A COMPARISON OF LEVELS OF AWARENESS AND USAGE OF QUALITY TOOLS/CONCEPTS IN DEVELOPING NATIONS: MALAYSIA AND TURKEY

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Abstract

Total quality management (TQM) has become an integral part of doing business on a global scale over the past twenty years. A requirement for exporting products to most major markets in the world today is verification that the producer has appropriate quality systems in place. The primary means of providing this verification is through ISO 9000 certification. Developing nations have recognized that building a reputation for quality is key to their success. Malaysia and Turkey are two such developing nations.

Dr. Mahathir's Vision 2020 provided the impetus for industrialization in Malaysia and the corresponding need for quality systems. The founding of SIRIM to provide ISO certification was in response to this need for quality system verification in Malaysia. In Turkey the motivation for quality came from the forming of the European Union and Turkey's desire to become a member. Companies who desire to market to countries in the European Union are expected to be ISO certified.

Separate surveys, using the same survey instrument, were conducted in Malaysia and in Turkey. In both cases the intent of the survey was to determine the extent of awareness and usage of TQM tools and concepts in companies in each country. Comparisons were made between ISO certified and non-certified companies, between geographical regions within each country and between sizes of companies. In addition, in Malaysia comparisons were made between types of industries.

Considering that there were some distinct differences in the demographics of the samples from the two countries there were some surprisingly similar results. There were differences in usage of TQM by region within each country. Both studies found differences between ISO 9000 certified and non-certified companies with the differences more often occurring in usage among basic tools/concepts. In both countries there was low usage of advanced tools across all firms, though in Malaysia younger firms reported higher usage of these tools. One disturbing similarity in findings was evidence in both countries that some tools were either being used incorrectly or were misunderstood by the user in both ISO 9000 certified companies and non-certified companies. This occurrence in both countries suggests that a flaw may have existed in ISO 9000 certification inspection procedures. One would hope that the implementation of the new standards for ISO certification will correct such problems for companies who earn certification in the future.

1. Introduction

Increasing emphasis has been placed on quality throughout the world since the early 1950s. The drive for quality has gained momentum dramatically in the past twenty years. In the last few years this emphasis on quality has not been restricted to manufacturing companies but has also been extended to government agencies and all service industries from hospitality to education to the medical field. The element that remains common across all areas of application and all industries is the necessity for having a quality system in place.

The primary purpose of all quality certifications, including QS 90 and ISO 9000, is to provide verification that an organization has a quality system in place. The amount emphasis on and level of usage of specific quality tools will vary from industry to industry and application to application. Even with this variation in usage one would expect all basic quality tools to have some degree of usage regardless of the industry and that the managers of the quality systems to be familiar with all tools, both basic and advanced. At the least we would anticipate that if an organization indicates usage of a particular tool it would be using it correctly.

This paper looks at the results of two separate surveys on the usage of quality tools and concepts in developing countries. The two countries involved were Malaysia and Turkey and the same survey instrument was used in both studies. The purpose of this paper is to compare the previous two studies to identify similarities and differences between levels of usage in the countries involved.

2. Related Research

In recent years much has been written on quality management, the relationship between its successful implementation and a company's success and the environmental, economic and cultural factors that foster its implementation. The relationship between quality and company success has been detailed in [3], [6], [8], [10] and [15], to name a few. The rational factors that impacted implementation of quality systems were studied in a survey of eight Asian countries in [1].

The tools and concepts that are inherent in a quality system have been identified in many books and articles. Among these are [3], [6] and [13] as well as the QS 90 and ISO 9000 manuals. In particular, since this article looks at Malaysia and Turkey it specifically compares results of [12] and [14]. The specific problem addressed here is the identification of similarities and differences between two developing countries with respect to the levels of usage of quality tools and concepts.

3. The Surveys

Two separate surveys, using the same instrument, were conducted in two developing nations, Malaysia and Turkey. The survey in Malaysia [12] included 239 companies out of a random sample of 1493 companies selected from [5], [11] and ISO 9000 certified companies as listed on the SIRIM web site at that time. In the Turkish study [14] the questionnaire was sent to the top 500 manufacturing firms in Turkey, resulting in 140 returns. Since the survey was sent only to the top 500 manufacturing firms the resulting sample cannot be considered a random sample of all firms. The results of the two surveys are not directly comparable since the Malaysian sample contained some government agencies, service companies and manufacturing firms.

The instrument for both studies consisted of 25 TQM tools and concepts as identified in [2] and [13]. The number was limited to 25 to keep the time for completion relatively short. Both broad concepts and specialized tools germane to each broad concept were randomly included to provide a cross check on consistency of responses [12]. The justification for the type of survey instrument came from studies on the usage of OR tools by [4] in Kenya and [7] in the U.K. The actual questionnaire is obtainable by request.

Both studies attempted to compare results across geographical regions, company sizes and quality certification levels. In addition, the Malaysian study [12] attempted to make comparisons by type of industry and by age of company. This article combines the results of those studies using only descriptive measures.

4. Comparison of Results

Eighty percent of the companies in the Malaysian study were of limited corporation status while only 18.6% of the Turkish companies were in that category. All of the Turkish companies were in manufacturing whereas only 52% of the Malaysian firms indicated they were solely manufacturing but 91% indicated a combination of categories, one of which may have been manufacturing. Defining large as having at least 500 employees, about 66% of the Turkish sample represented large companies while large companies comprised only 29% of the Malaysian sample. With regards to ISO 9000 certification 78% of the Turkish companies were certified compared to 56% of the Malaysian companies who responded to this question.

Both studies used cluster analysis to see if the tools/concepts fell into the sets of basic and advanced tools that were anticipated. The Malaysian study grouped SPC, X bar charts, fishbone diagrams, Pareto charts, TQM, histograms, check sheets, inspection sampling, flow diagrams and quality teams as basic tools and concepts. The only other tool anticipated to have been in the basic set was range chart. Cluster analysis on the Turkish responses included the range chart and scatter diagrams in the basic category. The advanced category for Malaysia included range charts and scatter diagrams as well as: affinity diagrams, tree diagrams, matrix diagrams, arrow diagrams, benchmarking, house of quality, PDCA cycle, Taguchi methods, quality function deployment, concurrent engineering, FMEA, capability measures and gauge control. Thus, only scatter diagrams and range charts were categorized differently between the two countries.

Statistical analysis within each study utilized either one-factor analysis of variance, t tests or Tamhane's multiple comparison procedure with the choice depending on whether or not Levene's test for homogeneity of variances indicated a problem. Both studies found differences in usage among geographical regions with both countries exhibiting higher usage in more industrialized areas.

In evaluating differences in usage by company size a significant difference occurred in the Turkish study only for Taguchi methods. The Malaysian study indicated significant differences with respect to company size on all but six of the tools/concepts. Of the six, quality teams, flow charts and inspection sampling showed fairly high usage for all sizes whereas concurrent engineering, house of quality and QFD had limited usage for all sizes. In both countries larger companies had higher usage levels whenever a difference existed. That result is logical since larger companies tend to have more resources for training and for hiring consultants. The marked difference between Turkey and Malaysia on the number of significant results by size is probably due to the fact that three categories were used in Malaysia while only two were used in Turkey. Additionally, the Malaysian sample contained some very small companies, which was not the case in the Turkish sample.

Comparison of average usage levels between ISO certified and non-certified companies in Malaysia indicated higher usage levels by certified companies on all tools/concepts except affinity and arrow diagrams, benchmarking, concurrent engineering, gauge control, house of quality and QFD. Results in the Turkish study indicated no difference in usage levels between certified and non-certified companies on ten tools. These ten were comprised of the seven tools listed for Malaysia plus check sheet, matrix diagram and capability measures. In both countries the lack of significant differences occurred primarily with advanced tools and corresponded to low usage levels for both certified and non-certified companies.

Overall, for both studies respondent knowledge was higher than level of usage on every tool. Generally, regardless of country, ISO 9000 certified companies indicated higher levels of usage on almost all of the basic tools than non-certified companies. Regarding advanced tools certified companies indicated significantly higher usage levels on seven of them in Malaysia. Significant differences in usage levels between ISO and non-ISO firms were found for only four advanced tools in Turkey. Anomalies surfaced in both studies. In using control charts for statistical process control X bar charts are normally used in conjunction with range charts and usually displayed on the same sheet of paper. Both studies indicated significant differences in usage levels between X bar charts and range charts. Since the two charts go together it seems that these two tools were not being applied properly. Indications of possible misuse of these two tools were evident for both ISO certified and non-certified companies in both studies.

5. Managerial Implications

Several conclusions can be reached from these two studies. It is obvious from the surveys' results that ISO 9000 certification definitely raises the level of awareness of the importance of having quality systems in place and operating with respect to market penetration. In both countries a majority of quality tools had significantly higher usage in ISO certified companies than in non-certified companies. This was especially true with respect to tools in the basic category. In conjunction with the earlier findings stated in [3], [6] and [15], Ozgur states in [14] that "a bona fide commitment to quality and ISO certification can be:

- A strategic marketing tool
- A means for improving productivity
- A strategy for gaining competitive advantage
- A way to enhance position in the global marketplace."

Both studies found that there was little difference in the knowledge levels of the managers between certified and non-certified companies. Thus, it appears that the majority of the companies, regardless of certification, have talent and skills available internally. This, in turn, implies that:

- A "quality champion" is available if the support of top management is provided
- Quality initiatives would be forthcoming if the resources are provided.

Two possible negative implications stem from two results that appeared in both studies. First, there was very little use of advanced tools by either certified or non-certified companies. Second, there was evidence that some tools, particularly in the area of SPC, were either misunderstood or were being misused. The managerial implications from these two points are:

- All companies need to place more emphasis on continuous training programs
- ISO 9000 auditors need to look at actual applications of tools in the future.

6. Summary

Two separate surveys of the levels of awareness and usage of quality tools and concepts were conducted in Malaysia and Turkey. Both surveys used the same survey instrument with similar results. While there were some demographic differences between samples in the two countries the overall results for both indicated:

- ISO 9000 certified companies reported a much higher usage of quality tools, particularly the basic ones
- No significant difference in the level of awareness of managers between certified and non-certified companies
- Limited use of advanced quality tools for all companies

- Both certified and non-certified companies should place more emphasis on training and educational programs.

Future studies need to be conducted after the new ISO certification requirements have been implemented and have had sufficient time to stabilize. It is important to determine if the anomalies exhibited in these studies show up in the future. Another point that would be of interest is a comparison of usage and awareness of quality tools in developing countries to fully developed nations.

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