

New research TQM is alive

The link between Total Quality Management and financial performance

Those who passionately believe in Total Quality Management (TQM) might be surprised to learn that in the past few years, many business magazines and newspapers have attacked it as nothing but a failed management fad because it has delivered lackluster economic returns. For example, when the 1995 Baldrige Award winners were announced, *USA Today* welcomed them by posing the question "Is TQM Dead?" A recent *Wall Street Journal* article raised the issue "Is Total Quality Management (TQM) yesterday's news or does it still shine?" *The Washington Post* wrote about "Totaled Quality Management", *The Economist* talked about "The Cracks in Quality", and a *Business Week* article on management paradigms proclaimed that "TQM is as dead as a pet rock". It's ironic that the magazines and newspapers that are now thrashing TQM are the very same ones that in the 1980s were singing its praises and promoting it as the paradigm that every organization should adopt. Nonetheless, to respond to the critics, it is important to understand why TQM is currently being lambasted.

Unrealistic expectations and a quick-fix mentality are the two main reasons why TQM is getting a bad rap. Many firms adopted it with inflated expectations of what it could deliver — it was expected to be a sure bet to reverse poor performance. When TQM didn't deliver the hoped-for results, it was deemed a failure. Furthermore, contrary to TQM's philosophy, many firms adopted it seeking instant and swift gratification. Often, implementation efforts were measured against short-term financial performance. When short-term improvements didn't materialize, many firms got disillusioned.

Proponents of TQM are obviously unhappy with the bad publicity that the system has received. Many have pointed to the popularity of quality awards at the state and national levels as evidence that TQM is alive and well. Some have indicated that there is growing interest among organizations to use the Baldrige and other quality award criteria for internal self-assessment. Many have also used anecdotes of performance improve-

ments (typically of Baldrige winners) to make the case that it does work. Finally, some have simply stated that the link between TQM and financial performance is strong but hard to establish.

Unfortunately, the arguments offered by the proponents haven't been enough to counter the criticisms. The negative publicity has caused firms to question the relationship between TQM and financial performance. A recent survey of 27 vice presidents of quality shows that nearly 75 percent of them are under considerable pressure to show the pay-off from TQM. An article in the September 7, 1998 issue of *Fortune* reported survey results about tools that were management's favorites in 1997. TQM was ranked 10th among all tools, with 16 percent of respondents indicating they were extremely satisfied with it and 14 percent indicating dissatisfaction.

It appears that the debate about the value of TQM is based more on anecdotes, impressions, opinions, and less on what one would consider to be scientific and objective

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Improves that and well

performance by Dr. Kevin B. Hendrick and Dr. Vinod R. Singhal

evidence. The arguments advanced by both the detractors and proponents of TQM do not stand up to the standards of scientific evidence. More evidence is needed to resolve this controversy, and the best way is to use objective and verifiable data to link TQM to bottom-line measures of performance. This article describes an approach for doing this, and discusses results from a research study whose primary objective was to document the financial impact of TQM.

Methodology

There were four main steps in developing the research methodology.

The first step was identifying a set of firms that have effectively implemented TQM. To be considered an effective implementation means that the key principles such as focus on customer satisfaction, employee involvement, and continuous improvement are well accepted, practiced, and deployed within the firm. The winning of quality awards was used as proof of effective implementation of TQM.

The study included winners from about 140 different award givers, some of which are listed in Table 1 on page 34. Many award givers are customers who have developed quality award programs

for their suppliers. These include most major automobile manufacturing firms in the U.S. and many large manufacturing firms. Award givers also include independent organizations such as the National Institute of Standards and Technology (which administer the Malcolm Baldrige National Quality Award) and various other U.S. states that give quality awards. To avoid biases associated with asking winners to self-judge the impact of TQM on financial performance, the sample of winners was restricted to include only publicly-traded firms. This provided the flexibility to use

manufacturing sector.

The second step was deciding the time period over which the performance would be examined. Two five-year time periods were chosen. The first five-year period (referred to as the post-implementation period) began one year prior to and ended four years after the date of winners winning their first quality award. Since it takes award givers about six to nine months to evaluate and certify the effectiveness of the implementation, it was assumed that the winner's TQM implementation was effective about a year before the date of winning the first award. Ex-

this time period that winners were likely to implement TQM and incur the associated implementation costs. To provide a balanced perspective on the net benefits of TQM, it is important to estimate the magnitude of these costs. Figure 1, on page 34, depicts the determination of the two periods for a winner that won its first award in 1990.

The third step was choosing performance measures. Stock price performance was an obvious choice as this measure is easily understood and extensively tracked by various stakeholders. The study also examined the profitability of

The study found that stock prices of award winners significantly outperformed their benchmark portfolios — by 34 percent, which in the sample translated into \$669 million dollars.

objective and historical financial data as far back as necessary, and to uniformly define performance measures. The sample consisted of about 600 winners representing nearly 50 distinct two-digit Standard Industrial Classification (SIC) Codes, with 75 percent of the sample winners coming from the

examining performance from this point provides an estimate of the financial impact of TQM implementations once they are effective.

The second period (referred to as the implementation period) began six years prior to and ended one year prior to the date of winners winning their first quality award. It is during

award winners by estimating the changes in operating income, defined as net sales less cost of goods sold plus selling and administrative expenses. Operating income is influenced by changes in the growth rate and efficiency. Growth is measured by estimating the percent change in sales, total assets, and employ-

ees. Improvement in efficiency is measured by estimating the percent change in return on sales and return on assets. Return on sales is the ratio of operating income to sales and measures the profit per dollar of sales. Return on assets is the ratio of operating income to assets and measures the profit per dollar of assets.

The final step was choosing appropriate benchmarks for comparing the performance of the award winners. The performance of all firms is influenced by industry and economic conditions, which may have nothing to do with whether firms have an effective TQM implementation. Benchmarks serve the purpose of adjusting a firm's performance for the relevant industry and economic influences. Stock market portfolios such as the S&P 500 Index were used to

benchmark the stock price performance of award winners. For the other performance measures a benchmark was created by matching each award winner to a firm of similar size from the same industry.

Results for the implementation period

No significant differences in performance were observed during the implementation period. Basically, there was no difference in the performance of the winners and the benchmarks. This is good news, since one might have expected declining performance during this period because of the direct and indirect costs in implementing TQM. It is plausible that during the implementation period winners find easy improvement oppor-

tunities. Capitalizing on these opportunities pays for the implementation costs. The results could also suggest that the implementation costs might not be as high as widely believed.

Results for the post-implementation period

Results for the post-implementation period indicate that on almost every performance measure, quality award winners outperformed the benchmark.

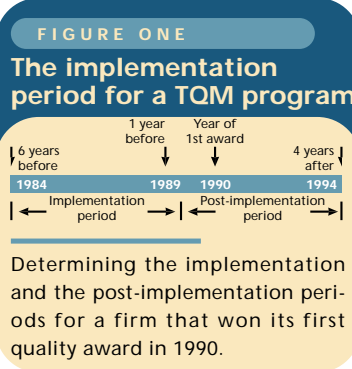


Figure 2, on page 35, compares the stock price performance of award winners against the various benchmark portfolios computed using the following process: For each award winner, a hypothetical \$100 was invested in the winner's stock one year prior to the date of winning their first quality award. At the same time an equal amount was also invested in a benchmark portfolio. Both investment strategies were tracked for the next five years. At the end of five years the stock price returns from holding the stocks of the award winners were compared against the returns from investing in the benchmark portfolio.

The results indicate that award winners significantly outperformed the benchmark portfolios. The stock prices of award winners increased by an average of 114 percent over the five-year period. Over this same time period an alternative strategy of investing a similar amount in S&P 500 Index and holding it over the same time period would have resulted in a 80 percent return. The difference of 34 percent is a statistically and economically significant level of outperformance. This difference translates to an average market value creation of an extra \$669 million. Award winners outperformed a benchmark consisting of all stocks traded on the New York, American, and NASDAQ stock exchanges. This portfolio experienced a 76 percent gain as compared to the 114 percent gain from investing in award winners. Award winners also beat a benchmark consisting of firms in the same industry by 26 percent and a benchmark consisting of firms of similar size by 34 percent.

A more detailed analysis of the pattern of stock price outperformance reveals some additional and interesting insights. Figure 3 compares the stock price performance of the award winners against the S&P 500

TABLE ONE

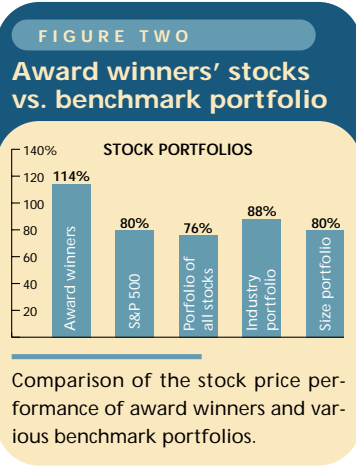
Quality award givers whose recipients are included in the sample

Customers that give awards to their suppliers	Independent award givers
Auto Alliance International Inc.	Alabama Senate Productivity & Quality Award
Chrysler Corp.	Arizona's Pioneer and Governor's Award for Quality
Consolidated Rail	California Governor's Golden State Quality Awards
Eastman Kodak Co.	Connecticut Quality Improvement Award
Ford Motor Co.	Delaware Quality Award
General Motors Corp.	Florida Governor's Sterling Award
General Electric	Massachusetts Quality Award
Goodyear Tires	Maryland Senate Productivity Award
GTE Corp.	Maine State Quality Award
Honda of America Manufacturing Inc.	Michigan Quality Award
International Business Machines	Minnesota Quality Award
J. C. Penny & CO	Missouri Quality Award
Lockheed Corp.	National Association of Manufacturers (The Shingo Prize)
Minnesota Mining & Tech.	National Institute of Standards and Manufacturing & Tech. (Baldrige Award)
National Aeronautical and Space Authority	North Carolina Quality Leadership Award
New United Motor	New Mexico Quality Award Manufacturing Inc. (NUMMI)
Toyota Motor Manufacturing U.S.A. Inc.	New York Governor's Excelsior Award
Nissan Motor Manufacturing Corp. U.S.A	Nebraska Edgerton Quality Award
Pacific Bell	Oklahoma Quality Award
Sears Roebuck & Co.	Oregon Quality Award
Texas Instrument Co.	Pennsylvania Quality Award
TRW Inc.	Rhode Island Award for Competitiveness and Excellence
Xerox Corp.	Texas Quality Award
Union Carbide	Tennessee Quality Award
Westinghouse	Virginia Senate Productivity & Quality Award
Whirlpool	Washington State Quality Award

Index on an annual basis for each of the five years in the post-implementation period. The award winners beat the S&P 500 Index in four out of the five years, with most of outperformance occurring from the third year onwards. Award winners beat the S&P 500 in the third year by five percent, in the fourth year by seven percent and in the fifth year by 12 percent.

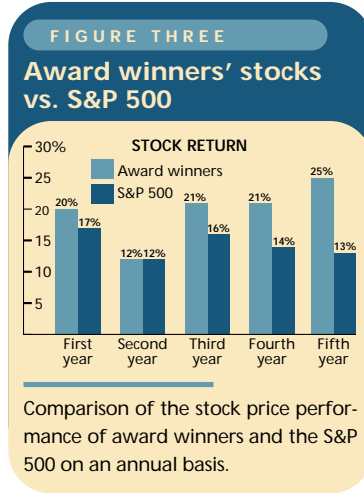
Since award winners

are likely to have an effective TQM implementation a year before they win their first quality award, the pattern of annual stock price performance of Figure 3 suggests that it might take a couple of years after effective implementation before the benefits of TQM begin to show up in the form of higher stock returns. Organizations should view TQM as a long-term in-



vestment and must allow time for its benefits to show up in financial performance.

Figure 4 (page 37) depicts the performance of award winners and benchmark firms on accounting based performance measures. Operating income for award winners increased by an average of 91 percent over the post-implementation period. This is in



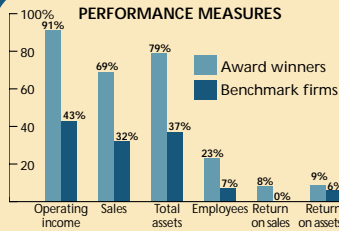
contrast to an average 43 percent increase over the same time period for the benchmark firms. The difference of 48 percent is a statistically and economically significant level of outperformance. Award winners also experienced higher growth as compared to the benchmark firms. Winners improved sales by 69

percent sales (compared to 32 percent for the benchmarks), improved total assets by 79 percent (compared to 37 percent for the benchmarks), and increased the number of employees by 23 percent (compared to seven percent for the benchmarks). Winners also showed higher improvement in efficiency measures. The return on sales improved by eight percent, compared to no

improvement for the benchmarks, and the return on assets improved by nine percent compared to six percent for the benchmarks. These results clearly indicate that TQM does improve profitability, leads to higher growth, and improves efficiency. Furthermore, they provide additional validity to the winners' stock

FIGURE FOUR

Financial performance vs. benchmark firms



Comparison of the average percent change in performance of award winners and benchmark firms for the post-implementation period.

price performance shown in Figure 2. The improvement in profitability is the reason for the rise in stock prices of the award winners.

Figures 5 through 7 present results on how the performance of award winners differs by their characteristics. These results are useful in setting ex-

pectations from effective TQM implementations. All performance numbers reported in these figures are the average of the differences between the performance of the winners and their respective benchmarks. The numbers indicate the extent to which the winners outperformed the benchmarks.

Independent versus customer award winners

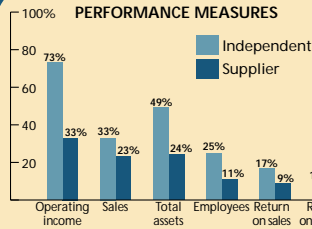
There are some very dramatic differences

among firms that won independent awards, such as the national and state quality awards, and those winning customer awards such as those given by Chrysler, Ford, and Texas Instruments. The national and state awards have more comprehensive and stringent evaluation criteria, and use a

multi-stage evaluation process conducted by independent third-party examiners. Thus, winning independent awards could indicate more mature TQM implementations when compared to the maturity of implementations at firms that have only won awards from their customers.

FIGURE FIVE

Independent awards vs. supplier awards



Comparison of the average percent change in performance of independent award winners and suppliers award winners.

Figure 5 shows that independent award winners significantly outperformed customer award winners. In terms of improvement in operating income, independent award winners outperformed their benchmarks by an average of 73 percent whereas customer award winners outperformed their benchmarks by 33 percent. Independent award winners do better than customer award winners on sales (33 percent vs. 23 percent increase), on return on sales (17 percent vs. nine percent increase), and return of assets (10 percent vs. six percent increase). Independent award winners also do better on stock price performance. They outperformed the S&P 500 by 51 percent compared to the 26 percent

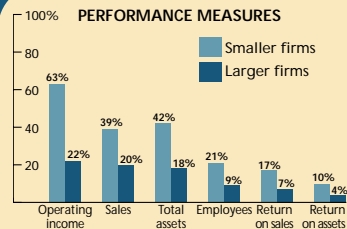
outperformance of S&P 500 by customer award winners.

Although independent award winners do better than customer award winners, it is important to emphasize that winning customer awards also pays off since these winners do better than their corresponding benchmarks on all performance measures.

Smaller versus larger award winners

Many managers believe that TQM is less beneficial to smaller firms as such firms cannot afford the high implementation costs. Figure 6 shows the contrary. Both smaller (total assets less than \$600 million) and larger (total assets larger than \$600 million) award winners gain from effective TQM implementations. For example, in terms of growth in operating income, smaller winners outperformed their benchmarks by an average of 63 percent, whereas

FIGURE SIX
Smaller firms vs. larger firms



Comparison of the average percent change in performance of smaller and larger award winners.

larger winners outperformed their benchmarks by about 22 percent. Figure 6 also shows that smaller winners fared better than larger winners. Smaller winners experienced a 63 percent improvement in operating income (compared to 22 percent for larger winners), a 39 percent increase in sales (compared to 20 percent for

larger winners), and a 17 percent improvement in return on sales (compared to seven percent for larger winners). The observation that smaller winners did better than larger winners is not that surprising considering many key elements of TQM such as teamwork, worker empowerment, and spirit of co-operation across functional departments are already present to some extent in smaller firms. Additionally bringing change can be more difficult in larger firms. Clearly, the results do not support the conventional wisdom that TQM is less beneficial to smaller firms.

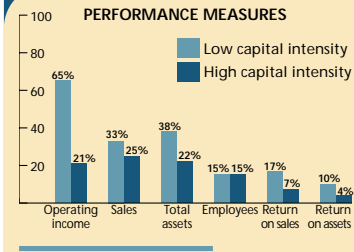
An important component of TQM is adopting practices such as employee training, involvement and empowerment, and information sharing. Em-

ployees are the driving forces for improvements originating from activities such as suggestion programs, quality circles, cross-functional teams, and process improvement teams. Clearly, the opportunities for gains from these activities are likely to be higher in a less capital-intensive environment than in a more capital-intensive environment. Capital intensity is measured as the ratio of net property, plant, and equipment to the number of employees. For the purposes of this study, winners with assets per employee less than \$25,000 are considered low capital-intensive, and winners with assets per employee greater than \$25,000 are high capital-intensive.

Figure 7 (page 41) shows that low capital-intensive award winners do better than high capital-intensive award winners on all performance variables except growth in employees. For example, in terms of improvement in

FIGURE SEVEN

Lower capital vs. higher capital intensity



Comparison of the average percent change in performance of lower capital and higher capital intensity award winners.

operating income low capital-intensive winners outperformed their benchmarks by an average of 65 percent and high capital-intensive winners outperformed their benchmarks by 21 percent.

In contrast to the anecdotal and perceptual evidence that has been used by many experts

lacklustre economic gains is unwarranted. The proclamation that TQM is dead is premature. TQM is alive and well. These results should be reassuring to those firms that have made heavy investments in TQM and had to defend themselves against both internal and external critics. For

to pass judgment on whether TQM is valuable, the evidence presented in this article provides a statistically valid assessment on the impact of TQM on financial performance. The message from the analysis of the financial performance of 600 quality award winners is clear and simple — when TQM is implemented effectively, financial performance improves dramatically. The criticism that TQM has produced

those firms that were considering disbanding their TQM, these results should cause them to rethink their decision. One would hope that managers responsible for implementing TQM would use these results to debate, and perhaps put to rest many questions that others might have about the legitimacy of TQM as a viable and effective management system.

The results also support what many quality gurus have said repeatedly— firms that want to adopt TQM must have patience. It is widely accepted that TQM takes a long time to implement as it requires major organizational changes in culture and employee mindset. Hence, the benefits will be realized in the long-run. The evidence shows that even after effective implementation, it still takes a couple of years before financial performance starts to improve.

Firms should also be realis-

tic about what to expect. They shouldn't be carried away by the hype. Keep in mind that TQM is a philosophy or foundation to develop a management system. A management system based on TQM can only improve the probability of making the right decisions. It cannot guarantee that all decisions will be right.

Furthermore, organizational characteristics such as size, capital intensity, and the maturity of implementations, all influence the gains from TQM.

Finally, the gains from TQM are likely to be tempered by the behavior of competitors. As more firms in a particular market segment adopt TQM, the extent of gains will diminish. ■

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