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An empirical study on comparing total quality management (TQM) items of national quality award applicants in Slovenia

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The purpose of this paper is to study the differences in total quality management (TQM) items of the companies taking part in Slovenian national quality award - Slovenian business excellence prize (SBEP) and other large companies in Slovenia. This paper reports on the research findings of a study conducted in 110 large Slovenian companies regarding their approach to systematic quality improvement process. The differences in the use of quality management approaches and tools were studied in three groups of companies: a group of "top companies" (according to their financial results), a randomly chosen group of companies and SBEP applicants. Multivariate analysis was used to analyze the items of the sample and to compare the differences among the groups. The results of this research are specific for large companies from Slovenia and analysis is cross sectional. Further research could be done in small and medium enterprises (SMEs) and public sector. A longitudinal study could be conducted in order to verify additional knowledge related to the causal relationship between applying for the quality award and TQM item. The main contribution of the study is to demonstrate affects of systematic implementation of quality improvement process based on research results of the SBEP applicants compared to the other groups of companies. The research results comparing two clusters of companies showed significantly better results for Cluster 1, which consisted of 59% of SBEP applicants including all SBEP finalists and winners, as compared to other companies included in the research. The main differences between two clusters in favour of Cluster 1 were related to the: proposals for improvements, non material recognition, self-assessment, national quality award participation, benchmarking, knowledge and best practice exchange as well as employee satisfaction. The findings from the research have been used for further strategic activities of the SBEP and are expected to help by supporting quality and business excellence development initiatives in Europe and worldwide. This paper analyses TQM items of the SBEP applicants in comparison to the other group of companies and provides a descriptive reference that can be used for evaluation of quality improvement development in large companies.

Key words: Total quality management (TQM), TQM item, quality award, continuous quality improvement.

INTRODUCTION

The implementation of continuous improvement is nowadays the basis for progress in organizations and also a prerequisite for successful business performance, encouragement of technological development and gaining of competitive advantage. For decades, total quality management (TQM) system in organizations has been recognized as an important ground for setting up approaches and tools for measuring of their business performance and therefore, contributes to the continuous improvement of their business quality. In the literature, several definitions of TQM are stated. According to Ishikawa (1985), TQM is defined as an activity where

everyone studies, practices and actively participates in quality control within organization. The quality of the work of all employees must become part of life and business in the organization. Crosby (1988) stated that, the quality is too important to be left to the professionals. Professionals should keep the program; the implementation of quality is an obligation and opportunity to employees performing work tasks. TQM is generally understood as a synonym for continuous improvement in quality, stressing that in both cases, there is change in culture (Staes and Thijs, 2008). Quality is the domain of all employees, not just experts in quality; it is necessary to continuously plan, control and improve (Juran, 1995). Involving employees and their satisfaction are factors that are identified as two very important drivers of continuous improvement and customer satisfaction (Juran, 1970; Peters and Waterman, 1982; Ishikawa, 1985; Crosby, 1988; Labowitz et al., 1993; Kaplan and Norton, 1996; Hiam, 1999; Eskildsen and Dalghaard, 2004; Pina and Selles, 2008; Sit et al., 2009). Today's companies use different total quality management (TQM) approaches and tools such as ISO standards, EFQM Excellence Model, Six Sigma, 20 Keys, etc. Various TQM approaches, tools and methods are used differently by different organizations. However, every organization has to find its own process and an optimal selection of TQM tools, techniques and approaches (Peters and Waterman, 1982; Robinson and Schroeder, 2004; Soković and Pavletić, 2007; Mann, 2008; EFQM, 2009) in order to exploit the advantages of their introduction. In different countries worldwide, a number of quality and excellence awards have been established for decades. Quality and excellence awards have been established in order to encourage the exchange of best practices, organizational learning, benchmarking and to support continuous improvements and organizational competitiveness.

Initially, national quality awards were established to promote and support systematic implementation of TQM and to help cope with the global competitiveness. The first national quality award - the Deming prize - was founded in Japan in 1951, followed by the Malcolm Baldrige National Quality Award (MBNQA) in the USA and Australian Business Excellence Award (ABEA) which were both established in 1988. The EFQM European Excellence Award (EEA) was launched in 1991 and the New Zealand Business Excellence Award (NZBE) in 1993. Quality and excellence award systems are based on business excellence models using standardized criteria, internal and external assessment and scoring methodology which enable international benchmarking and comparisons. The EEA is based on EFQM Excellence Model, while ABEA and NZBE are both using MBNQA

Baldrige Criteria for Performance Excellence. Today in Europe over 26 national awards for quality and excellence are established all based on the criteria of EFQM Excellence Model and practices of EEA. In 1998, a national quality award called Slovenian Business Excellence Prize (SBEP), which operates according to the criteria of the EEA, was established in Slovenia.

Research studies conducted in USA, Australia and Europe within applicant companies for national quality awards have confirmed positive effects of systematic use of the tools and approaches for the development of quality management system. The purpose of this paper is not to present the level of development of TQM in large companies, but rather to use the data obtained to identify the items of Slovenian Business Excellence Prize (SBEP) applicants in comparison with the other two groups of companies in the survey. The research question was: what differences exist among companies, applicants for the national excellence award in their items related to the use of TQM approaches and tools from the other companies in the survey? The set of TQM attributes can help to propose a more comprehensive and descriptive reference that can be used for evaluation of TQM development in large companies.

The aim of this paper is to detect main differences between SBEP applicants and other companies and therefore to contribute to the understanding of TQM items in large companies participating in quality awards such as SBEP in Slovenia.

PREVIOUS RESEARCH REGARDING THE SYSTEMATIC IMPLEMENTATION OF TQM APPROACHES AND TOOLS

Many studies show that systematic use of quality management approaches and tools in various organizations has a positive effect on relationships with customers and innovativeness (Peters and Watermann, 1982); improved business performance (Mann and Kehoe, 1994); internationalization, sales enhancement and cost reduction (Huarng, 1998); innovativeness and employee satisfaction (Hiam, 1999; Dahlgaard and Dahlgaard 1999; PWC 1, 2000; Dahlgaard et al., 2004; PWC 2, 2009; Phelps, 2008); employee training and empowerment (Gupta, 2000; Semiz, 2011); improvement in organizational performance (Busteed and Vogel, 2000; Warwood and Roberts, 2004; Mann and Grigg, 2006; Shoorvarzy and Tuzandehjani, 2011); dynamic role of strategy formulation, application and deployment (Leonard and McAdam, 2003); definition of organizational key performance indicators (Johnson, 2004); improvements related to organizational processes, generating ideas for improvement (Robinson and Schroeder, 2004); organizational performance and market orientation (Demirbag and Koh, 2006); customers and employees (Piskar and Dolinšek, 2006; Semiz, 2011); management improvement and customer satisfaction (Pina and Selles, 2008; Sit et

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al., 2009; Yeung, 2011) and size and strength of relations in the social networking (Gutierrez and Perez, 2010).

Further research findings conducted among applicant companies for quality awards have proved that systematic implementation of TQM principles also influenced business results. The results of a study done by NIST (1998) in USA showed that award winners strongly outperformed the Standards and Poor's 500. An empirical study conducted in USA by Hendricks and Singhal (2001) among quality award winners and control group of companies indicated that quality award winners improved significantly their financial performance as com-pared to other companies. The award winners showed significant improvement in the value of their common stock, operating income, sales and return on sales, employment and asset growth. Further study was done by Boutler et al. (2005) in Europe and the results showed that award winners experienced higher increases in share value, sales, capital expenditure over assets and capital expenditure over sales, higher growth in assets and further reduction in costs over sales in comparison to the other companies. Similar study was done by Hanson and Eriksson (2002) in Sweden. Results of their study show that award winners showed better financial results than the branch indices or competitors. Also, results of a research done by Hausner (1999) among award participants in Australia showed that award scores were correlated with business results such as profitability, sales, costs and productivity.

The findings of a research among award winners in New Zealand conducted by Angell and Corbett (2009) showed that external assessment played very important role in promotion of continuous improvement and con-firmed substantial improvements in non-financial results such as strategic planning, measurement analysis and knowledge management capabilities. Findings of research presented by Wardwood and Roberts (2004) among MBQNA award winners and UK companies initiated that effective leadership, application of best practice, economic survival, market orientation and employee involvement are important factors for TQM implementation. Also results of a study examined use and effects of self-assessment based on MBQNA criteria conducted by Saunders and Mann (2005) confirmed positive effects to customer results, customer and market systems and business results.

Main aspects of the systematic implementation of TQM approaches and tools included in the study

The main focus of the study was to find out whether SBEP applicants differed in their items related to the use of TQM approaches and tools from the other companies in the survey. The main steps used in the research procedure followed the basic scientific approach described in literature (Eisenhardt, 1989; Yin, 1994;

Chang, 2005) including collection, review and study of theory in the field of quality and excellence, identification of the research question, conceptual assumptions, collection, analysis and interpretation of data.

In recent decades, the philosophy of quality has developed from the initial stages focused mainly on statistical process control to the contemporary approaches related to the management, people, innovativeness and other organizational aspects, which have become more and more important. In the literature on TQM management, various findings, aspects and perspectives have been proposed from different authors studying practices and results of excellent organizations worldwide, which we used as starting points for our study:

1. Peters and Waterman (1982) proposed that the leadership and productivity through people played important role in TQM in excellent organizations.
2. According to Hiam (1999), TQM is composed from statistical tools and approaches, committed leadership, employee training and teamwork, innovation in business process and employee satisfaction.
3. According to Robinson and Schroeder (2004), stimulating employee ideas (proposals for improvements) is crucial part of TQM implementation.
4. According to Hendricks and Singhal (2001), the quality and excellence winners, which have systematically implemented TQM using excellence model showed better financial results than the control group of companies.

In the second step, we discussed issues related to TQM approaches and tools with the representatives of both the professional and academic sphere. In the third step, we examined the commonly used approaches and tools supporting TQM used in most successful organizations in Slovenia and abroad, especially among finalists and winners of the SBEP and EEA which are presented in award submission documents, best practices databases at EFQM and on professional conferences annually such as EFQM Excellence Forum on European level and EFQM Winners' Conference on the Slovenian level. On the basis of ISO standards, EFQM excellence model, balanced scorecard, Six sigma, benchmarking, 20 keys, investment in HRM, leadership, organisational culture, employee stimulating and motivating were included in the survey. Based on studied literature, gained feedback from professionals, academics and practitioners we finally identified following TQM items to examine in our study:

i. Invested financial and human resources,
ii. Use of tools and approaches,
iii. Measurement, realization and rewarding for proposals for improvement,
iv. Number of proposals for improvement,
v. Identification of changes,
vi. Management implications,
vii. Financial indicators.

METHODOLOGY

Research design and methods

In order to answer the research question, we had to study sample of large companies in Slovenia. The methodology used in the survey was based on fundamental approaches described in the literature. Data for the study were collected through questionnaires and supported by interviews. The questionnaire was pre-tested by pilot respondents and improved according to their feedback. Data were analyzed by using multivariate analysis (principal component analysis, factor analysis, cluster analysis) to identify the main characteristics of the sample. Within the sample, three groups of companies were contained: a list of Slovenian companies, chosen according to their good financial indicators - hereinafter called the "top group"; the second group of large companies was randomly chosen and hereinafter called "control group"; the third group consisted of the applicants-large companies taking part in SBEP, hereinafter called "the SBEP group". Significance tests were performed (t-test and ANOVA) to study differences between sample means of the top group, the control group and the SBEP group. The questionnaire was sent to 500 large Slovenian companies (within it: 250 companies from the first group – "the top firms" – with the highest net profit and 250 randomly chosen companies from the second group –"the control group") in 2007. These two groups also contained 42 applicants taking part in SBEP assessments in 1998 to 2006 hereinafter. The study was limited to the 2006 business year data. Empirical research was conducted on the basis of 110 responses from Slovenian companies (response rate: 22%): the top group had 48 responses (44%); the control group had 39 responses (35%) and the SBEP group had 23 responses (21%). Within the SBEP applicant group, we received responses from 12 finalists (representing 54% of all SBEP finalists) and 7 responses from the winners (78% of all the winners). The study included companies with up to 250 employees (31%), between 251 and 500 employees (34%), between 501 and 1050 employees (28%) and over 1500 employees (7%). Most of the questionnaires were answered by: heads of organizational units (54%), quality department employees (14%), general manager (14%), and HR department employees (3%), whereas 15% did not specify their position. The majority of companies were involved in manufacturing (55%) and a minority in mining, water supply, sewerage, waste management, environmental remediation, real estate and health and social care (all of them 1%). The questionnaire developed in this study consisted of ten main complex sets of items:

i. General data on company,
ii. Financial and human resources invested in continuous improvements,
iii. Use of continuous improvement tools, measurement and rewarding of employees for continuous improvement,
iv. Realization and rewarding proposals for improvement,
v. Number of proposals for improvement, TQM approaches,
vi. TQM recognition schemes, identification of TQM changes and
vii. Managerial implications on TQM process.

The questionnaire consisted of open questions and questions using a 6 – point scale ranging from 0 to 5 points (0 - approach / tool not known/ and not used, 5 - most often used /most important) (Kern Pipan, 2010). Factor analysis was used with the aim of data reduction and therefore, to simplify the large number of items into a smaller set of representative factors. The objective was to condense the information contained in number of original variables into a smaller set of factors with a minimal loss of information (Hair et al., 2006). The studied sample consisted of 110 responses, which is sufficient to perform factor analysis. Hair et al. (2006) stated that sample size should be 100 or larger and sample has to have more observations than variables. Altogether, we had 64

source variables to examine in our study. Aiming to identify the representative variables for each of eleven sections, we decided to apply data reduction and summarization. According to Hair et al. (2006), factor analysis provides the basis for creating a new set of variables that incorporate the character and nature of the original variables in much smaller number of new variables, whether using representative variables, factor scores or summated scales. In this manner, problems associated with large number of variables or high inter correlations among variables can be substantially reduced by substitution of the new variables. The researcher can benefit from both the empirical estimation of relationship and the insight into conceptual foundation and interpretation of the results. First, we used factor analysis by principal component analysis (with Varimax rotation), which aims at clarifying the observed variables by a smaller number of factors. As a result, 19 main indexes were designed. In the second step, the representative items were selected from the main indexes. In some cases, more than one principal component was detected, which implies a difference in item content. In such cases we decided to select the first two items, which resulted in 32 representative items, which we used for further examination using factor analysis.

With the aim to evaluate the level of differences and importance among three groups of companies (top group, control group and SBEP group), additional statistical analysis was conducted. Significance tests were performed to study whether there were any significant mean differences between the top group, the control group and the SBEP group of companies in the extent of their characteristics related to TQM and their view of importance using ANOVA. Table 2 shows mean values for the perceived items for all three observed groups of companies, differences between means of top group (TG), control group (CG) and SBEP group (SB) of companies and calculated p-values. The next step involved hierarchical clustering and Ward's method. Using hierarchical clustering, we attempted to find out whether Slovenian companies (top group, control group and SBEP group) could be classified according to their characteristics related to the use of tools and approaches for systematic implementation of TQM.

RESULTS

An exploratory study using factor analysis was conducted with 32 representative items using principal component analysis (with Varimax rotation). At the same time, we performed the internal consistency tests to ensure construct validity of the sample. The factor analysis was applied according to the following rules: (1) seven main components with eigenvalue > 1; (2) factor loading > 0.3; (3) correlations with main components > 0.3 and (4) total variance explained > 61.637. For the purpose of this study, the reliability of the seven main components was determined using Cronbach's alpha on standardized items. Cronbach's alpha on standardized items is used when items have relatively heterogeneous variances. The literature recommend an alpha higher than 0.6 (Black and Porter, 1996; Nunally, 1978). Cronbach's alpha on standardized items for construct validation was calculated and it was acceptable, except value of factor 6 which is rather marginal (0.59). The Kaiser-Meyer-Olkin (KMO) indicator was calculated to assess sample size adequacy. The minimum acceptable level is 0.5 (Hair et al., 2006; Kaiser, 1974). Bartlett's test of sphericity is a statistical test for the   overall   significance   of   all

correlations within a correlation matrix (Eisenhardt, 1989). The KMO was 0.699 and Bartlett's test of sphericity χ^2 =1826.994; df =496; p < 0.001), which is acceptable. In summary, the adequacy and reliability of the selected components were suitable for further study and research.

Table 1 gives the summary of factor analysis resulting in seven main factors based on main characteristics of the sample. The first factor describes the issue related to the internal encouragement and rewarding and consists of nine items: implementation of material and non material recognition of proposals for improvement, internal comparison of number of proposals for improvements, average percentage of realization of proposals for improvement, internal audits and certification using ISO 9001 and process indicators. The second factor identifies importance of recognition schemes and self-assessment and consists of SBEP projects, self-assessment, participation on quality award competitions, participation in national excellence award and involving employees as auditors or assessors. The third factor underpins the meaning of the leadership and changes implications and consists of monitoring of employee satisfaction, conducting personal interview, leadership style, value system and attendance at seminars and trainings. The fourth factor captures the importance of quality certificates and standards and consists of accreditation and internal audits using ISO 17025.

The fifth factor describes the importance of knowledge and best practice exchange and is composed of collaboration with consultant companies, collaboration with professional institutions and universities, benchmarking, attendance at conferences and use of peer assessments. The sixth factor shows the meaning of financial and human resources and consists of invested financial resources for education, number of employees on research and development (R&D), financial indicator - ROA and invested days of trainings per employee. The seventh factor emphasizes the importance of internal approaches for improvement and consists of use of Six Sigma and 20 keys.

For items shown in Table 2, we can reject null hypotheses and confirm that there are significant differences in mean values of items of SBEP companies as compared to other groups of companies included in the survey. We followed up on ANOVA results by performing Post Hoc Tests (Tukey HSD, Scheffe and LSD) which confirmed significant statistical differences in favour of SBEP group as compared to results of pair of other two groups of companies.

The results presented in Table 2 show that the SBEP group of companies possesses higher levels of achievements compared to other groups of companies related to:

Factor 1: Internal encouragement and rewarding, including non-material recognition for proposals for improvement.

Factor 2: Recognition schemes and self-assessment including use of self-assessment and external assessments by EFQM Excellence model.

Factor 5: Knowledge and best practices exchange including collaboration with academic and professional institutions to encourage best practices exchange, collaboration with consultant companies to encourage improvements, use of benchmarking with best in class.

Factor 6: Financial and human resources - however concerning financial results in our study, in case of ROA the SBEP group did not receive the highest score (5.835), control group received 0.263 and the top group received 7.169.

For all other items, we cannot reject the null hypothesis, because there are no significant differences in mean values of items between the three groups of companies under survey as follows:

Factor 1: Internal encouragement and rewarding including use of material recognition and comparison of number of proposals for improvements, ISO 9001 standards, process indicators with statistical tools and the achieved number of proposals for improvements.

Factor 3: Managerial implications including impact of leadership, value system, employee satisfaction, annual employee interview and trainings on TQM implementation.

Factor 4: Quality certificates and standards including use of ISO 17020, 17025 standards.

Factor 5: Knowledge and best practices exchange including peer assessments and conferences and workshops.

Factor 6: Financial and human resources including number of employees in R&D, financial resources for education and number of educational days for encouragement of proposals for improvement.

Factor 7: Internal approaches for improvement including use of 6 sigma and 20 keys.

Additionally, we used hierarchical clustering and Ward's method upon our data and ended up with a two-cluster solution where Cluster 1 contained 33 (30%), and Cluster 2, 77 (70%) companies of the sample. By using cross-tabulation (Table 3) it can be shown that Cluster 1 (C1) included 9 (27%) companies from the top group, 5 (15%) from the control group and 19 (58%) from the SBEP group including all SBEP finalists and winners taking part in this survey.

Cluster 2 (C2) consisted of 39 (51%) companies from the top group, 34 (44%) from the control group and 4 (5%) from the SBEP group.

It can be shown (Table 4) that the top group split into 19% in Cluster 1 (C1) and into 81% in Cluster 2 (C2); the control group was presented in 13% in Cluster 1 and in Cluster 2, 87%.

Table 1. Results of factor analysis.

Factor	Variance (%)	Item	Loading
1. Internal encouragement and rewarding	14.651	Material recognition of proposals for improvement	0.810
		Internal comparison of proposals for improvements (with financial evaluation)	0.807
		Internal comparison of number of proposals for improvements	0.787
		% of realized proposals for improvements	0.727
		Non-material recognition of proposals for improvement	0.640
		ISO 9001:2000 certification	0.598
		ISO 9001:2000 internal audits	0.577
		Process indicators using statistical tools	0.498
		Number of proposals for improvements per employee	0.302
2. Recognition schemes and self-assessment	10.570	Collaboration in SBEP projects	0.862
		Self-assessment using EFQM Excellence model	0.876
		Collaboration in quality awards	0.802
		Importance of SBEP	0.665
		Employees involved as auditors/assessors	0.494
3. Managerial implications	8.583	Impact of employee satisfaction on improvements	0.746
		Impact of annual employee interview on improvements	0.685
		Impact of leadership style on improvements	0.615
		Impact of value system on improvements	0.595
		Following changes and novelties on seminars and trainings	0.558
4. Quality certificates and standards	7.637	ISO 17025, 17020 accreditation	0.868
		ISO 17025, 17020 internal audits	0.834
5. Knowledge and best practice exchange	7.565	Collaboration with consultant companies to encourage improvements	0.647
		Collaboration with academic and professional institutions to encourage best practices	0.614
		Benchmarking with best in class	0.590
		Following changes and novelties on conferences and workshops	0.546
		Use of peer assessments	0.537
6. Financial and human resources	6.520	Number of employees in R&D per 100 employees	0.776
		Financial resources for education in 10000 EUR per 100 employees	0.723
		Number of educational days for encouragement of proposals for improvement per employee	0.614
		Return on assets (ROA)	0.391
7. Internal approaches for improvement	6.112	Performance of 20 keys	0.714
		Performance of 6 sigma	0.703
Total variance	61.637		

On the contrary, 83% of the SBEP group could be found in Cluster 1 and 17% in Cluster 2. Both clusters were designed according to the items describing TQM items related to the use of tools and approaches for systematic

Table 2. Statistically significant differences between the three group means (p<0.05) obtained by ANOVA (TG=top group, CG= control group, SB=SBEP group).

Factor	Item	TG	CG	SB	p
1. Internal encouragement and rewarding	Non-material recognition of proposals for improvement	1.542	1.436	2.913	0.002
	Self-assessment using EFQM Excellence model	0.708	0.538	3.130	0.000
	Importance of SBEP	0.542	0.564	2.087	0.000
2. Recognition schemes and self-assessment	Collaboration in SBEP projects	0.583	0.487	3.174	0.000
	Employees involved as auditors/assessors	1.458	1.256	3.000	0.000
	Collaboration in quality awards	0.917	0.744	2.261	0.000
	Collaboration with academic and professional institutions to encourage best practices	1.833	1.410	2.609	0.023
5. Knowledge and best practices exchange	Collaboration with consultant companies to encourage improvements	1.625	1.077	2.130	0.027
	Benchmarking with best in class	2.667	2.385	3.391	0.020
6. Financial and human resources	Return on assets (ROA)	7.169	0.263	5.835	0.000

Table 3. Composition of the clusters in percentage.

Cluster		TG	CG	SB	Total
C1	No.	9	5	19	33
	%	27	15	58	100
C2	No.	39	34	4	77
	%	51	44	5	100
Total	No.	48	39	23	110
	%	44	35	21	100

implementation of quality and business excellence in Slovenian companies. According to the results of the study, Cluster 1 was composed mainly from the SBEP group, with a minor part composed from the other two groups. On the contrary, Cluster 2 consisted mainly of the top and the control groups of companies, while the SBEP group represented a minority.

Significance tests using t-tests were carried out for the perceived items (items) in order to investigate whether there were any significant differences between Clusters 1 and 2 (Table 5). The null hypothesis used within t-test is as follows:

H_0: $\mu 1 - \mu 2 = 0$,

That is, there are no significant differences between Clusters 1 and 2 in the mean values of perceived items.

Table 5 shows mean values for the perceived items for both clusters of companies, which are statistically significant. Differences in the mean values between both clusters of companies in favour of Cluster 1 companies

could be detected.

For the items quoted in Table 5, we can reject null hypotheses and confirm that there are significant differences in items between Clusters 1 and 2 companies included in the survey. As far as classification of the three groups (top, control and SBEP) is concerned, Cluster 1 is predominantly composed of companies from the SBEP group (58%) containing all SBEP finalists and winners (Kern Pipan, 2010). The results of comparison related to TQM items (items) of the three groups (Table 2) show that in general, the mean values of the SBEP group exceed the other two groups. For items shown in Table 5, we can reject null hypotheses (H_0) and confirm that there are significant differences in mean values of items of Cluster 1 companies as compared to Cluster 2 companies included in the survey.

For these items, we can reject the null hypothesis (H_0) and confirm that there are significant differences in mean values of items between Cluster 1 companies and Cluster 2 companies.

The results (Table 5) show that the Cluster 1

Table 4. Composition of the groups in percentage.

Cluster		TG	CG	SB	Total
C1	No.	9	5	19	33
	%	19	13	83	30
C2	No.	39	34	4	77
	%	81	87	17	70
Total	No.	48	39	23	110
	%	100	100	100	100

companies possess higher levels of achievements compared to Cluster 2 companies related to:

Factor 1 "Internal encouragement and rewarding" including eight items out of nine.
Factor 2 "Recognition schemes and self-assessment" including all five items.
Factor 3 "Managerial implications" including four items out of five.
Factor 4 "Quality certificates and standards" including one item out of two.
Factor 5 "Knowledge and best practice exchange" including all five items.
Factor 6 "Financial and human resources" including two items out of four.
Factor 7 "Internal approaches for improvement" including one item out of two.

For all other presented items, we cannot reject the null hypothesis, because there are no significant differences in mean values of items between the Clusters 1 and 2 under survey as follows:

Factor 1 "Internal encouragement and rewarding" composing of material recognition of proposals for improvement.
Factor 3 "Managerial implications" including only impact of leadership style on improvements.
Factor 4 "Quality certificates and standards" including ISO 17020, 17025 accreditation.
Factor 6 "Financial and human resources" including number of employees in R&D and number of educational days for encouragement of proposals for improvement.
Factor 7 "Internal approaches for improvement" including use of 20 keys.

DISCUSSION

The overall findings show that the SBEP group of companies, which systematically introduce TQM possesses higher levels of results in general as compared to other groups of companies (Table 2). A comparison of statistically significant results obtained by comparing both clusters (Table 5), bring us to the conclusion that in general, the mean values of Cluster 1 companies exceed Cluster 2. The overall findings show that the Cluster 1, which has contained 58% of SBEP participants possessed higher levels of results in general as compared to Cluster 2. Higher mean values have been mainly related to the items capturing use of:

i. Internal encouragement and rewarding of employees in TQM implementation which has been related to non-material recognition for proposals for improvement from Table 5 (Cluster 1 = 2.364 and Cluster 2= 1.545) which confirms findings from Table 2 (top group = 1.542, control group = 1.436 and SBEP group = 2.913) and employee involvement in assessments (Table 5: Cluster 1 = 3.152, Cluster 2 = 1.091) which confirms results from Table 2 (top group =1.458, control group = 1.256 and SBEP group = 3.000) and also results from other authors who indicated the importance of values, non-material motivation, employee involvement on TQM introduction in companies (Peters and Waterman, 1982; Imai, 1996; Hiam, 1999; Dahlgaard and Dahlgaard, 1999; Robinson and Schroeder, 2004, Dahlgaard et al., 2004, PWC 1, 2000; Phelps, 2008; Semiz, 2011)
ii. Recognition schemes related to use of assessment within quality awards from Table 5 (Cluster 1 = 2.273, Cluster 2 = 0.649) which confirms results from Table 2 (top group= 0.917, control group = 0.744 and SBEP group =2.261), use of self-assessment using EFQM Excellence model (Table 5: Cluster 1 = 2.727 and Cluster 2 =0.481) which is consistent with results from the Table 2 (top group =0.708, control group = 0.538 and SBEP group =3. 130) and also with findings from many authors who emphasized the positive impact of internal and external assessment in TQM implementation (Vogel, 2000; Johnson, 2004; Warwood and Roberts, 2004; Mann and Saunders, 2005; Mann and Grigg, 2006; Hausner and Vogel, 2007; Angell and Corbett, 2009);
iii. Knowledge and best practice exchange related to the collaboration with academic and professional institutions to encourage best practices from Table 5 (Cluster 1=2.818, Cluster 2 =1.429) which confirms results from Table 2 (top group = 1.833, control group =1.410 and SBEP group =2.609) which confirmed the findings from

Table 5. Statistically significant differences between two cluster means (p<0.05, *p<0.09) obtained by t-test (C1 = Cluster 1, C2 = Cluster 2).

Factor	Item	C1	C2	p
Internal encouragement and rewarding	Internal comparison of number of proposals for improvements (with financial evaluation)	2.667	1.740	0.027
	Internal comparison of number of proposals for improvements	1.879	1.247	0.082*
	% of realized proposals for improvements	5.149	3.666	0.058*
	Non-material recognition of proposals for improvements	2.364	1.545	0.022
	Number of proposals for improvements per employee	0.557	0.180	0.020
	ISO 9001:2000 certification	4.697	3.714	0.000
	ISO 9001:2000 internal audits	5.000	3.896	0.001
	Process indicators using statistical tools	4.152	3.130	0.002
Recognition schemes and self-assessment	Collaboration in SBEP projects	2.606	0.442	0.000
	Self-assessment using EFQM model	2.727	0.481	0.000
	Importance of SBEP	2.000	0.390	0.000
	Collaboration in quality awards	2.273	0.649	0.000
	Employees involved as auditors/assessors	3.152	1.091	0.000
Managerial implications	Impact of employee satisfaction on improvements	3.848	3.234	0.030
	Impact of annual employee interview on improvements	4.030	3.013	0.001
	Impact of value system on improvements	4.152	3.481	0.019
	Following changes and novelties on seminars and trainings	3.939	3.377	0.021
Quality certificates and standards	ISO 17025, 17020 internal audits	1.697	1.039	0.061*
Knowledge and best practice exchange	Collaboration with academic and professional institutions to encourage best practices	2.818	1.429	0.000
	Collaboration with consultant companies to encourage improvements	2.455	1.143	0.000
	Benchmarking with best in class	3.576	2.351	0.000
	Following changes and novelties on conferences and workshops	3.788	3.104	0.008
	Use of peer assessments	2.242	0.935	0.000
Financial and human resources	Financial resources for education in 10000 EUR per 100 employees	3.926	2.484	0.071*
	ROA - Return on assets	6.408	3.598	0.051*
Internal approaches for improvement	Performance of six sigma	1.364	0.896	0.075*

Gupta (2000), Warwood and Roberts (2004), and Semiz (2011) and to benchmarking with best in class (Cluster 1 = 3.576, Cluster 2 =2.351) which confirms that results from Table 2 (top group = 2.667, control group = 2.385 and SBEP group =3.391) is also consistent with findings stated by

Gupta (2000), and Jarrar and Zairi (2000) who have highlighted the importance of best practices exchange and also with Warwood and Roberts (2004), Mann and Grigg (2006), EFQM (2009) and PWC1 (2000) who have emphasized the positive effects of benchmarking with best in class on TQM implementation in organizations;

iv. Financial results - ROA from Table 5 (Cluster 1 = 6.408, Cluster 2 = 3.598) which is mainly consistent with results from Table 2 (top group = 7.169, control group = 0.263 and SBEP group = 5.835) and confirms results by NIST (1998), Hausner (1999), Busteed and Vogel (2000), Hendricks and Singhal (2001), Hanson and Eriksson (2002), Boutler et al. (2005), Hausner and Vogel (2007), and Shoorvarzy and Tuzandehjani (2011) who have reported positive impact of TQM implementation to financial results. However, in case of financial indicator (ROA), the SBEP group received 5.835, control group received 0.263 and the top group received 7.169. Based on these results, we can partly confirm that systematic use of TQM has positive affects to financial results in Slovenian large companies.

As shown by the results from our study, companies under survey do not differ significantly in mean values of the items related to the use of material recognition of proposals for improvement, impact of leadership style and use of 20 keys. Although results in Table 5 indicate higher mean values of Cluster 1 compared to Cluster 2, in items related to the managerial implications on TQM implementation (value system, employee satisfaction, annual employee interview), no significant difference in impact of leadership style is shown between both clusters of companies. The results also show no significant difference to the Factor 3 "Managerial implications" which captures value system, employee satisfaction, and annual employee interview and leadership style comparing top group, control group and SBEP group of companies.

However, many authors reported on important role of leadership and values in successful TQM implementation in excellent organisations. According to EFQM (2009) and MBQNA (2011), leaders have to act as role models for values, ethics and expectations in excellence implementation. Peters and Waterman (1982) stated that the excellent companies seem to have developed cultures that have incorporated the values and practices of the great leaders. Further Robinson and Schroeder (2004) argued that leadership has to reinforce such an organizational culture that supports openness and therefore, encourage proposals for improvements in the organization. Warwood and Roberts (2004) argued that successful implementation of TQM in general is affected by internal implications such as effective leadership supporting organizational culture such as trust, belief, motivation, but also by importance of external influences such as other programmes, market orientation and application of best practices which should be considered

in organisational pursuit of excellence. They examined UK organizations in comparison with EEA/MBQNA winners and found out that EEA/MBQA winners are more focused on issues such as application of best practice, economic survival and market orientation, factors which do not feature in UK organizations surveyed.

CONCLUSIONS AND FUTURE RESEARCH

This paper presents the results of a survey conducted among large Slovenian companies with the main purpose of comparing the TQM items of SBEP companies with two other groups of companies. The findings of the survey show that SBEP companies have better results in the perceived items. The main differences of the SBEP group as compared to the other companies included in the survey can be found in non-material recognition of employees for their proposals for improvement, using regular self-assessment, importance of participation in national quality award, involving employees as external assessors or auditors, taking part in award assessment, benchmarking, collaborating with professional and scientific institutions supporting knowledge and best practice exchange and last but not least achieving better financial results (ROA).

Additional results of cluster analysis which was used for classification of companies according to their TQM items showed that the majority of the SBEP companies (58%), including all finalists and award winners, gathered in Cluster 1.

Hence, the main items of Cluster 1 are very similar to those of the SBEP group stated above. However, the findings of cluster analysis also show that there are some companies which have similar TQM items as the SBEP group (although they have not taken part in award assessment). These companies could be regarded as »potential SBEP applicants« for future award assessments in Slovenia and at the European level.

The main differences of the SBEP group as compared to the other companies can be found in higher scores related to proposals for improvement and non-material recognition, which indicates the importance of employee involvement in the continuous improvement process and their satisfaction.

On the basis of our research, it can be concluded that in general, the companies which took part in the national quality award (the SBEP group) have higher mean scores of perceived items as compared to the other two groups. We strongly recommend companies to systematically introduce "TQM spirit", since we have shown on a representative sample that systematic use of quality approaches and tools as well as taking part in the award process including external assessment, has a positive effect on the development of TQM principles, organizational performance and financial results in Slovenian companies.

The focus of this study has been on large companies from Slovenia. A longitudinal study could be conducted in order to test gained results on longer term and causal relationship between applying for the quality award and performance indicators.

There are some questions which remain open related to managerial implications linked to the TQM implementation such as leadership style, management of the values, organizational culture and investments in human resources, which should be addressed by further research studies.

Further research focus could be comparison with SMEs and public sector. On the other hand can be additional research done focusing on implementation of proposals for improvements related to non-material recognition and managerial role and impact on TQM implementation in Slovenian companies. This would contribute to better understanding and use of TQM principles and help to improve business results in Slovenia and worldwide.

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