

Don't Count TQM Out

Evidence shows implementation pays off in a big way.

by

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ONE MIGHT WONDER WHY IT IS NECESSARY TO DOCUMENT the link between total quality management (TQM) and financial performance. After all, TQM has been one of the hottest business models of the last 15

years, widely embraced by many organizations. Should this not be enough to demonstrate the value of TQM? Unfortunately not. TQM has come under increasing criticism from many business gurus for delivering lackluster economic returns. A recent issue of *Business Week* had this comment about TQM:

"What's as dead as a pet rock? Little surprise here: It's total quality management. TQM, the approach of eliminating errors that increase costs and reduce customer satisfaction, promised more than it could deliver and spawned mini-bureaucracies charged with putting it into action."¹

The *Economist*, *Fortune*, *Newsweek*, *Wall Street Journal*, and *USA Today*, among others, have featured articles that question whether TQM has creat-

ed significant economic value.² These articles suggest that many firms have become disillusioned or disappointed with TQM, and that TQM could well be a fad that is fast losing popularity.

Unrealistic expectations, quick-fix mentality, and competition from other tools are some reasons many firms have soured on TQM. Some firms may have adopted TQM with inflated expectations of what it could deliver. TQM was expected to have all the answers. It was expected to turn lead into gold. It was a sure bet to reverse poor performance.

When TQM did not deliver the hoped-for results, it was deemed a failure. Furthermore, contrary to the TQM philosophy, many firms adopted TQM seeking instant and swift gratification. Often TQM efforts were

TABLE 1 Names of Some Quality Award Givers

Organizations that give awards to their suppliers	Independent award givers
Auto Alliance International Inc. (Part of Mazda Motor Manufacturing) Chrysler Corp. Consolidated Rail Eastman Kodak Co. Ford Motor Co. General Motors Corp. General Electric Goodyear Tires GTE Corp. Honda of America Manufacturing Inc. IBM J.C. Penney & Co. Lockheed Corp. National Aeronautical and Space Administration New United Motor Manufacturing Inc. (NUMMI) Toyota Motor Manufacturing U.S.A. Inc. Nissan Motor Manufacturing Corp. U.S.A. Pacific Bell Sears Roebuck & Co. Texas Instruments Co. 3M TRW Inc. Xerox Corp. Union Carbide Westinghouse Whirlpool	Alabama Senate Productivity & Quality Award Arizona's Pioneer and Governor's Award for Quality California Governor's Golden State Quality Awards Connecticut Quality Improvement Award Delaware Quality Award Florida Governor's Sterling Award Massachusetts Quality Award Maryland Senate Productivity Award Maine State Quality Award Michigan Quality Award Minnesota Quality Award Missouri Quality Award National Association of Manufacturers (the Shingo Prize) National Institute of Standards and Technology (Baldrige Award) North Carolina Quality Leadership Award New Mexico Quality Award New York Governor's Excelsior Award Nebraska Edgerton Quality Award Oklahoma Quality Award Oregon Quality Award Pennsylvania Quality Award Rhode Island Award for Competitiveness and Excellence Texas Quality Award Tennessee Quality Award Virginia Senate Productivity & Quality Award Washington State Quality Award

measured against short-term financial performance. When short-term improvements did not materialize, many firms became disillusioned.

Competition from other business paradigms also created problems for TQM. New models, such as supply-chain management, reengineering, and time-based competition, recently became popular. Selling them against TQM was easy. All one had to do was show a few very successful TQM implementations that did not produce results. Such examples were easy to find in the form of prestigious quality

award winners that subsequently experienced poor financial performance.

Proponents of TQM are obviously unhappy with its skewering in the business press. Some have stated that, while hard to establish, the link between quality and financial performance is strong. But this has not been enough to counter the criticisms. The reality is that the negative publicity about TQM has caused firms to question the relationship between TQM and financial performance. A recent survey of vice presidents of quality shows that nearly 75% of them are

under considerable pressure to show the payoff from quality.³

Ironically, the case against TQM is based on studies that report managers' perceptions about whether TQM has had a significant financial impact. It is rarely based on objective data and statistically valid analyses. The lack of rigorous analyses motivated the authors' research on the link between TQM and financial performance.⁴

Sample selection

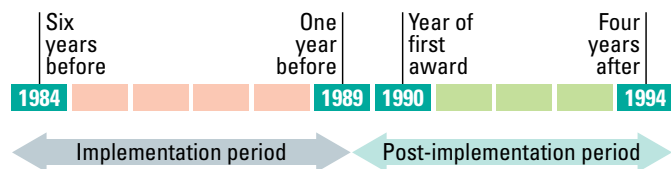
Any attempt to establish the link between TQM and financial performance must focus on firms that have implemented TQM effectively. This is important because while most firms will claim they have implemented TQM, few are doing it effectively. Including ineffective implementers obscures the impact of TQM. Effectively implementing TQM means that the key principles of TQM, such as focus on customer satisfaction, employee involvement, and continuous improvement, are well accepted, practiced, and deployed within a firm.

The authors' research uses the winning of quality awards as a proxy for effective implementation of TQM. A review of various quality-award criteria confirms that the core concepts and values emphasized are those that are widely considered to be the building blocks of effective TQM implementation. Awards are given after applicants go through a multilevel evaluation process, where they are judged by internal or external experts. A stringent process seems to be in place to ensure that winners are effectively implementing and practicing TQM.

The authors' sample represents award winners from about 140 different award givers, some of which are listed in Table 1. Many award givers are customers that have developed quality award systems for their suppliers. These include most major automobile manufacturing firms in the United States and many large manufacturing firms that have won the Malcolm Baldrige National Quality Award. Award givers also include independent organizations such as the National Institute of Standards and Technology

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FIGURE 1 Determining Implementation and Post-Implementation Periods



(which manages the Baldrige Award) and various states in the United States.

To avoid biases associated with asking winners to judge the impact of TQM, the sample of winners is further restricted to include only publicly traded firms. This provides the flexibility to use objective and historical financial data as far back as necessary and uniformly define performance measures. The sample consists of about 600 winners representing nearly 50 distinct two-digit Standard Industrial Classification (SIC) codes, with 75% of the sample winners coming from the manufacturing sector.

Setting the time periods

Performance is examined over two five-year periods. The first period—the post-implementation period—starts one year before and ends four years after the winners win their first quality award. Clearly, winners have a reasonably effective TQM implementation by the time they win their first quality award.

Since it takes award givers about six to nine months to evaluate and certify the effectiveness of the implementation, the authors assumed that the winner's TQM implementation was effective about a year before winning the first award. Examining performance from this point provides an estimate of the financial impact of TQM implementations once they are effective.

The second period—the implementation period—starts six years before and ends one year before the winners win their first quality award. It is during this time period that winners are implementing TQM and incurring 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 depicts the determination of the two periods for a winner that won its first award in 1990.

Choosing financial measures

The primary performance measure tracked is the percent change in operating income, which equals net sales less cost of goods sold and sales and administrative expenses. This measures the profits generated from operations before interest and taxes. Thus, it is unaffected by the method of financing, any gains or losses from the sale of assets, and the tax code, all of which have little to do with TQM.

Operating income is affected because of change in the growth rate and/or efficiency. To explore the source of changes in operating income, the following measures are also tracked.

Growth measures

- % change in sales
- % change in total assets
- % change in number of employees

Efficiency measures

- % change in return on sales
- % change in return on assets

Choosing benchmarks

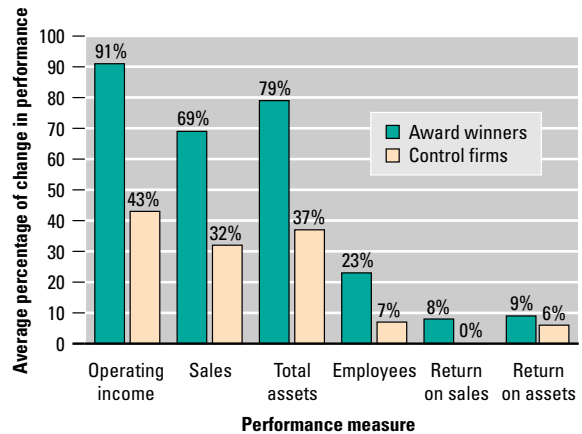
To provide a benchmark for the performance of the award winners, a sample of control firms was generated. The authors assumed that firms in the same industry and of similar size are subject to similar economic, industry, and competitive factors. For each award winner, a control firm was chosen that was in the same industry and was the closest in size as measured by the book value of assets.

Results for the implementation period

No significant differences in performance are observed during the implementation period. Basically, there is no difference in the performance of the winners and the controls. This is good news since one would have expected worsening 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 opportunities (low-hanging fruit). Capitalizing on these opportunities pays for the implementation costs. On the other hand, the results could suggest that the implementation costs may not be as high as widely believed.

FIGURE 2 Comparison of Award-Winning Firms and Control Firms for Post-Implementation Period



All performance numbers are the average of the differences between the performance of the winners and their respective controls.

Results for the post-implementation period

Figure 2 presents the results for the post-implementation period. The results show significant differences in performance between award winners and controls. During this period, the growth in operating income of winners averaged 91%. This is in contrast to 43% average growth for the controls. The difference of about 38% is a statistically and economically significant level of outperformance.

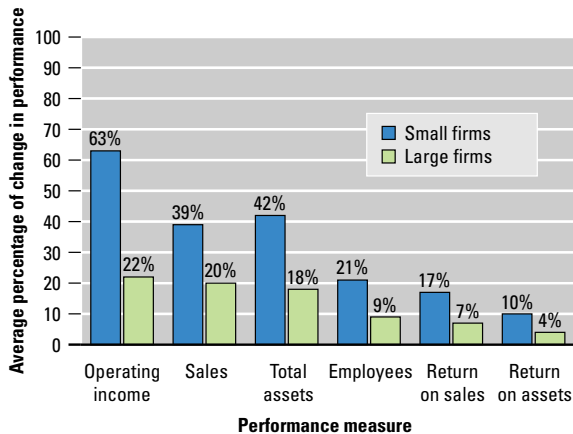
Winners, on average, experience a 69% jump in sales (compared to 32% for the controls), a 79% increase in total assets (compared to 37% for the controls), and a 23% increase in number of employees (compared to 7% for the controls).

Winners also show higher improvement in efficiency measures. The return on sales improves by 8% compared to no improvement for the controls, and the return on assets improves by 9% compared to 6% for the controls. Overall, winners significantly outperform the controls during the post-implementation period.

More results

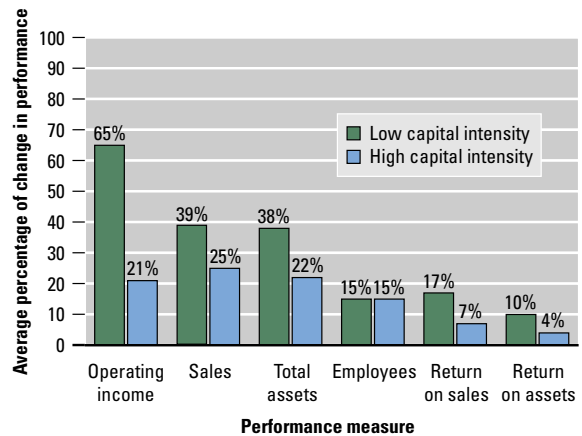
Figures 3 through 6 present results on how the performance of award winners differs by their characteristics. These results are useful in setting

FIGURE 3 Comparison of Small and Large Award Winners for Post-Implementation Period



All performance numbers are the average of the differences between the performance of the winners and their respective controls.

FIGURE 4 Comparison of Low Capital-Intensive and High Capital-Intensive Award Winners for Post-Implementation Period



All performance numbers are the average of the differences between the performance of the winners and their respective controls.

expectations 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 controls. The numbers indicate the extent to which the winners outperformed the controls.

Small vs. large award winners

Many managers believe TQM is less beneficial to smaller firms because such firms cannot afford the high implementation costs. Figure 3 shows the contrary. Both small (total assets less than \$600 million) and large award winners (total assets greater than \$600 million) gain from effective TQM implementation.

For example, in terms of growth in operating income, small winners outperformed their controls by an average of 63%, whereas large winners outperformed their controls by about 22%. Figure 3 also shows that small winners fared better than large winners. Small winners experienced a 63% improvement in operating income (compared to 22% for large winners), a 39% increase in sales (compared to 20% for large winners), and a 17% improvement in return on sales (compared to 7% for large winners).

The observation that small winners did better than large winners is not that surprising considering the fact that many key elements of TQM, such as teamwork, worker empowerment, and cooperation across

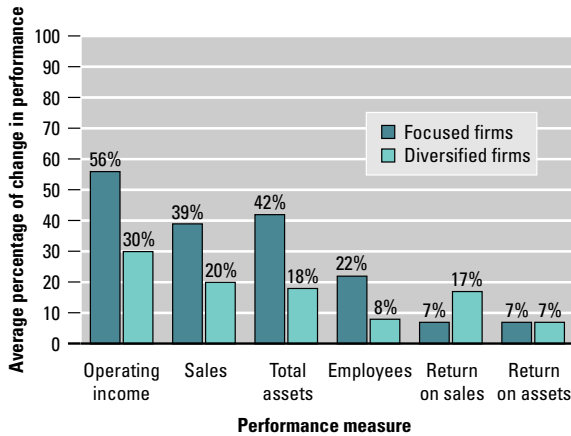
functional departments, are already present to some extent in small firms. Additionally, bringing change can be more difficult in large firms.

Low vs. high capital-intensive award winners

An important component of TQM is adopting practices such as employee training, involvement and empowerment, and information sharing. Employees are the driving force 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. Assets per employee less than \$25,000 are considered low capital-intensive, greater than \$25,000 are considered high-capital-intensive.

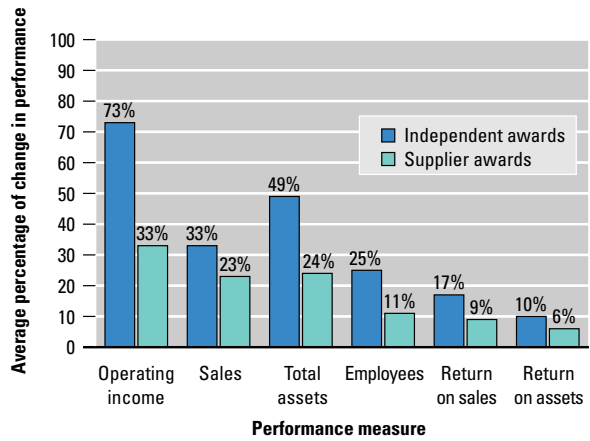
Figure 4 supports this conjecture. Low capital-intensive award winners do better than high capital-intensive award winners on all performance variables except growth in employees. Observe that both low and high capital-intensive winners gain from effective TQM implementations. For example, in terms of improvement in operating income, low capital-intensive winners outperformed their controls by an

FIGURE 5 Comparison of Focused and Diversified Award Winners for Post-Implementation Period



All performance numbers are the average of the differences between the performance of the winners and their respective controls.

FIGURE 6 Comparison of Independent-Award Winners and Supplier-Award Winners for Post-Implementation Period



All performance numbers are the average of the differences between the performance of the winners and their respective controls.

average of 65%, and high capital-intensive winners outperformed their controls by 21%.

Focused vs. diversified award winners

The measure of focus vs. diversified is based on the Herfindahl index, which is the ratio of the sum of the squared fraction of sales of each business segment to the firm's total sales. The value of this index ranges between 0 and 1. For example, a firm with only one segment would have an index of 1, and a firm with five segments that each contribute 20% of sales would have an index of 0.2. For this study, winners with an index greater than 0.5 are considered as focused, and those with less than 0.5 are considered diversified.

Focused firms are likely to benefit more from TQM than diversified firms because the different operating units in a more focused firm are likely to be very similar in terms of organizational culture, technology, operating procedures, and competitive priorities. Therefore, the lessons learned from a successful TQM implementation in one operating unit can easily be implemented in other operating units.

As operating units gain experience with TQM, the knowledge created in the process can be transferred at low cost to other units. Such economies of scale and learning synergies may not be present to the same extent in more diversified firms.

Figure 4 provides evidence to support this. Focused

award winners do better than diversified award winners on all performance variables except efficiency measures, such as return on sales and return on assets. Note that both focused and diversified winners gain from effective TQM implementation. In terms of improvement in operating income, focused winners outperformed their controls by an average of 56%, and diversified winners outperformed their controls by about 30%.

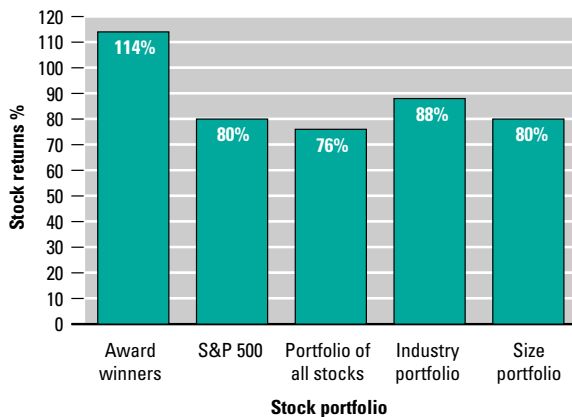
Independent- vs. supplier-award winners

Different award givers use different criteria for evaluating quality improvement implementation and have different standards to qualify for the awards. Therefore, different awards could be indicative of different levels of maturity in TQM implementations. We use the winning of independent awards (for example, the Baldrige Award or state quality awards) as a proxy for more mature TQM implementations when compared to only supplier-award winners.

Figure 6 shows that both independent- and supplier-award winners gain from effective TQM implementation. In terms of improvement in operating income, independent-award winners outperformed their controls by an average of 73%, whereas supplier-award winners outperformed their controls by about 33%.

Figure 6 also shows that independent-award winners fared better than supplier-award winners.

FIGURE 7 Comparison of Award Winners and Benchmarks for the Post-Implementation Period



Independent-award winners experienced a 39% increase in sales (compared to 23% for supplier-award winners), a 17% improvement in return on sales (compared to 9% for supplier-award winners), and a 10% improvement in return on assets (compared to 6% for supplier-award winners). Thus, more effective TQM implementation pays better.

Stock price performance of award winners

Figure 7 shows the stock price performance of the award winners relative to various benchmark portfolios. Over a five-year period, the portfolio of winners beat the S&P 500 index by 34%—a 114% to S&P's 80%. This outperformance translates to an average market value creation of \$669 million—good work by any standard. Winners also outperformed a benchmark consisting of all stocks traded on the New York, American, and NASDAQ stock exchanges, and benchmarks consisting of firms in the same industry and of similar size.

TQM is a good investment

The message from the authors' research is simple: Don't give up on TQM yet. When implemented effectively, it improves financial performance dramatically. The criticism that TQM has produced lackluster economic gains is unwarranted. The proclamation that TQM is dead is premature.

Managers should be careful in switching quality tools quickly. Before they consider dropping TQM, they should pay careful attention to whether there is evidence to support other competing models. Many times new paradigms are nothing but a repackaging of existing models. For those managers who have not embraced TQM, this study's evidence provides compelling reasons to do so. TQM still has a long way to go. Recent surveys show that only about 30% of U.S. manufacturing plants have widely adopted it.⁵ The numbers are likely to be even lower for service establishments.

Be patient

The benefits of TQM are achieved over a long period. A closer examination of the evidence reveals that even after effective implementation, it still takes a couple of years before financial performance starts to improve.

Managers who embrace TQM for quick gains will be disappointed. Unfortunately, many reasonably effective TQM implementations may have been disbanded because they were judged on short-term returns. To get the benefits from TQM, one must be patient. TQM is not a quick fix. It improves performance in the long haul.

Be realistic

Set realistic expectations on the potential impact of TQM. It is not a panacea for all business concerns. Organizational characteristics such as size, capital intensity, extent of diversification, and the maturity of the TQM implementations influence the gains from TQM. These and other factors should be considered in setting expectations.

ACKNOWLEDGMENT

This research was partially supported by a grant from the U.S. Department of Labor. We thank Victoria Taylor, executive director of the Georgia Oglethorpe Award (Georgia's Baldrige-based award), for providing encouragement and comments in writing this article.

REFERENCES

1. J.A. Byrne, "Management Theory—or Fad of the Month?" *Business Week*, June 23, 1997, p. 47.
2. See "The Cracks in Quality," *The Economist*, April 18, 1992, pp. 67-68; "The Straining of Quality," *The Economist*, Jan. 14, 1995, pp. 55-56; R. Jacobs, "TQM: More Than a Dying Fad?" *Fortune*, Oct. 18, 1993, pp. 66-72; J. Mathews and P. Katel, "The Cost of Quality: Faced With Hard Times, Business Sours on

Total Quality Management," *Newsweek*, Sept. 7, 1992, pp. 48-49; G. Fuchsberg, "Total Quality Is Termed Only Partial Success," *Wall Street Journal*, Oct. 1, 1992, p. B1; G. Fuchsberg, "Quality Programs Show Shoddy Results," *Wall Street Journal*, May 14, 1992, p. B1; and "Is TQM Dead," *USA Today*, Oct. 17 1995, pp. B1-B2.

3. C. Ittner and D. Larcker, "Measuring the Impact of Quality Initiatives on Firm Financial Performance," in *Advances in Management of Organization Quality*, Vol. 1, edited by D.F. Fedor and S. Ghosh (Stamford, CT: JAI Press, 1996), pp. 1-37.

4. This research is described in the following papers: K.B. Hendricks and V.R. Singhal, "Quality Awards and the Market Value of the Firm: An Empirical Investigation," *Management Science*, Vol. 42, No. 3, 1996, pp. 415-436; K.B. Hendricks and V.R. Singhal, "Does Implementing an Effective TQM Program Actually Improve Operating Performance? Empirical Evidence From Firms that Have Won Quality Awards," *Management Science*, Vol. 43, No. 9, 1997, pp. 1,258-1,274; K.B. Hendricks and V.R. Singhal, "Firm Characteristics, Total Quality Management, and Financial Performance: An Empirical Investigation," working paper, Georgia Institute of Technology and The College of

William and Mary, 1997; K.B. Hendricks and V.R. Singhal, "The Long-Run Stock Price Performance of Firms with Effective TQM Programs," working paper, Georgia Institute of Technology and The College of William and Mary, 1998.

5. G. Taninecz, "Numbers and Much More: Plant Leaders and Corporate Manufacturing Executives Assess Their Operations," *Industry Week*, Dec. 1, 1997, pp. 14-22.

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