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Total quality management: practice and outcomes in the largest US firms

Susan Albers Mohrman, Ramkrishnan V. Tenkasi,
Edward E. Lawler III and Gerald E. Ledford Jr
The University of Southern California, Los Angeles, California, USA

Total quality management (TQM) is an approach to managing organizations which emphasizes the continuous improvement of quality and customer satisfaction, entails the application of systematic tools and approaches for managing organizational processes with these ends in mind, and involves the establishment of structures such as quality improvement teams and councils for maintaining focus on these ends and enacting organizational improvement processes. (For a review of current thinking on TQM theory and practices, see Klimoski, 1994.) It includes a set of practices which initially gained popularity in postwar Japan. Partly because of their success in Japan they have been exported to the rest of the world. In the USA interest in TQM has expanded as globalization, deregulation, and increased consumer power has created increasingly competitive conditions. This article examines the pattern of use of TQM practices in the largest US firms, the results these companies feel they are getting from their application, and preliminary analyses of the relationship between TQM and financial measures.

The study

The findings reported in this article draw from a research project reported elsewhere in more complete form (Lawler *et al.,* forthcoming). They are based on analysis of a 1993 survey mailed to the companies listed in the 1992 *Fortune* 1,000 listing of the 500 largest service and 500 largest industrial companies in the USA. This was the third in a series of surveys administered by the Center for Effective Organizations at the University of Southern California (Lawler *et al.,*1992). These surveys examine the use and impact of employee-involvement oriented organizational improvement initiatives. These initiatives involve the transfer of power, information, knowledge and skills, and performance-oriented rewards downward and throughout the organization, in order to enable increased employee involvement in the success of the organization and to create conditions where the employee is an empowered stakeholder in that success. The purpose of this series of studies is to find out how broadly applied these approaches are and whether companies are deriving benefit from them.

Over the three time periods, the amount of the survey focusing on TQM has increased, reflecting the increased use of this approach. Questions focusing on quality circles were included in the first survey in 1987 (Lawler *et al.*, 1989). These

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circles were the first manifestation of what was to become total quality management. Additional TQM items were included in the 1990 survey, primarily to determine the extent to which this approach is being implemented in conjunction with high involvement practices. In this survey, it became apparent that TQM was undergoing extensive expansion, and that it was increasingly uppermost in the minds of management. Although more than half of the companies had started employee involvement prior to the initiation of TQM, 76 per cent of companies saw their employee involvement activities as part of TQM rather than the other way around (Lawler *et al.*, 1992).

The 1993 survey included a more inclusive set of items on TQM, asking not only about the use of a representative sample of TQM practices, but also about its perceived effectiveness. The response rate for the survey was 29 per cent. The survey was mailed to the CEO of the firm, but was most likely to be filled out by corporate vice presidents of human resources or other staff functions such as quality. On average, responding companies had 24,354 US-based employees. The average percentage of manufacturing based employees was 25 per cent. Forty-five per cent of the sample were service firms. Fifty-four per cent of the companies were unionized.

Constructs and measures

Three sets of variables were measured in order to examine the extent of use of various TQM practices, the perceived benefit of TQM, and the relationship of organizational characteristics to its use. Each of these will be described briefly.

Total quality management

There is no clear consensus in the literature about what TQM is or what practices are part of it. For example, Smith and Whittle (1994) argue that it is a phenomenon that has arisen in the practitioner community, and that different practitioners describe TQM and its essential components and practices differently. Others (Reeves and Bednar, 1994; Spencer, 1994) have also stressed the considerable definitional ambiguity surrounding TQM. They argue also that it has both an ideological and a methodological facet.

For purposes of our study, we started with the assumption that total quality management assumes diverse forms, but that it embodies a common espoused philosophy and draws from a set of practices for improving the performance of the organization. The key to TQM is the definition of quality as meeting customer requirements, and the belief that the organizational capability to deliver quality is enhanced by continuously improving the capacity of the work processes of the organization to deliver value to the customer. The focuses on the customer and on organizational processes are distinctive contributions of TQM to the performance improvement arena.

Many TQM practices originated in Japan, where they began with the seemingly simple notion of quality circles – groups of employees trained in the use of problem-solving and statistical process control techniques who were asked to generate improvements in their work processes. The difficulty of

transporting this approach to the USA (Lawler and Mohrman, 1985) provided evidence that its success required far more than setting up groups and training them; it required a new philosophy of management. The process and customer-oriented philosophy was described in detail in works of Deming (1986) and the mechanics of process-oriented management were developed in depth in Juran (1989).

Meanwhile, the Japanese were further elaborating these approaches to include more and more aspects of the way the firm does business. Such features as just-in-time deliveries from suppliers and a work cell organization for manufacturing were included. The work cell design resembles the self-contained teams advocated by socio-technical systems theorists (e.g. Pasmore, 1988), although self-management aspects are not the primary focus as they often are in STS writing. Although originally used mainly in manufacturing settings, TQM has also been applied to many administrative processes, and more recently many service sector organizations have adopted some aspects of TQM.

A recent US contribution to customer- and process-oriented management is the concept of "re-engineering" the organization (Davenport, 1993; Hammer and Champy, 1993), which has led to many company efforts to try fundamentally to reconceptualize the processes by which value is delivered to the customer and to organize to optimize these processes.

Our survey investigated a set of 13 practices commonly included in the practices that companies refer to as TQM. These practices include some which are encountered in most organizations using TQM and others which are representative of the variety of practices employed. They include organizational approaches such as quality improvement teams; quality councils, cross-functional planning, self-inspection, direct employee exposure to customers, collaboration with suppliers in quality efforts, just-in-time deliveries; and work cells; improvement tools such as the use of statistical process control techniques by front-line employees, process simplification, and re-engineering; and measurement systems such as customer satisfaction and cost of quality monitoring. Companies which reported that they had active TQM initiatives were asked what percentage of employees worked in units where each practice was in place.

Eleven of these practices factored into two main clusters, or scales, based on usage patterns. The first cluster constitutes a set of core practices which are deployed by both service and manufacturing firms: quality improvement teams and councils, cross-functional planning, direct employee exposure to customers, process simplification, re-engineering, and customer satisfaction measuring. The second cluster is composed of production-oriented practices deployed primarily in manufacturing settings or in administrative and service settings characterized by routine processing work. It includes just-in-time deliveries, work cells, statistical process control, and self-inspection. Two other approaches did not fit either of these factors, and so we treat them as single practices. They are cost of quality monitoring and collaboration with suppliers in quality efforts.

Perceived outcomes

Companies were asked to estimate the impact of TQM on eight outcomes. These outcomes factored into three scales. One scale is composed of the direct performance outcomes of work processes, including productivity, quality of product or service, customer service, and speed of response to customers. Given the focus of TQM on work processes, it was expected that direct performance outcomes would be positively affected by TQM initiatives. A second scale is company performance, including profitability and competitiveness. Although these financial and market impacts are more distant from the work processes and influenced by many other factors, they might be influenced if companies are able to achieve a competitive advantage by early adoption, by making process changes which provide a cost structure advantage, or by achieving a market reputation for quality and/or customer responsiveness.

The third scale is employee outcomes, including worker satisfaction and quality of work life (QWL). TQM is often touted as an empowerment-oriented approach to organizational improvement; however, it is often implemented in a top-down fashion (Lawler *et al.*, 1992). Managers are sometimes the key participants in TQM process improvement activities, and often managers determine the quality agenda. Consequently, the impact on employee satisfaction and QWL may depend on whether the resulting work processes are implemented in a way which contributes positively or negatively to employee job satisfaction, and whether employees become actively involved in the improvement processes. How TQM affects employee outcomes is important, because it serves as one indication of whether they, as important organizational stakeholders, benefit from the organizational transformations that are occurring in today's globally competitive environment.

Organizational characteristics

We expected several organizational characteristics to be related to the use of TQM, and possibly to moderate its impact. These organizational characteristics are described briefly below.

Manufacturing or service. Because of its historical genesis in manufacturing firms, we expected manufacturing firms to be making more extensive use of TQM practices. In addition, distinctive TQM practices are more likely to be adopted in these different settings and may even offer different potential benefits. For example, the process improvement focus may be more readily accepted in throughput-oriented work such as is common in manufacturing. In these settings managers are used to thinking about work processes and process engineering has been in place for a long time. On the other hand, customer-oriented practices may be more natural to people in service organizations, where contact with the external customer is built into much of the work.

Business environment. Given the continuous improvement-oriented nature of TQM, we expected use to be higher among companies in difficult business environments. Thus, we examined whether the level of foreign competition and the performance pressures for speed, cost containment, quality, shorter product

life cycles and need to adapt to rapid change are related to the use of TQM. We also looked at whether companies in declining and rapidly growing businesses would be more extensive adopters.

Downsizing and delayering. Many companies are responding to difficult competitive conditions by downsizing and/or reducing layers in the organization. Forty-seven per cent of the companies in this study had downsized and 72 per cent had removed at least one layer in the past ten years. We examined whether companies which take such measures also are more likely to invest in process and customer-oriented TQM practices to improve business performance.

Size. It can be argued that larger firms are more likely to experience fragmentation of activities and process problems, and therefore should be more likely to adopt process-oriented innovations. Furthermore, large firms often have access to more extensive resources to support innovation. On the other hand, accomplishing fundamental change in large firms is a very difficult process (Beer *et al.*,1990; Mohrman *et al.*, 1989), which might lead to reluctance to pursue such change and/or to early discouragement and abandonment of implementation.

Unionization. In the sample as a whole, 25 per cent of the workforce was unionized in these firms. Forty-six per cent of the companies had no union at all. In unionized companies, the percentage of employees in unions averaged 44 per cent. Other research has found that performance-oriented practices are no more or less likely to be implemented in, or have a beneficial impact on, union firms (McMahan and Lawler, 1995). This is in contrast to the popularly expressed belief that it is harder to effect change in unionized settings.

Patterns of use of TQM practices

Since the early 1980s, the use of TQM has been on an upward trajectory in US companies. Seventy-three per cent of responding companies report having a TQM initiative in place in 1993. Similar percentages have been reported in other surveys of US organizations (for example Moran *et al.,* 1994). Four-fifths of the companies in our study began their TQM initiative after 1985, and one quarter began after 1990. The average TQM programme in 1993 covered 50 per cent of employees in the corporation. TQM is more prevalent in manufacturing than in service firms, with 12 per cent of manufacturing and 39 per cent of service firms having no TQM at all. On the other hand, there is a sizeable number of companies in both manufacturing (28 per cent) and service firms (22 per cent) which have company-wide coverage.

Table I shows the extent of coverage for the 13 TQM practices in those companies which have TQM programmes. The two most frequently employed are customer satisfaction monitoring and quality improvement teams, and 56 per cent and 59 per cent of companies cover about half or more of their employees with these two practices. Self-inspection, collaboration with suppliers, and direct employee exposure to customers are slightly less frequently used, with about 35-40 per cent of companies covering about half or more of their employees. Work cells are the least frequently employed, with only 19 per cent of companies covering about half or more of their employees, and 35 per cent having no work cells at all. The

	None (0 per cent)	Some (1-20 per cent)	About half (41-60 per cent)	Most (61-99 per cent)	All (100 per cent)
Core practices					
Quality improvement teams	3	41	22	29	5
Quality councils	20	49	12	13	5
Cross-functional planning	13	64	8	14	2
Process re-engineering	8	65	11	12	4
Work simplification	8	56	17	14	4
Customer satisfaction monitoring	1	40	18	31	10
Direct employee exposure to customers	2	64	16	17	2
Production-oriented practices					
Self-inspection	7	54	14	23	3
Statistical control method used by front-line employees	12	65	11	12	1
Just-in-time deliveries	17	55	13	14	1
Work cells or manufacturing cells	35	47	14	5	0
Other practices					
Cost of quality monitoring	17	57	13	11	2
Collaboration with suppliers in quality efforts	5	55	16	21	3

Source: Adapted from Lawler *et al.* (forthcoming)

Table I.
Percentage of employees covered by total quality practices

other practices lie in the middle. Thus, the picture is one which shows most companies having some TQM practices in place, but with widespread use of only a few of the practices. In general, the production-oriented practices are among the less frequently employed, no doubt because they are applicable primarily in routine, throughput-oriented work settings.

The use of some practices varies significantly between service and manufacturing firms. Predictably, manufacturing firms make more extensive use of the four production-oriented practices and of collaboration with suppliers and cost of quality monitoring. Service firms exceed manufacturing firms in the arenas of customer satisfaction monitoring and direct employee exposure to customers, as was hypothesized based on the customer-oriented nature of the work they do.

Table II shows the relationship of various market conditions to use of TQM practices. Companies experiencing foreign competition and extreme performance pressures are more likely to use most of the TQM practices. This provides evidence that competitive pressures have led to the adoption of TQM. In results not shown in Table II, companies in declining markets were not more likely than others to use TQM. Companies in rapidly growing markets were slightly more likely to use

TQM practices	Foreign competition	Extreme performance pressures[a]
Core practices overall	0.17*	0.17*
Quality improvement teams	0.20**	0.16*
Quality councils		0.14*
Cross-functional planning	0.22**	0.21**
Process re-engineering	0.17*	
Work simplification	0.16*	
Customer satisfaction monitoring		
Direct employee exposure to customers		
Production-oriented practices overall	0.30***	0.25***
Self-inspection	0.16*	0.20**
Statistical control method used by front-line employees	0.31***	0.14*
Just-in-time deliveries	0.20**	0.24***
Work cells or manufacturing cells	0.33***	0.20**
Other practices		
Cost of quality monitoring	0.15*	0.15*
Collaboration with suppliers in quality efforts	0.17*	0.15*

Notes: [a] Rapid change, intense cost competition, intense speed to market competition, shorter product life cycles and intense quality competition

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

Source: Adapted from Lawler *et al.* (forthcoming)

Table II.
Relationship of market conditions to adoption of TQM practices (correlation analysis)

the production-oriented approaches and cost of quality monitoring. Their use of the production-oriented approaches may be because they are starting up new plants with these new practices in place. Companies which have responded to performance pressures by downsizing or by delayering are no more likely to employ TQM than those that are not. Eliminating employees and simplifying the hierarchy do not make it more likely that the firm will put in place these TQM practices.

Unionization does not relate to the adoption of TQM overall. Only two practices are significantly related, use of quality improvement teams and quality councils. Both of these are more likely to be used in firms having a union presence. This may be because firms with a unionized workforce use employee participation as their major form of employee involvement and employ quality councils as mechanisms of institutional union/management co-operation.

Finally, the size of the organization has very little impact on the extent of coverage with TQM practices. Only one practice, just-in-time deliveries, is more likely in larger firms, no doubt indicating the increased bargaining leverage of large firms *vis-à-vis* suppliers, and their ability to establish exclusive sourcing.

Impact of TQM

Impact on perceived outcomes

Companies are very satisfied with their TQM initiatives. Eighty-three per cent report that their experience has been positive or very positive, and 79 per cent plan to increase or greatly increase their use of TQM in the next three years. Thus, the people at the top of the organization feel that TQM is beneficial. Indeed, in the eight outcome areas which were measured, at most 1 per cent of companies felt TQM had a negative impact. At least 80 per cent of companies felt they had achieved positive or very positive benefits in the areas of productivity, quality of product and service, customer service and speed of response. Two-thirds or more felt positive about the impact on competitiveness and profitability and on employee satisfaction. Almost as many (63 per cent) felt positive about the quality of worklife. About a third felt neutral or unable to say what kind of impact TQM was having on people and profitability, a high number compared to the other outcomes where respondents were much more certain about its positive impact.

This rosy picture of TQM contrasts markedly with other studies that have shown extensive disappointment with TQM achievements and the widespread abandonment of TQM programmes (Smith and Whittle, 1994). This in part may be because we asked only whether the impact had been positive, not whether all the companies' objectives had been met, a common way to ask the question in other studies. Our sample of companies is broader that those used in other studies and it is more focused on large companies. These differences may also contribute to our results being different.

Table III shows the correlation between the major TQM practice factors and the outcome factors for the sample as a whole. The extent of use of core practices relates to the company's perception that it is achieving benefits in the areas of

	Perceived TQM outcomes		
	Direct performance outcomes [a]	Profitability and competitiveness	Employee satisfaction and QWL
Core practices overall	0.31**	0.35**	0.25**
Production-oriented practices overall	0.23**	0.27**	
Other practices			
Cost of quality monitoring		0.22**	
Collaboration with suppliers in quality efforts		0.21*	

Notes: [a] Productivity, customer satisfaction, quality and speed

* $p \leq 0.01$, ** $p \leq 0.001$

Source: Adapted from Lawler *et al.* (forthcoming)

Table III.
Relationship of TQM outcomes to extent of adoption of TQM practices (significant correlation coefficients)

direct work performance outcomes, profitability and competitiveness, and satisfaction and QWL. Use of production-oriented practices relates only to performance and company outcomes, and not to employee outcomes. The two single practices, cost of quality monitoring and collaboration with suppliers, relate only to profitability and competitiveness. The overall pattern indicates that employees are somewhat less likely to experience benefit as a result of the more extensive use of TQM than is the company.

Because the use patterns of TQM practices and the operating logics of service and manufacturing firms both differ, we performed regression analyses separately for these two sub-samples, to determine which of the TQM practices were having the strongest impact. Table IV indicates that in service firms only the core practices relate to outcomes, and they are significant predictors of all three categories of outcomes. In manufacturing companies, the core practices are the significant predictors of the direct work performance outcomes and of employee outcomes. The production-oriented practices are strong predictors of company productivity and competitiveness outcomes, and weaker but significant predictors of employee satisfaction and QWL. On the other hand, monitoring the cost of quality and collaborating with suppliers in quality efforts are negatively related to employee outcomes.

Size of company and whether or not it had gone through downsizing or reduced layers are not related to TQM outcomes, nor are the competitive conditions and

	Manufacturing firms						Service firms					
	Direct performance outcomes		Profitability and competitiveness		Employee satisfaction and QWL		Direct performance outcomes		Profitability and competitiveness		Employee satisfaction and QWL	
Independent variables	Beta	*t*	Beta	*t*	Beta	*t*	Beta	*t*	Beta	*t*	Beta	*t*
Core practices	0.28	2.90**	0.09	0.76	0.33	2.32*	0.46	3.9***	0.44	0.58***	0.51	4.52****
Production oriented practices	0.08	0.63	0.29	3.2***	0.30	2.0*	0.15	0.99	0.08	0.61	0.06	0.42
Cost of quality monitoring	–0.01	–0.62	–0.04	0.33	–0.26	–2.15*	0.01	0.09	0.21	1.69	–0.09	–0.72
Collaboration with suppliers in quality efforts	–0.08	–0.12	–0.05	0.41	–0.38	2.59**	–0.13	–0.81	–0.13	–0.89	0.08	0.56
Notes:												
R^2	0.07		0.09		0.10		0.21		0.32		0.26	
F	8.39**		10.23***		2.97*		15.2***		13.38****		20.48****	

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$, **** $p \leq 0.0001$

Table IV.
Results of linear regression analysis of relationship of extent of TQM adoption on perceived TQM outcomes

whether the company is in a growing or declining market. In addition, union status of the firm was unrelated to outcomes experienced from TQM. On the other hand if the firm had a union, the greater the involvement of the union in the TQM effort, the greater the positive impact experienced on direct performance outcomes such as productivity, quality, and customer satisfaction, as well as competitiveness and quality of worklife. Speed, satisfaction, and profitability were not related to the extent of union involvement in the TQM effort.

Impact on financial outcomes

We conducted preliminary analyses of the impact of TQM on some key financial outcomes. We view the analyses as preliminary since a rigorous examination of the impact of any organizational practice on financial outcomes would entail an investigation of a longitudinal nature. In order to establish firmly the relationship between an organizational improvement effort and financial outcomes, multiple years of performance results have to be examined in the context of the performance improvement effort. However, in this instance the analysis restricts itself to cross-sectional data for the year 1993.

Several financial outcome measures have been associated with the effectiveness of TQM efforts. Reeves and Bednar (1994) have broadly classified these as measures that concern themselves with a firm's increased internal efficiency and measures that focus on external effectiveness. Commonly identified internal efficiency measures directly attributable to TQM processes are employee productivity, manufacturing costs, and inventory costs (Deming, 1986; Garvin, 1987). The most popular external effectiveness measure is market share, which for Juran (1992) is the fundamental test of a TQM effort, since improved product quality arising from TQM efforts should necessarily result in better sales and hence a better market share. The other most frequently identified metric is firm financial performance (Buzzell and Gale, 1987).

Our internal efficiency measures included two employee productivity measures, cost of manufacturing (or cost of goods in the case of service firms), and inventory turnover. The two employee productivity measures were sales per employee and a total factor productivity measure. Total factor productivity is a ratio that is frequently employed to assess the efficiency of utilization of capital and employees (for a complete description of the measure see Levine *et al.*, 1995). Cost of manufacturing was computed as sales divided by cost of goods, and inventory turnover was computed as sales divided by inventory costs. Our external efficiency measures included market share computed as firm sales divided by industry sales with industry being conceived as all the fortune companies within a specific fortune industry classification. The financial performance measures employed were return on equity, return on investment, return on sales, and return on assets.

We conducted regression analyses to examine the relationship between extent of TQM adoption and financial outcomes. With the exception of market share, we controlled for specific industry type and capital intensity for analyses involving all the financial ratios since the norms for these measures vary by type of industry and how labour intensive or capital intensive the industry is. Since market share by its very nature is an industry specific measure we distinguished only at the

broader level of manufacturing versus service and ran separate equations for these two sub-samples.

With respect to the internal efficiency measures we found significant results for the total factor productivity index (Table V). Extent of TQM adoption and particularly collaboration with suppliers in quality efforts is positively related to efficiency of employee and capital utilization. However, the relationship of TQM to manufacturing costs and inventory turnover was not statistically significant although the patterns were in the predicted direction with production-oriented TQM practices exhibiting the strongest relationships.

The results for the external effectiveness measures were also encouraging. There was a significant relationship between core TQM practices and market share for manufacturing firms (Table VI), although the relationship was not significant for service firms. No significant relationships were observed between TQM adoption and return on investment, return on sales, and return on assets. However, there was a significant relationship between TQM and return on equity. There was a significant positive relationship between production-oriented TQM

Independent variables	R^2 change	F	Beta
Controls	0.34	9.35**	
Fortune industry types			
Capital intensity			
Predictors	0.009	2.05*	
Core TQM practices			0.01
Production-oriented practices			0.01
Cost of quality monitoring			–0.12
Collaboration with suppliers in quality efforts			0.23*

Notes: All significance levels are one-tailed

* $p \leq 0.05$, ** $p \leq 0.0001$

Table V.
Results of linear regression analysis of relationship of extent of TQM adoption to total factor productivity

Independent variables	Manufacturing firms Beta	*t*	Service firms Beta	*t*
Core TQM practices	0.37	2.90*	–0.05	–0.57
Production oriented practices	–0.10	–0.58	0.10	1.19
Cost of quality monitoring	–0.14	–1.01	–0.07	–0.76
Collaboration with suppliers in quality effort	0.18	1.04	0.07	0.87
R^2	0.14		0.01	
F	8.40*		1.42	

Note: * $p \leq 0.01$

Table VI.
Results of linear regression analysis of relationship of extent of TQM adoption to market share

practices and return on equity, while core TQM practices were negatively related (Table VII). However, the negative relationship between core TQM practices and return on equity has to be interpreted with caution since we used a block model regression procedure (with the exception of market share) in analysing the relationship between TQM practices and financial ratios. Under this procedure blocks of variables are entered into the regression equation and their combined effect on the dependent variable is examined. This is a preferred procedure when dealing with multiple variables and enables control of multi-collinearity effects (Hair *et al.*,1984). While individual items within a particular block may show negative or positive relationships with the criterion it is the sum effect of the significant predictors that is taken into consideration. This is derived by computing the total value of a set of significant predictors. If the total value of the significant predictors within a block is positive, the directionality is positive as well, as was the case in this instance.

Discussion and conclusions

Three-quarters of all large US firms have a TQM initiative covering on average almost half of employees, but various practices are used to differing extents. The study found two major clusterings of TQM practices. The first contains core practices that are being applied in all kinds of work settings and are equally applicable and extensively applied in both service and manufacturing settings. The second contains production-oriented practices that fit best with routine work, and have been primarily applied in manufacturing settings with some application in throughput-oriented administrative and service functions.

Results of the analysis of the perceived outcomes suggest that in service firms, more widespread application of the core practices is associated with a stronger impact on all three outcome domains: work performance outcomes, company competitiveness and profitability, and employee satisfaction and QWL. Thus, all

Independent variables	R^2 change	F	Beta
Controls	0.13	3.03***	
Fortune industry types			
Capital intensity			
Predictors	0.02	3.62*	
Core TQM practices			–0.35*
Production-oriented practices			0.45**
Cost of quality monitoring			0.02
Collaboration with suppliers in quality efforts			–0.19

Notes: All significance levels are one-tailed

* $p \leq 0.01$, ** $p \leq 0.001$, *** $p \leq 0.0001$

Table VII.
Results of linear regression analysis of relationship of extent of TQM adoption to return on equity

the stakeholders feel that they are benefiting: the middle management that is responsible for managing work processes, upper management that worries about the financial and market position of the firm; and the employees who carry out the work performances. However, the results of the financial analysis do not support these perceptions since core practices are related to market share only for the manufacturing firms.

On the other hand, greater adoption of the production-oriented practices and of cost of quality monitoring and collaboration with suppliers does not contribute to any of the perceived outcomes in service organizations. It is possible that this is because service companies have only recently begun to restructure their processing operations into work cells, and to apply statistical techniques in analysing their flow. However, the financial analysis suggests that production-oriented practices are related to return on equity and collaboration with suppliers is related to total factor productivity for both service and manufacturing firms. This will be an important relationship to follow through time in light of the amount of current activity in this area.

In manufacturing firms, the core practices relate to work performance outcomes and to employee outcomes. The trend is reinforced by the financial outcomes since the core practices show a strong relationship to market share. Core TQM practices focus on the improvement of processes and provide mechanisms for employees to become involved. Apparently, they are having an impact in both arenas.

Also in manufacturing firms, the production-oriented practices relate to company performance and to employee outcomes. These production-oriented practices (work cells, statistical process control, self-inspection and just-in-time deliveries) are more structurally and procedurally disruptive of the traditional hierarchical, functional mode of operation, but they appear to have the largest pay-off in terms of company performance. Interestingly this pattern is also supported by the analysis on financial measures. Production-oriented practices display the strongest relationship to return on equity.

The negative relationship of collaboration with suppliers in quality efforts and cost of quality monitoring to employee outcomes suggests that these new practices may be creating stressful conditions which detract from the employee's past situation in the organization. They may be imposing new demands and requiring new skills of the employee. These two practices are ones for which there are adoption data in the 1990 survey. Cost of quality monitoring actually has experienced a decrease in usage during the three years from 1990 to 1993. On the other hand, collaboration with suppliers in the quality arena has experienced a very large increase. This may be an area where the business needs for high quality raw materials and inputs is leading to interorganizational change efforts which are complex to implement. Such changes may result in standardizing interfaces in a way that constrains organizational members, lead to transfer of jobs to suppliers, and/or are very slow to pay off. It will be important to track this through time to see whether these dynamics or others are at work.

However, an interesting finding is that while collaboration with suppliers in quality efforts is negatively related to employee outcomes it shows a significant positive relationship to the total factor productivity index. One possible explanation could be that individuals are having difficulty adjusting to the new practice and thus feel negatively affected by the new work form due to the increased work demands and are refusing to see the benefits accruing from the practice.

In short, it appears that most of the TQM practices are related to one form of performance improvement or the other. With the exception of cost of quality monitoring all other practices display significant positive relationship to either perceptual and/or financial outcomes. Core practices are related to market share for manufacturing firms, collaboration with suppliers is positively related to total factor productivity index across the complete sample and production-oriented practices have a significant impact on return on equity also for the whole sample. Production-oriented practices entail restructuring the work processes of the organization rather than simply overlaying a performance improvement capability. This may be precisely the reason why they appear to have a big impact on the competitiveness and profitability of all firms.

Widespread TQM adoption seems to be a win/win proposition for all stakeholders. Employees are seen to be benefiting from their increased involvement and from the implementation of work processes which give them more control over performance. Better work performance and company performance provide benefit to management and owners. Fears that TQM will be implemented in a manner which forgets the employee do not seem to be supported in this study. The study also supports other research which found that the union status of the firm does not limit adoption or the impact of performance-improvement approaches. However, it finds that in unionized firms, greater union involvement in TQM is related to greater company and employee related outcomes.

This study has obvious limitations. First, it is a cross-sectional study with no ability to discern causality. This is particularly the case for the financial analysis, since to establish accurately the impact of any organizational practice on financial outcomes, longitudinal analysis which examines multiple years of performance results is warranted. Further, we have speculated about causality based on the assumption that companies undertook TQM to improve performance and that they can accurately state whether such improvement has happened. It is possible that improvement from other initiatives is being inaccurately attributed to TQM by our respondents. Likewise, financial outcomes may also be attributable to reasons other than the TQM initiative.

Relying on the perceptions of one senior officer is clearly a limited window into the organization. In particular, it is risky to rely on this perspective in judging employee impact. A counterpart to this study is surely called for: one which investigates employee experiences with these practices. Furthermore, companies are at various stages with respect to TQM implementation, and their answers may reflect predictable stages in the difficult process of making major change in how an organization operates. Service organizations, for example, have been at it for less time; as a result, usage patterns and perceptions of effectiveness of

various approaches may be in flux. Probably, this is also why TQM efforts in manufacturing firms are strongly related to market share and not so in the case of service firms which are relatively new to the practice.

Finally, the study reflects only the experience of US companies. The transportability of various approaches and findings across cultural lines is difficult, as is witnessed by the disappointing results and decreasing use of quality circles in the USA, an approach which remains alive and well in Japan. Introduction of various practices is always in the context of both company and national norms, cultures and labour/legal contexts, that will certainly influence the difficulty, speed, and success of adoption.

Despite these weaknesses, this study may represent the most extensive look at company TQM practices, executive perceptions of their impact, and actual impact on key financial outcomes that has been undertaken to date in the USA. Put in the context of the larger study referred to earlier, it provides an overview of the approaches being used by large US companies to survive in the new competitive environment.

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(Susan Albers Mohrman, Ramkrishnan V. Tenkasi, Edward E. Lawler III and Gerald E. Ledford Jr are all based at the Center for Effective Organizations, School of Business Administration, University of Southern California, Los Angeles, California 90089-1421, USA.)