

TRANSFERABLE QUALITY ASSURANCE PRACTICES IN THE WORLD INDUSTRY

Péter JÓZSA

Department of Manufacture Engineering
Technical University of Budapest
H-1521 Budapest, Hungary
Ph: +361 463-3180
Fax: +361 463-3178
email: ace@next-1b.manuf.bme.hu

Received: September 5, 1999

Abstract

The key issue in quality management is to learn from the mistakes and successes of peer companies: to effectively transfer quality assurance practices that are strongly correlated with commercial success. Experience suggests that although a number of different quality assurance methods and philosophies are in existence (ISO 9000, MBNQA and TQM being the most popular ones), achievements are not correlated with the applied methods, but with the implementation of the method.

This paper reviews the available literature of quality assurance transfer and discusses the preliminary results of an international survey undertaken on the topic of international technology transfer of quality assurance, with focus on Hungarian companies that have successfully implemented QA methods based on experiences of their foreign partner companies. Special attention is given to identifying quality related factors in QA programs that are related to successful implementation at a significant statistical level. Short description of the questionnaire and applied statistical methods are discussed in the paper.

Methodology: This paper is based on 362 returned questionnaires from companies world wide (of which 47 companies are located in Hungary) and 87 deep follow-up interviews with managers in charge of quality assurance programs. Any information published in this paper will only present this data in aggregate form and will not identify any participating individual or organization.

Keywords: quality assurance, technology transfer, international transfer.

1. The Impact of Quality Assurance

The usefulness of ISO (or the power of the certificate), is generally a competitive advantage factor for international firms, as ISO 9000 is 'de facto' a world standard for quality related issues. The ISO certificate is often considered as a barrier for small and medium businesses to enter new markets [4] or simply put, many corporations may not give small businesses the opportunity to bid unless they have been registered for or begun to implement ISO 9000 standards. If entrepreneurship and opening of small businesses want to compete, the following implications should be considered:

In general, 'big' organizations have ISO registration. 'Small' business owners, simply put, many corporations may not get the opportunity to bid unless a

potential supplier has been registered for or begun to implement ISO 9000 standards. The survey indicates that the majority (59%) of medium to small firms implemented or plan to implement ISO to be able to bid! The figure was almost the same in the United States and Europe, in Australia, however, only 28% of the firms aim at ISO for this reason. Most Australian managers pointed out that the British-style "by appointment" system, which has traditional roots in the country is often perceived equivalent or superior to ISO. Most Australian firms with international transactions, however, chose ISO.

ISO is considered expensive: it takes up to US\$ 40,000 and 12 to 18 months to be certified. Also, there is a six to eight months backlog [1].

Registration seems to pay off, however. In a survey of registered US companies¹, 89 percent noted 'greater operational efficiency' and 48 percent stated they were 'more profitable after their registration'. The survey also indicated, that once implemented, ISO 9000 gives small businesses not only an opportunity to save money, but also the opportunity to bid for more work [3]. The survey that serves as a basis for this paper also indicates, that ISO registrations older than 2 years have a significant positive correlation to commercial success.

Even companies from different cultural backgrounds seemed to converge towards the same approach in their quality program implementation in Hungary. For instance, Magyar Suzuki, Ford and Audi all envisioned to implement ISO 9000 together with their original quality assurance philosophies, as this was demanded by the market. The latter ones were mostly TQM-style philosophies and according to the survey, they exist parallel to the more formal QA methods very well [8].

The use of TQM philosophy alone, however, was less likely to produce success in some of them. The 1994 Quality Yearbook has identified several factors that inhibit the successful adaptation and transfer of the TQM philosophy. These were mainly because of the inherent nature of TQM: it focuses people's attention on internal processes rather than on external results, on minimum standards. Also TQM tends to develop its own bureaucracy, it delegates its pursuit to quality 'gurus' and experts rather than involving real people in the trenches.

Another important point is that TQM does not demand changes in management compensation or an entirely new relationships with outside partners, and drains entrepreneurship and innovation from an institution's culture.

The research indicated that in Hungary the lack of process focus and lack of involvement proved most the most important factors to account for failures. Managers in charge of QA programs emphasized that Hungarian workforce, which proved more innovative and highly skilled than its counterparts in the firms country of origin, got bored of the original QA philosophies and resisted its implementation.

However, at companies where management was flexible, of which General Electric, 3M and Suzuki must be mentioned here, success soon followed the implementation of the QA program. An opposite outcome was also noticed at firms that enforced their original QA programs without regard to the different environment. As a result, these companies, (of which a significant percentage was Italian and

¹ see list of literature

Austrian based) faced poor results, high scrap rate and horrendous job fluctuation in general.

ISO and TQM-style methods in the same company are not common in Hungary, only at subsidiaries of multinational companies such as Suzuki, Opel or GE. However, at these companies, no significant deviations could be detected when compared to other companies with one single QA method, either by country or country of origin in Hungary.

These findings warrant another remark: ISO registration or continuous improvement for its own sake can be counterproductive. As Ford Motor Company's Hungarian branch states in its mission statement, improvement is only justified if it is done towards customer values and needs.

2. Quality Management Transfer and Business Performance

There is evidence that quality management is not only the key for survival, but also has a considerable effect on performance. Extensive literature search has discovered three studies directed towards Quality management impact on performance at international companies. The most significant ones are the following²:

The earliest study: the Union of Japanese Scientists and Engineers published a study by Dr. Noriaki Kano and others on the Japanese companies that won the Deming Prize between 1961 and 1980. The study considered the earnings rate, productivity, growth rate, liquidity, and safety of the companies and concluded that most companies had an upward trend in or maintained a favourable level of business performance. A few companies showed a temporary upturn in performance, then maintained a performance level above the industry average.

In 1993, a business research group³, surveyed senior executives at 800 large U.S. corporations about their quality management practices. Of 149 firms that responded, 111 reported that they had a quality management program in place. Thirteen of the remaining 38 said they were planning to institute TQM. Sixty-two respondents reported that they measured the impact of quality on profitability. Of these, 47 reported '*noticeably increased*' profits due to quality management, while only 1 firm reported decreased profits due to '*the increased costs of providing higher quality products and services.*'

The business research group also interviewed senior quality executives at 12 U.S. companies recognized for the excellence of their products and services and found a consensus on the following points:

- Total quality is the 'strategy of choice' for assuring the economic position of U.S. firms in the global marketplace.
- Quality improvement is a long-term process.

²Data provided by interviewed firms. Disclosed parts of these studies can be found in Hoover Business Resources and Data-Star databases.

³The company has not authorized the publication of its name.

- At many companies, concerns remain over the lack of top-level involvement in quality programs.

A prominent quality management consulting firm maintains a proprietary data base for its clients that documents that firms with total quality management systems in place consistently exceed industry norms for return on investment. This higher return on investment was attributed to three factors.

- TQM, by improving the quality of products and services, reduces the direct costs associated with poor quality: inspection, rework, warranties, etc.
- Improvements in quality tend to lead to increases in productivity.
- The combination of improved quality and increased productivity leads to increases in market share.

The first point of the list was justified by the survey. In general (but especially in the USA) service and product quality is on the top of all improvement lists. Heavy emphasis is placed on process planning and prevention. Analysis of survey data also detected a high positive correlation between process planning/prevention and ability to realize long term growth and financial objectives.

Last, as a part of this study, a survey of 135 quality management managers in the United States concerning their perceptions of quality was made. Among the respondents, 54 percent said they were pleased with the results of their quality improvement efforts, with half of these reporting *'significant results, including increased profitability and/or increased market share.'* Many of the remaining respondents either *'weren't aware of'* or had not implemented quality improvement programs. Of all respondents, 51 percent believed that *'the United States is gaining on foreign competition in terms of quality'*.

In Hungary, fully American owned Hungarian firms were similar in this respect. The only single factor that proved significantly different was the perceived impact of QA efforts on performance. However, most of the surveyed managers remarked, that the potential cause of this phenomenon was the short span (typically less than 5 years) of their presence in the Hungarian market, and they reasonably expect similar results to their mother companies.

3. Common Traits of Industry Leaders

The survey was principally aimed at investigating successful companies and identify traits, or practices that have a statistically significant high degree of correlation with commercial success, and which can be transferred to other companies. Most of the investigated firms have impressive achievements in customer service, production costs, product reliability, defect or failure rates, and cycle time, as these factors are considered most important core competencies [5].

The increases in employee quality training, the decreases in the number of suppliers used, the decreases in warranty costs, and the increases in employee productivity are considerable. All surveyed have either a 'formal' quality management

program or an 'informal' quality philosophy. Only 8% of the sample population has no quality assurance whatsoever while 38% has both formal **and** informal. A considerable emphasis is put on clear communication of goals toward employees. Most winner companies use MIS or other IT tool for mainly monitoring and planning.

The study has discovered, that American or American owned Hungarian companies have a significant lead in applied IT tools: over 85% of the surveyed companies employs computer based tools to aid their QA efforts in the U.S.⁴! These figures were 55 and 18 (!) in cases of European and Australian companies, respectively.

4. Quality Assurance vs. Performance

During interviews with managers, it became apparent that high quality products are considered expensive, as quality adds to a firm's total costs since more costly methods, materials, equipment and labour are required to produce a higher quality product. The findings of the research as well as previous research data [5], [6], however, support the opposite view of the quality-total cost relationship. Most of the reviewed research findings suggest that successful implementation of quality improvement programs will reduce total costs and increase productivity, providing the firm with a greater level of profitability. Also, analysis of survey data indicated that while formal (ISO-style) methods have a consistent, but relatively moderate effect on financial figures, informal, TQM-style methods produce more significant positive effect at the cost of having more deviation from the expected mean figures.

Researching US and Japanese air conditioner manufacturers, it was found that savings in the internal (scrap and rework) and external (field service) costs associated with the higher quality manufacturers were greater than quality control costs (prevention and inspection) [2]. CROSBY describes firms which have measured the costs of quality (failure and control costs) and finds the total costs of quality to be typically 20–40% of sales. Since profit margins are frequently less than this range, a reduction in costs associated with poor quality can be shown to increase profitability. GALE and KLAVANS discuss a study performed by the Strategic Planning Institute (the Profit Impact of Market Strategy, PIMS), showing that high quality products and services are among the most profitable ones. The study also finds that improvements in product quality lead to higher market share. Also, the study concludes that quality improvements increase profits by increasing customer-perceived value. A number of other authors also use the PIMS study and find a positive relationship between quality and profitability (CRAIG, DOUGLAS, PHILLIPS, CHANG, BUZZEL and [6]).

⁴65% in Hungary

5. Quality Programs vs. Company Size

A recent research [7] into TQM programs indicates what works and what does not when adopting and implementing a TQM program. His finding seems to support the conclusions above. However, JUGENHEIMER distinguishes among different sizes of companies. Different sizes and types of organizations need to use different strategies to make TQM a success.

According to Jugenheimer, quality programs work best when the organization:

1. Starts working on only a few practices,
2. Concentrates with a narrow focus, uses cycle-time
3. Analyses, explains the quality program to all internal and external publics, and simplifies and improves procedures and processes, and shortens the cycle to get things done.

JUGENHEIMER [7] writes: *'To be successful, each organization must define its own best approach, rather than adopting what everyone else seems to be doing. There are also certain paths that work best, depending on the performance level of the organization.'*

The study confirms these findings: Hungarian companies that focused on 'small-gains', (or 'little steps, long distance', at Suzuki) were especially successful.

6. The Effect of Prevention

The achievements were especially remarkable at firms focusing on prevention, mistake proofing and process planning: *'...it became evident early in the project that achieving a C_p greater than 2 would go only part of the way. Mistake-proofing the design would also be required ... Mistake-proofing the design is an essential factor in achieving the [total number of defects per unit] goal.'* [Motorola].

Another user, TRW, reported it reduced customer complaints from 288 to 2. Also, the AT&T Power Systems, the first US manufacturer to win the Deming prize, found Poka-Yoke extremely useful. *'Average outgoing defects reduced by 70%. A washing machine drain pipe assembly line produced 180,000 units without a single defect (6 months).'* [9].

The survey indicates that prevention, mistake proofing and process planning, FMEA and other similarly oriented methods are more likely to lead to success than other, formula and documentation based methods. Fortunately, these methods are gaining acceptance in Hungary.

7. Summary

The analysis of the survey indicates, that there is evidence that technological and philosophical traits and practices are responsible for commercial success. Also,

these practices can be effectively transferred between companies, even though they are in different industrial and economical background. Most often successful factors include quality management philosophies and practices which improve overall competitiveness of Hungarian firms and help them to penetrate new markets. These include a significantly higher degree of freedom to employees, delegation, use of IT tools. Due to the nature of the Central and Easter European environment, a long term focus and patience is required when implementing **any** QA program, regardless of its nature or origin.

Past experiences indicate that existing cultural and economical differences can be effectively incorporated in the ‘Western’ firm models. Factors and practices associated with successful QA implementation were not significantly different in Hungarian and foreign firms, therefore it can be expected that ‘know-how’ can be adapted from other firms.

References

- [1] REIMANN, C. W. – HERTZ, H. S. (1996): The Malcolm Baldrige National Quality Award and ISO 9000 Registration: Understanding Their Many Important Differences, Office of Quality Programs, National Institute of Standards and Technology, Gaithersburg.
- [2] EVANS – LINDSWAY (1995): The Management and Control of Quality, WEST.
- [3] TAYLOR, R. L. (1995): Small Businesses should prepare; ISO 9000 is on the way.
- [4] KOLARIK, W. J. (1994): Creating Quality, McGraw-Hill.
- [5] COOPER – KLEINSCHMIDT (1993): New products: What Separates Winners from Losers?, Elsewhere Science.
- [6] MAANI, K. (1989): Productivity and Profitability through Quality – Myth and Reality, *The International Journal of Quality & Reliability Management*.
- [7] JUGENHEMIER, D. (1995): When TQM Works–And Doesn’t Work, Edition of Quality Progress.
- [8] KOVESI, J. (1996): Total Productive Maintenance as a Requirement of World Class Manufacturing, *Periodica Polytechnica*, 1999 Vol. 4. No. 1.
- [9] CORRIE, R. K. (1991): Engineering Management: Project Evaluation, Thomas Telford Ltd.