

## **Best Practices in Quality Management for Innovation Performance**

Scott Leavengood  
Department of Wood Science & Engineering, Oregon State University  
Corvallis, Oregon, USA

Timothy R. Anderson  
Department of Engineering & Technology Management, Portland State University  
Portland, Oregon, USA

### **Abstract**

In many business sectors today, focus on quality as a competitive tool is being replaced by a focus on innovation. Research exploring connections between quality management, innovation, and company performance suggests that quality is ‘necessary but insufficient’ in today’s business environment. In short, the task facing managers is how to adapt their quality management practices to achieve innovation performance in addition to quality performance.

To answer this question, west coast U.S. forest products manufacturers were surveyed about their quality management practices and performance with respect to both quality and innovation. Survey results were analyzed using data envelopment analysis followed by cluster analysis to identify two categories of high-performing firms: those that were achieving primarily quality outcomes and those that were achieving both quality and innovation outcomes. Executives from firms in each category were interviewed to provide detail on the management practices used by the companies. The interviews were examined to identify similarities and differences in practices between the two categories of firms.

Results suggest that firms wanting to adapt their quality management practices to achieve both quality and innovation performance must first change how they view innovation; firms that were primarily focused on quality rather than innovation viewed innovation as an end rather than the means to some higher business goal. By contrast, firms focused on innovation viewed innovation as a means to attain customer satisfaction through higher quality products and to increase profitability via more efficient processes. Perhaps the most significant finding is related to how firms relate to their customers – firms focused on innovation proactively seek to identify and meet their customers’ needs whereas quality-focused firms primarily emphasize reacting to customer complaints. These findings suggest several specific areas where top managers can focus to improve the innovation performance of their companies.

**Keywords** innovation, quality management, best management practices

## **Introduction**

In many business sectors today, focus on quality as a competitive strategy is being replaced by a focus on innovation. This has led some in the quality profession to pose the question ‘is quality dead?’ (McManus 1999). While most would agree that quality will always be critical to competitiveness, innovation is likely to continue to grow in importance as a key element of competitive strategy. Therefore, a key challenge confronting organizations is determining how to integrate the two, that is, how to manage for both quality and innovation performance.

However, we must first ask, is it even feasible to integrate quality and innovation; are these complementary or competing objectives? The answer to this, at least in part, will depend on a company’s approach to quality management. That is, quality management is not a static set of tools and techniques. Quality management has changed as manufacturing practices and processes have changed. And even within the set of practices known as Total Quality Management (TQM), there are widely varying approaches and areas of emphasis. Therefore, prior to discussing the feasibility of integrating quality and innovation, we first address the varying approaches to TQM.

### **Varying Approaches to TQM**

At its core, TQM is based on three fundamental principles:

1. Focus on customers and stakeholders;
2. Participation and teamwork by everyone in the organization; and
3. A process focus supported by continuous improvement and learning (Evans and Lindsay 2002).

While these three principles serve as a simple means to define the guiding principles of TQM, they lack sufficient detail to define key practices companies use in implementing TQM. The U.S. Malcolm Baldrige National Quality Award (MBNQA) is often used as the conceptual framework for defining the key practices in TQM (Ahire et al. 1995; Black and Porter 1995). The seven criteria that comprise the MBNQA include Leadership; Strategic Planning; Customer and Market Focus; Measurement, Analysis, and Knowledge Management; Human Resource Focus; Process Management; and Results (NIST 2009).

Given the broad nature of these principles and practices, the emphasis placed by individual firms on each element varies widely. In fact, several TQM researchers have addressed the concept of dualities within TQM. Lewis et al. (2006) explored one such duality - the so-called ‘soft vs. hard tools’ or factors of TQM. The authors defined soft factors as including customer focus and satisfaction, people training, top management commitment, teamwork, employee involvement, and supplier management. Hard factors included continuous improvement and innovation, information and performance measurement, process management, strategic planning, process control, and product and service design.

A second type of duality within TQM is the scope of implementation of TQM in a firm. From the start, the ‘Total’ in Total Quality Management indicated the goal of focusing quality improvement efforts company-wide. Regardless, years of quality efforts being focused solely on the plant floor, combined with challenges in adapting quality methods to non-manufacturing

applications, led to slow spread of TQM throughout organizations. Along these lines, McAdam et al. (1998) state that the literature on TQM divides TQM into two categories – holistic TQM and continuous improvement TQM.

The third duality within TQM involves several issues related to internal vs. external focus. At one level, an internal focus emphasizes process improvement and an external focus emphasizes customer focus. Further, within customer focus, firms may either take a reactive vs. proactive approach to customer needs. Also within the concept of external focus, there are firms that take what could be considered a ‘closed system’ view of the firm’s external environment, namely customers and suppliers with whom they have direct business relationships. Firms that take more of an ‘open system’ view allow for consideration of a much broader picture of the company context, e.g., end consumers, communities where products will be used, and environmental impacts (Sitkin et al. 1994).

In summary, there are varying approaches to implementing TQM including use of hard vs. soft tools and techniques, scope of implementation, and internal vs. external focus. These dualities may be conceived of as varying levels of emphasis on the three fundamental principles of TQM presented above. In the context of quality and innovation, the question is, are there specific approaches to implementing TQM that lead to quality as well as innovation performance? Or again, is such a goal even feasible?

### **Quality and Innovation Tradeoffs**

Quality and innovation have traditionally been seen as competing rather than complementary goals with various tradeoffs implied to achieve one goal vs. the other (Kanji 1996; Samaha 1996). For example, some have argued that quality management focuses on incremental improvement and satisfying existing customers whereas innovation management emphasizes breakthrough improvements in products and processes and focusing on acquiring new customers. Or as McAdam et al. (1998) stated, “Quality is doing things better; innovation is doing things differently.”

Numerous researchers have explored the relationships between quality management, innovation, and company performance (Bossink 2002; Prajogo and Sohal 2003; Prajogo and Sohal 2004; Singh and Smith 2004; Hoang et al. 2006; Prajogo and Sohal 2006a; Prajogo and Sohal 2006b). In general, the research has shown positive correlations such as a supporting role for quality in the management of innovation, suggestions that TQM lays the foundation for innovation, and straightforward assessments that TQM significantly and positively impacts quality and innovation performance.

A key gap in the research conducted to date is lack of detail in how specific quality management principles and practices are related to quality and innovation performance. That is, many researchers have explored relationships between quality and innovation, however there has been little work to identify specifically how companies might adapt their quality management practices to achieve innovation performance in addition to quality performance. In particular and based on the review of the literature, the following propositions are made related to the TQM dualities presented previously:

1. Firms that use a mixture of hard and soft tools will outperform (with respect to quality and innovation performance) firms that use primarily hard tools.
2. Firms that have implemented TQM companywide will outperform firms that have implemented TQM more narrowly (i.e., holistic vs. continuous improvement TQM)
3. Firms for which the focus is both internal and external will outperform firms with primarily an internal focus.

## **Materials & Methods**

To answer the propositions stated above, a two-phase research project was conducted. The goal of Phase 1 was to identify firms in two broad categories – 1) firms that are effectively achieving quality but not innovation outputs and 2) firms that are effectively achieving both quality and innovation outputs. The goal of Phase 2 was to conduct case studies with several firms in each category and analyze the results to identify similarities and differences in quality management practices. Details for each phase are described below.

### **Phase 1 – Identification of Case Firms**

Forest products manufacturers were surveyed about their quality management practices as well as their performance with respect to quality and innovation. We used a questionnaire developed and used previously by Prajogo and Sohal (2006a); management practices (i.e., ‘inputs’) were adapted from the Malcolm Baldrige National Quality Award and performance ‘outputs’ included quality and innovation (product, process, and business system). A cover letter and questionnaire were mailed to forest products firms (primary, secondary, and equipment manufacturers with at least 10 employees) on the west coast of the U.S.; a reminder letter and questionnaire were sent approximately two weeks after the first mailing to all non-respondents.

Data envelopment analysis (DEA) was used to analyze survey responses to identify firms that were efficiently converting ‘inputs to outputs.’ DEA uses linear programming (LP) to determine the relative efficiency of firms through the simultaneous consideration of multiple inputs and multiple outputs (Charnes et al. 1978). The goal is to identify the ‘benchmark’ firms, those that produce the maximum amount of outputs given inputs, or conversely, use the minimum amount of inputs, given outputs. Hence, DEA was deemed to be an appropriate technique to identify the ‘efficient’ firms, i.e., in the present context, those that were successfully converting quality management practices (‘inputs’) into quality and innovation performance (‘outputs’). Survey responses related to outputs for efficient firms were then analyzed using cluster analysis to identify firms that were effectively achieving primarily quality outputs (‘quality-oriented’ firms) and those achieving both quality and innovation outputs (‘balanced’ firms).

### **Phase 2 – Case Studies**

Two firms in each category (i.e., quality-oriented and balanced) were selected for case studies. Case studies included in-person interviews with one senior manager in each firm. In addition, web-based information such as company websites and other third-party information about firms available on the Internet were examined as well.

Interview questions were developed to explore in greater depth each of the input and output areas from the questionnaire (e.g., questions on specific practices related to employee training, etc.) as well as to ensure each firm was categorized accurately. For example, we asked about specific examples of product and process innovations; if properly categorized, ‘balanced’ firms would be able to provide such examples whereas ‘quality-oriented’ firms would not.

Interview questions were pilot tested with five industry experts to ensure clarity; questions were revised based on expert feedback. In-person interviews were then conducted at each firm that lasted between 90 and 120 minutes. Each interview was audio recorded and transcribed verbatim. All data (interview transcripts and web-based sources) were then input into qualitative research software and coded to assign responses into categories related to each of the broader propositions presented above (e.g., statements related to use of hard vs. soft tools, external vs. internal focus, etc.) as well as for specific practices within each input area (e.g., responses related to employee empowerment, measurement of customer satisfaction, etc.).

## Results

The final sample frame (excluding firms that were no longer in business, bad addresses, etc.) included 2654 companies. A total of 215 firms responded for a response rate of approximately eight percent. Data envelopment analysis resulted in identification of 28 ‘efficient’ firms. Cluster analysis on the output responses of the efficient firms revealed seven ‘balanced’ firms and two ‘quality-oriented’ firms. Case studies were conducted with two of the balanced firms and both of the quality-oriented firms. Characteristics of the case firms are shown in Table 1 below.

*Table 1. Characteristics of Case Firms*

|                               | <b>Balanced</b>  | <b>Quality-Oriented</b>  |
|-------------------------------|------------------|--------------------------|
| <b>Years with the company</b> | 4, 5 years       | 21, 25 years             |
| <b>Employees</b>              | 10-15, ~75       | 10-15, ~50               |
| <b>Industry sector</b>        | Cabinets, lumber | Trusses, remanufacturing |

Interview responses confirmed the categorization of the firms, i.e., all firms provided evidence of their commitment to quality but only the balanced firms provided evidence of innovation performance. Specifically, with respect to quality, one balanced firm said, “if anybody was eyeing quality and not just low-bid, I think we were by far the best value.” And one of the quality-oriented managers repeatedly stated his company emphasizes “do it right the first time” (a well-known mantra in quality management). By contrast, with respect to innovation, the balanced firms made statements such as “the core of our business is our technology” whereas the quality-oriented firms expressed skepticism about innovation as evidenced by statements such as “technology is wonderful... when it’s proven.”

With respect to the three propositions presented above:

1. Tools (hard vs. soft) – results for this proposition were *inconclusive*. Support for this proposition would have included evidence that balanced firms emphasized use of both

hard and soft tools while quality-oriented firms emphasized only hard tools. However, only one firm mentioned (a balanced firm) hard tools. In addition, there was some evidence that balanced firms place more emphasis on soft tools – People Management and Customer Focus in particular, as discussed below.

2. Scope (companywide vs. narrow) – there is *some support* for this proposition. Firms that focused on all three of the key TQM principles (People Management, Customer Focus, and Process Management) were deemed to have a wide scope whereas firms that demonstrated minimal emphasis on at least one of the areas were deemed to have a narrow scope. In this case, there was evidence that balanced firms placed more emphasis on Customer Focus. However, contrary to expectations, quality-oriented firms were somewhat moderate on Process Management.
3. Focus (internal vs. external) – there is *some support* for this proposition. Firms with an internal focus were those that primarily emphasized Process Management and Information & Analysis and that took a reactive approach to Customer Focus. By contrast, firms with an external focus were those that saw the context of their firm more broadly (beyond the immediate customer) and those that took a proactive approach to Customer Focus. While balanced firms were more proactive with respect to Customer Focus, all of the firms provided evidence that they see the context of their firm broadly.

In general, many of the management practices were similar in balanced vs. quality-oriented firms. However, there were a few areas where there were noticeable differences; these areas included Strategic Planning, Information & Analysis (benchmarking in particular), and as discussed above, Customer Focus. Examples of statements made by interviewees that demonstrate the differences between firms are shown in Table 2 below.

*Table 2. Key Areas of Differences between Balanced and Quality-Oriented Firms*

|  | <b>Balanced</b>  | <b>Quality-Oriented</b>  |
|--|--|--|
| <b>Strategic Planning</b>                        | “we focus on facility development, what services and products to provide, market development, developing strategic partnerships with clients,... financial planning, business control procedures.”   | “Well, to try and survive we just cut costs everywhere we can.”  |
| <b>Information &amp; Analysis (benchmarking)</b> | “We try and benchmark our uptime for a... complex industrial process. We compare very well. We’re running around 98.5% of total available time in a day... So we’ve got a really really good technology and we find ways to keep it running continually.”  | “I don’t care what my competitors do. I don’t look at them. I don’t think about them. Fifteen years ago I did. And that was a mistake. I think that you do what you do and you run hard” |
| <b>Customer Focus</b>                            | “if we saw sticks in the air [a new home being built]... we could stop by, measure it up... and as long as we’d get their contact information then we could do the bid. And we’d do a set of drawings.”<br><br>“our main customers, we try to get them out here once a year and let them tour the facility.” | [in response to question about measuring customer satisfaction]<br>“Word gets back quickly.”<br><br>“It’s real simple – if they keep buying from you, they’re satisfied.”                |

The results of the 3 propositions, key differences highlighted in Table 2, as well as other statements from the firms can be summarized broadly as follows:

- Balanced firms were more proactive, forward-thinking, and amenable to taking risk. This was particularly the case with Customer Focus where balanced firms made significant efforts, and took a fair amount of risk, to obtain new customers.
- Quality-oriented firms were generally reactive, focused on meeting present needs, and risk-averse. While it was clear that these companies also focused on their customers, the primary focus was on existing customers rather than in pursuing new customers.

Lastly, there were also apparent differences in how balanced and quality-oriented firms viewed innovation. Balanced firms discussed their efforts to develop new products as a means to improve product quality. For example, the cabinet manufacturer talked about new product development in the context of developing countertops that were more water resistant. Similarly, balanced firms discussed process innovation as a means to be able to produce more consistent products (one form of quality). By contrast, quality-oriented firms viewed innovation primarily as ‘technology’, i.e., the end, rather than a means to some broader goal. As evidence of that fact, interviewees made statements such as “we focus on technology over people” and “technology is wonderful... when it’s proven.”

### **Conclusions**

One unanticipated finding of this research was that the quality-oriented firms hadn’t in fact, ‘missed the boat’ with regards to innovation, but rather deliberately chose not to pursue innovation. Hence, a prerequisite for the following recommendations is that a firm include innovation as part of its competitive strategy. Findings from this research suggest that managers desiring to adapt their current quality management practices to achieve both quality and innovation performance should:

- Change how the firm views innovation – from seeing innovation as simply ‘technology’ to seeing innovation as a means to achieve quality and profitability
- Work to alter the company culture such that it is more amenable to risk, forward-thinking, and proactive. For example:
  - Engage in strategic planning that goes beyond cost-cutting; seek to identify longer-term trends that may impact the firm and how the company might respond
  - Benchmark competitors – much can be learned about best practices from firms within and beyond a firm’s industry sector
  - Proactively focus on customers – this is perhaps the most significant difference between the balanced and quality-oriented firms. Managers should work to ensure their company takes the initiative to identify, communicate, and respond to the needs of current as well as potential customers.

One limitation of the research is, of course, the low response rate to the survey and the small number of cases. In addition to being a bad time to conduct such research (many candidate firms were shut down temporarily or permanently due to the ongoing recession), the results of the cluster analysis revealed only two candidate firms in the quality-oriented category. An additional

limitation was the limited sample frame; results may not be applicable to a broader region or to other industrial sectors. Lastly, the study did not consider financial performance of case firms; this limitation was by design in that the objective was to study quality and innovation performance. However, results clearly might have been different had measures of financial performance been considered as well.

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