individual put it, " the only reward we have is to keep our job." Rewards, recognition and the type and amount of positive feedback to employees depend on the approach individual department managers take. Company-wide events that allow for positive feedback on a broader scale, such as quality month, are on the rise. No explicit link is made with TQM, however.

Salaried employees are given an annual evaluation of their role in TQM as part of their performance appraisal by their manager( competent, role model, questionable). Hourly employees are evaluated individually with respect to their contribution to quality values, but successful participation in a team is not looked at specifically.

It has been suggested that employees play an active role in the performance appraisal of their superior, by providing feedback that will allow to gauge the effectiveness of the manager's activities and behaviors with respect to achieving company objectives.

## IV. DATA ANALYSIS AND RESULTS

### *A. Data Analysis Methods*

The interview data has been analyzed by the team members and the results come from a group consensus. The results are a direct interpretation of the interview responses and any personal biases were closely monitored. The team feels that the results are reasonably accurate in that they only reflect the views and opinions of the managers questioned. The individuals of the team do not assume any responsibility for the companies use or outcome of this study.

The interview responses underwent a qualitative analysis by comparing the actual interview responses with the ideal KSF's characteristics as identified in the literature search. This technique is formally known as GAP Analysis and is commonly used to show separation between actual and ideal scenarios. We use GAP Analysis to identify the factors that support or work against the solution of an issue or problem which compare between the hypothesis and the survey events and then can find the actual status of the company. GAP Analysis does several tasks:

1. Enables a team to focus on the content of the problem, not on the history of the problem or differing personal interests of team members.
2. Creates easy to understand results that come from a simple, efficient process that can be applied to any key performance areas.
3. Provides a common language for discussing process performance.
4. Helps to indicate where changes need to be made.

## *B. Company "A"*

*Management Philosophy*

Executives at company A both agree that TQM must be a necessary part of the future business activity in order for them to be successful. While it appears that management has an understanding of TQM, it is not clear of the consistent level of commitment among managers. They both believe TQM is a process, not a project and that it is management's job to lead the organization down the process path. However, it is not evident that there is a true champion of TQM, someone with a persuasive intensity necessary to bring about sweeping cultural changes. While TQM has been identified as an important ingredient of day-to-day activity, a clear vision of TQM is not apparent. The new leadership has a new positive outlook which the previous administration did not possess in regards to TQM. Total Quality Management has not been embodied in the mission statement, in spite of perceptions by the company leadership.

*Relevance of Projects*

The company has applied TQM elements in several key business processes, such as mold manufacturing and setup reduction. However, management does not appear to have criteria or a method to analyze what key business processes need improvements. Employees were working on a project and suggested an improvement in the mold manufacturing area. Some leverage points have been addressed, such as sales force training. Yet the selection of the areas appears disjointed, not part of an overall cohesive movement of the company. A formal suggestion program to involve employees in identification of key areas is not established.

*Planning and Methods*

Management understands that the key to effective planning and methods lies providing the resources and time for individuals to pull away from there day to day jobs and focus on continuous improvement projects. Yet it is not evident

what mechanisms are in place that allow individuals to achieve this goal. For example, it is unclear how much support TQM receives from middle management. It appears that there are no tools to measure the success of TQM projects and audit the improvement process.

The company is willing to establish ad-hoc teams and task forces on a as-needed basis. The difficulty is in transferring an idea from a team to the organization. Clearly, the authority of the team and the team's leader is not sufficient to generate necessary support to undertake projects or implement plans.

*Motivation*

Both executives evaluate employees for merit raises and bonuses based partially on ones participation in TQM activities. Other than the Mold cells project, there exists no formal or informal incentive reward program objectively tied to TQM activities. There appears to be no feedback appraisal process that evaluates the team as a whole. Also, there may lack a program that fosters motivation and excitement for TQM. There is customer external feedback relating to product quality and processes, but it is not evidence that one exists for internal feedback.

*Empowerment and Trust*

They acknowledge that empowerment and trust within an organization is important, and that participative instead of a directive management style is necessary to be successful. However, it is not clear how management intends to lead the organization down a path to TQM acceptance within the organization. Base on the survey result, there appear to be some barrier such as lack of trust, which prevents a high level of empowerment. Currently, there does not exist a change management process for making this transition, other than in the Mold manufacturing area.

*Cultural Values.*

Management feels that the cultural mindset and historical union legacy is a barrier to TQM implementation. While management has understanding of the necessity of TQM as part of the culture, they lack a true believer to drive that the cultural change. There is the weakness between the equality of cultural values and TQM principles in the company. There is agreement that customer satisfaction is a key element and that customer's are both internal and external on nature. However, customer satisfaction is only one of many TQM elements and management may have too narrow a viewpoint on what constitutes TQM as an company-wide embodiment. Management must be careful not to use TQM slogans as a marketing tool unless it actually reflects the attitudes of the organization.

*Numbers for gap analysis* ( 1=poor, 2= below average, 3=average, 4= above average, 5= excellent)

Planning and Methods: 2

Project Relevance: 3

Cultural Values: 1

Management Philosophy: 2

Motivation: 2

Empowerment/Trust: 2

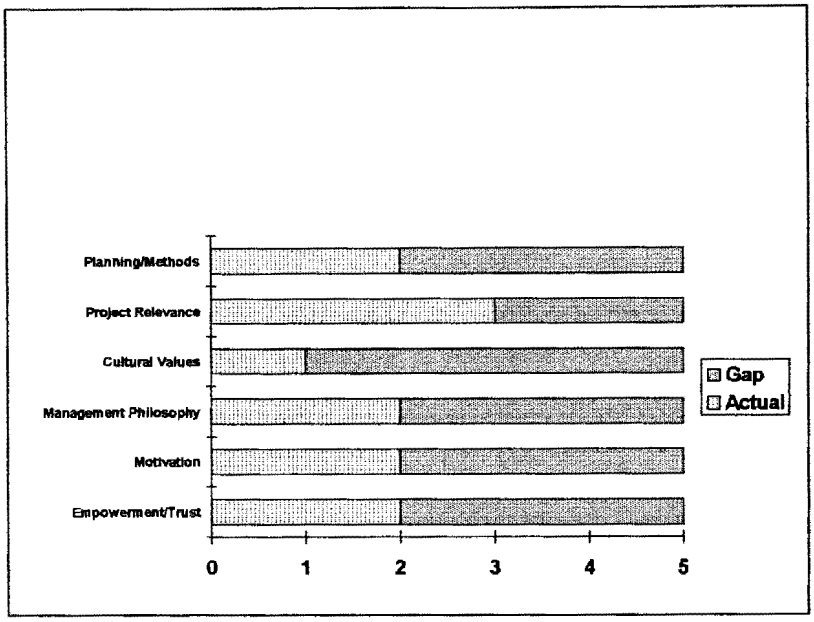


Figure 5: Gap Analysis: Company "A"

The Gap Analysis shows improvement is needed in all categories, but especially in the area of cultural values. They perform the best in project relevance.

## C. *Company "B"*

*Management Philosophy*

Managers of company B largely agree that the TQM philosophy is common sense and a must-have in the future. However, the way in which TQM was introduced into the company was more akin to a "program", with slogans, banners and pins. Management has a misunderstanding of TQM's purpose for continuing improvement, and as a result, there is a lack of long-term management commitment. Senior management at the corporate level has not stepped into an active role at leading by TQM example. Therefore, the viability of TQM depends largely on how well the local management is committed and unified in their vision of TQM. The addition of ISO9000, and the six sigma program have taken away the necessary emphasis. The quality manager is responsible for ISO9000 and six sigma coordination, but TQM training stands alone within the hands of the company TQM trainer, with no formal power, and greatly dampened enthusiasm. Senior management has failed to integrate the three "quality programs" into one body, one vision, and the company mission.

*Relevance of Projects*

The selected projects were largely demonstration projects, without relevance to the bottom line. There have been overburdening constraints of project selection, without involvement of employees. The business processes and their performance measures are not well enough understood to identify key leverage points.

*Planning and Methods*

The TQM implementation plan was a directive from corporate management, without participation by either local management or the employees. The details were not communicated. This approach repeated itself for ISO9000 and six sigma. Training in TQM and methods was sufficient, but not entirely relevant for application to day-to-day activities. SPC tools and process charting are commonly used on the shop-floor, but an overall measurement of quality goals is still being developed.

*Motivation*

Individual annual employee performance evaluations are tied neither to application of TQM principles, nor participation in team projects. The feedback system is highly dependent on individual managers, and does not include activities that cross departmental lines. There is no formal employee recognition and award system.

*Empowerment and Trust*

Communication in this company is largely top-down, or task oriented, with little opportunity for employee involvement. An exception is a permanent quality improvement team with responsibility to collect and follow employee corrective action requests. The company has traditional hierarchical organizational structure, with mostly directional management style. Top and middle management appear to view teams as possible threat to power, stemming also from a lack of training of the managers.

*Cultural Values*

There is a lack of true believers of TQM in the company at this point, as the trainer has waning enthusiasm to continue to drive the implementation. Management is trying to instill the same cultural values in employees that existed when the company was still small, and a family business. "Customer Satisfaction" as a slogan does not have the same impact, as profit sharing, on selling employees on the importance of their contribution to company success. The growing pains of the company has overshadowed the implementation of TQM as a whole. As a result, the cultural progression of TQM has fallen behind.

This is one of the reasons why the general approach and content of the TQM training needs to be revisited at company B, but there are other issues. The challenge has been to sustain growth, and integrate and reach an increasingly diverse work force. Six sigma has exposed weaknesses in the analytical skills area, and managers are learning that their general communication skills, and organizational skills, may need to be updated as well. TQM in this company can only be viable if a true champion is given full support and visibility, and all management behavior is aligned with the taught principles. This has to start with a conscientious acknowledgment of the value of employees ideas and solutions to problems. Otherwise, TQM will merely have been a "program" that had its heyday, and has now been pushed over by more modern ideas.

*Numbers for gap analysis* ( 1=poor, 2= below average, 3=average, 4= above average, 5= excellent)

Planning and Methods: 2

Project Relevance: 2

Cultural Values: 2

Management Philosophy: 2

Motivation: 1

Empowerment/Trust: 1

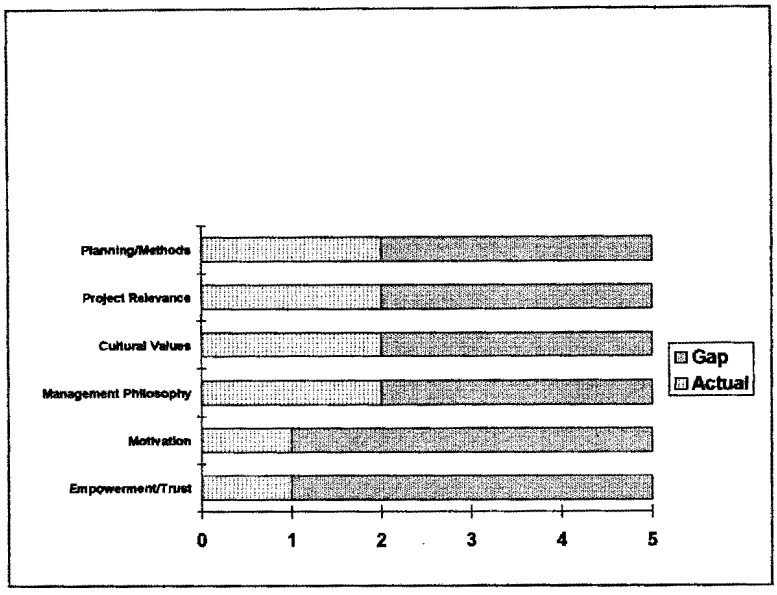


Figure 6: Gap Analysis: Company "B"

The Gap Analysis shows improvement is needed in all categories, especially in The areas of motivation and empowerment and trust.

## V. DISCUSSION

### *A. Company "A" and "B" Comparisons and Recommendations*

Companies A and B received identical ratings in the key success factors of planning and methods, and management philosophy, but exhibit entirely different approaches. The respective strengths and weaknesses that are present in each cases are:

Company A does not have a TQM implementation plan, except that a number of team projects using TQM methods improve the rating from what would have been lower. Company B has a plan, but is hampered by the directive style from corporate headquarters that did not involve any local management or employees. (A: 2, B: 2 ).

Company B's managers have TQM philosophies that are disjointed, leading to a lack of overall focus and commitment. Company A has a very limited understanding of TQM as a philosophy, and no vision of TQM in the company's future is apparent..( A: 2, B: 2 ).

The companies differed in the rating of the remaining four success factors.

Company A has in place employee performance evaluations and an award system that provide for positive feedback for employees. However, the system is limited in scope, and is not tied to direct involvement in TQM projects. Company B has discontinued a profit sharing plan, a strong de-motivator for employees (A: 2, B: 1).

Company A has conducted project activity in two key business areas, while company B identified projects for demonstration purposes, little related to key processes. ( A: 3, B: 2 )

Company A's management believes in the importance of employee empowerment to the success of TQM, but fails to translate this into reality. Company B's management uses largely directive management styles, and managers and employees are isolated from each other. ( A: 2, B: 1 ).

Company B has a good environment for TQM, but frequent changes in quality programs and rapid growth have distracted it from building a strong TQM culture. Company A struggles with its union environment and the barriers to a high performance and shared responsibility which limit TQM cultural pervasiveness in the company ( B : 2, A: 1).

Applying our model of the relationship of TQM longevity and success in an organization, the two companies have different characteristics. While company A is outwardly active in TQM projects, they are not pre-planned and aligned with an overall TQM vision by management. The effort is scattered, a shell with a weak core.

Company B's management has TQM in the heart, but does not communicate its philosophy by example through all the levels of the company. It is hampered by the corporate directive that overshadows much good intention.

Overall, neither company A nor company B appear to have the essential ingredients to assure TQM success long-term. However, with a strong effort of company A to drive a strong cultural change away from the union mentality, possibly with the help of a TQM champion, the organization will be able advance the implementation of TQM.

The recommendation for company "A" are as follows:

1. The company should designate a TQM champion who is responsible for driving the cultural change and administering the TQM movement.
2. The company should increase its scope of involvement in TQM elements as mentioned in the introduction of this paper.
3. The company should develop a incentive and reward program that is tied to TQM type activities involvement and suggestion inputs.
4. The company should develop a performance feedback and evaluation system for TQM type projects.
5. The company should develop a methodology for analyzing key business processes in relation to TQM philosophies.

Company B should focus on management training to have open communication with employees, and encourage a participative management style. It should also take a close look at its performance evaluation, and an effective reward system.

The recommendation for company "B" are as follows:

1. The company should designate a TQM champion who has sufficient leadership and decision making authority.
2. Managers would profit from management training in areas such as communication and team building, and leadership and management styles.
3. The company should develop a reward system with an emphasis on performance evaluations.
4. The company should focus TQM projects on key business processes with an emphasis on content not demonstration.
5. The company should develop a training program for managers.

### *B. Generalizations and Limitations*

One must be careful to generalize the results beyond appropriate limits. Due to the sample size chosen, it may not be valid to make broad statements regarding the applicability of the results to a wide population. Only managers were interviewed in both studied companies, and statements about the organizations were based largely on manager's perceptions and understanding. The interviewers, as company employees, can not rule out a certain bias based on their own experience. The ratings were therefore subjective, based on an average of team members' impressions. However, the results do provide some insight which may lead to further research.

## VI. CONCLUSIONS AND FUTURE WORK

1. The six identified Key Success Factors ( management philosophy, cultural values, empowerment and trust, relevance of projects, planning and methods, and motivation ) were analyzed in both case studies. These factors appear to adequately characterize a company's strengths and weaknesses in TQM implementation.

2. A model to aide in describing the interrelationship of these factors was applied to the analysis, but a clear conclusion about the forces between the elements and their impact on the element rating can not be drawn.

The model was derived from a large number of earlier studies and research, predominantly of larger companies. Many factors were consolidated to form this rather general model, the application to single cases, especially of small companies, is therefore limited. A more differentiated approach, with many more factors, may be necessary to analyze single companies (Examples could be customer focus, competition, decision making style).

Although all Key Success Factors should be present to ensure success of a TQM implementation, not all factors are equally important in individual cases. Also, the

elements do not have to be found at extreme (highest) ratings for each particular company.

Other factors of strong influence have been recognized in the course of the case study analysis, that fall into an environmental dimension, i.e. Company A has been strongly influenced by its historical union mentality, and a recent designation of largely new management and Company B could build on a strong culture of TQM in the past, but has struggled with the corporate approach to planning. The model should be expanded to reflect these driving issues. It should be verified by a much broader study that includes various industries, company sizes, and a more comprehensive survey instrument, that makes use of objective numerical methods.

In conclusion, we would like to thank the company managers for their willingness to participate in our study. It was our intention to provide a objective analysis of the companies in relation to what the literature says about TQM. While this project has enlightened the team members about the important elements of successful TQM efforts, part of our goal of this project was to provide recommendations for improvements in the companies. We hope that these findings will be accepted as constructive criticism and that the ideas presented will be incorporated at these companies to further the TQM movement.