



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

University of Wollongong  
Research Online

---

University of Wollongong in Dubai - Papers

University of Wollongong in Dubai

---

2013

# Slovenian national excellence award and TQM deployment in Slovenian companies

Karmen Kern Pipan  
*Ministry Of Internal Affairs*

Bostjan Gomiscek  
*University of Wollongong in Dubai, BostjanGomiscek@uowdubai.ac.ae*

Miroljub Kljajic  
*University of Maribor, Kranj, Slovenia*

---

## Publication Details

Kern Pipan, K., Gomiscek, B. & Kljajic, M. 2013, 'Slovenian national excellence award and TQM deployment in Slovenian companies', in S. Dahlgaard-Park, J. Dahlgaard & B. Gomiscek (eds), , *Quality Management and Organizational Development Conference (QMOD-ICQSS)*, University of Maribor, Slovenia, pp. 916-930.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library:  
research-pubs@uow.edu.au

## Slovenian National Excellence Award and TQM Deployment in Slovenian Companies

Karmen Kern Pipan

*PhD., Metrology Institute of the Republic Slovenia (MIRS)  
Grudново nabrežje 17, SI-1000, Ljubljana, Slovenia  
karmen.kern-pipan@gov.si*

Boštjan Gomišček

*PhD., Associate Professor  
University of Maribor, Faculty of Organizational Sciences  
Kidričeva cesta 55a, 4000 SI-4000 Kranj, Slovenia  
bostjan.gomiscek@fov.uni-mb.si*

Miroljub Kljajić

*PhD., Professor Emeritus  
University of Maribor, Faculty of Organizational Sciences  
Kidričeva cesta 55a, SI-4000 Kranj, Slovenia  
miroljub.kljajic@fov.uni-mb.si*

### Abstract

**Purpose:** This research aims to study the deployment and use of total quality management (TQM) approaches and tools for the systematic implementation of TQM, especially within companies that have been applicants for the National Quality Award - Slovenian Business Excellence Prize (SBEP), and its relation to tools and approaches regarding people involvement, external recognition, benchmarking and financial results.

**Methodology/Approach:** The survey is based on the analysis of a sample of companies composed of the three subgroups: “top companies” (based on their financial performance), a randomly chosen control group, and a group consisting of SBEP applicants. The questionnaire was distributed to 500 companies in 2007. The research was done on the basis of 110 respondents. Factor analysis was used to narrow the initial number of items, ANOVA to obtain statistically significant differences between the three group means and discriminant analysis to classify the sample according their use of TQM tools and approaches.

**Findings:** The results showed that the main differences between the three groups of companies in favour of the SBEP group were related to the importance of benchmarking, peer assessment, collaborating in national quality awards (NQA) and partly in financial results.

**Research limitations/implications:** Research limitations of this study might be related to the size of the sample, which is rather small (110 companies), and the fact that the survey conducted in the year 2006 (before the economic crisis). There is every reason to believe that a repeated survey could provide additional perspectives about the development of the TQM and positive effects of SBEP on reached quality excellence level and business performance after the crisis. However, this paper discusses managerial and research implications and provides suggestions for future study.

**Originality/Value of paper:** Based on the findings of this research, it can be concluded that,

the companies that took part in the NQA have higher mean scores of observed variables as compared to the other two groups of companies. However, the current economical crisis could be additional impulse that level of TQM development in the companies in this region is rather behind to European level. Nevertheless, further studies should focus not only on implementation of TQM tools and approaches, but on management commitment, innovation and its impacts on successful TQM implementation in the companies.

**Keywords:** Total quality management (TQM), national quality award (NQA), continuous improvement

**Paper type:** Research paper

## Introduction

In searching for sustainable excellence, organisations are constantly seeking new ways to adjust to the emerging requirements of technological development, legislation, competition, the global environment, as well as customers and other stakeholders. For decades, the TQM system has been recognised as an important platform supporting continuous improvement and measuring of their business performance. On a national level, national quality awards (NQA) have been launched to support the TQM implementation via the systematic implementation of continuous improvement in private and public organisations. In 1951, the Deming Prize was founded in Japan; in 1988, the Malcolm Baldrige National Quality Award (MBNQA) was launched in the USA; in 1991, the European Excellence Award (EEA) was established. In 1998, the Slovenian Business Excellence Prize (SBEP) was established based on EEA criteria. Several findings of research studies carried out in the USA, Europe, New Zealand and Australia among companies applying for NQA have confirmed the positive effects of the long-term systematic use of TQM tools and approaches on the development of QM system (Oakland and Tanner, 2008), companies' performance (Angell and Corbett, 2009) and financial results (Hendricks and Singhal, 2001; York and Miree, 2004; Boutler et. al. 2005).

However, a fundamental questions still remains regarding how companies achieve and sustain competitive advantage and pursue business excellence (Dahlgaard and Dahlgaard-Park, 2006; Lu et al. 2011). The aim of this paper is to study the deployment and level of use of QM tools, techniques and approaches supporting the systematic implementation of quality improvement process, especially within SBEP applicants and their relation to external recognition, people involvement, managerial implications and financial results. The next sections of this paper introduces the previous findings from the literature and explain the methodology used. The final section presents the results together with main conclusions, implications, limitations of the study and propositions for future research.

## Literature review

Continuous improvement of production process quality is the foundation of TQM, based on the encouragement of innovation, technological progress and business success. Issues with TQM and its influence on organisational performance have been asserted in many studies for decades. However, there is still no unique, widely accepted definition of TQM. Based on the findings of several different authors, TQM could be defined as a management philosophy supporting continuous improvement in customer focus, people involvement, operational performance and competitive advantage at all levels of the organisation (Crosby, 1980; Ishikawa, 1985; Juran, 1996).

CEBR (2012) reported on the implications of TQM on the macro-economic level in the United

Kingdom and indicated that TQM contributed 6.01% to the Gross Domestic Product (GDP) and more than £8.4 billion in UK tax revenues in 2011 (CEBR, 2012). The findings of several studies conducted among NQA applicants showed several positive effects of the systematic use of TQM on business performance. Hendricks and Singhal (2001) investigated NQA winners in the USA and reported on significantly better financial results in the value of common stock, operating income, sales and return on sales, number of employees and asset growth as compared with a control group of companies. Boutler et al. (2005) performed similar empirical research in Europe, and their results also confirmed the findings of Hendricks and Singhal. According to Jimenez and Costa (2009) and Vouzas and Gotzamani (2005), human resource practices play a key role in the TQM implementation process. An analysis of these findings shows that in a number of cases applying for NQA and the systematic use of continuous improvements indirectly shows positive effects on financial and non-financial results among companies applying for NQA, although the direct impact on TQM introduction has not yet been defined.

### Research methodology

The purpose of this research is to identify the main differences of the companies applying for SBEP in comparison with other studied companies. In the literature, several authors studying NQA applicants indicated positive implications of BEMs on organisational performance, which were used as starting points for our study:

1. Leonard and McAdam (2003) indicated that BEMs have been used as means of measuring, integrating and improving the organisation's systems.
2. Angell and Corbrett (2009) reported that external assessment showed positive results in management commitment and training, developing and empowering people.
3. Vokurka et al. (2000) argued that in the pursuit of TQM organisations realised that the NQA also offered models and tools for implementing a quality strategy, benchmarking, best practices, performing self-assessments and achieving improvement.
4. Mann and Grigg (2004) examined companies that systematically used BEMs, and found positive effects on benchmarking and self-assessment results.
5. Hendricks and Singhal (2001), York and Miree (2004) and Boutler et al. (2005) reported on the positive implications on the financial results of NQA winners.

Therefore, we expect a positive impact of the SBEP application on the use of tools and approaches for people involvement supporting QM, the use of QM tools and approaches for external recognition, the use of QM tools, and approaches for benchmarking and better financial results. To clarify this statement, we posit the following hypotheses:

*H1: SBEP applicants use more tools and approaches for people involvement supporting QM process than the other two groups of companies.*

*H2: SBEP applicants use more QM tools and approaches for external recognition (e.g. ISO certification, collaboration in NQA) supporting QM process than other the two groups of companies.*

*H3: SBEP applicants use more QM tools and approaches for benchmarking activities supporting QM process than the other two groups of companies.*

*H4: SBEP applicants using TQM approaches and tools companies achieve better financial results than the other two groups of companies.*

This set of hypotheses was tested on the representative sample of companies in Slovenia. Data for the study were collected in 2007 according to the plan presented in Table I.

Table I: Data collection plan (Kern Pipan et al., 2012)

Statistical population in the sample	large companies in Slovenia
Sample size and response rate	<ul style="list-style-type: none"> <li>- achieved 110 sample units</li> <li>- 22% response rate</li> <li>- Top Group (48), Control Group (39) and SBEP Group (23)</li> </ul>
Questionnaires answered by	<ul style="list-style-type: none"> <li>- heads of organisational units 53.64%</li> <li>- employees from the quality department 14.55%</li> <li>- general manager 13.64%</li> <li>- employees from the human resource department 2.73 %</li> <li>- 15.46% did not specify their position</li> </ul>
Data collection method	<ul style="list-style-type: none"> <li>- postal and e-mail delivery of questionnaire</li> <li>- supported by telephone contacts</li> </ul>
Data processing methods	<ul style="list-style-type: none"> <li>- statistical processing using SPSS v.15</li> <li>- interpretation of questionnaire responses</li> <li>- confirmation or rejection of research question</li> </ul>
The structure of respondents	<ul style="list-style-type: none"> <li>- 31% with fewer than 250 employees</li> <li>- 34% between 251 and 500 employees</li> <li>- 28% between 501 and 1050 employees</li> <li>- 7% above 1500 employees</li> </ul>

The studied sample contained three groups of companies: companies chosen according to their highest net profit based on the AJPES official database (the “Top Group”); the second group was randomly chosen from the CCI list (the “Control Group”) and the third group was applicants taking part in the NQA (the “SBEP Group”) taken from the official MIRS database from the years from 1998 to 2006. The questionnaire was distributed to 500 companies (250 from the “Top group” and 250 randomly selected from the “Control group”). The sample contained 42 SBEP applicants in 1998–2006. The questionnaire contained open and closed questions using a six-point scale ranging from 0 to 5 points (0: approach / tool not known/ and not used, 5: most often used /most important). The total number of questions (items) to examine in our study was 65 (Kern Pipan et al., 2011). Since the goal of the study was to identify the main characteristics and representative items, it was decided to use factor analysis to narrow the initial number of items. Furthermore, discriminant analysis was used for classification of the sample of studied companies according their use of TQM tools and approaches, which resulted in two discriminant functions.

### Data analysis

- Factor analysis was used (with Varimax rotation), which resulted in 19 latent variables:
- V1: Human resources in TQM, HRM and R&D departments (the number of employees dedicated to HRM, TQM and R&D in the companies - 3 items).
  - V2: Financial resources in TQM, education and R&D (financial resources invested to support continuous improvements, education and R&D - 3 items).
  - V3: Invested days of training per employee (invested days of training for TQM, innovative-

- ness, HRM and improved leadership - 4 items).
- V4: Approaches for knowledge transfer and innovativeness (approaches encouraging knowledge transfer and innovativeness: collaboration with consultant companies, collaboration with professional institutions and universities, regular quarterly employee interviews, employee promotion based on proposals for improvements, use of techniques for creative thinking - 5 items).
  - V5: Approaches for rewarding of improvements (the approaches for collecting and rewarding employees for their proposals for improvements: material recognition, non-material recognition, innovative teams, box and electronic collection of improvements - 5 items).
  - V6: Measurement of improvements (the approaches for measurements of proposals for improvements in organisation: systematic monitoring of proposals for improvements, internal comparisons of the number of proposals for improvements among employees and teams with financial evaluation - 4 items).
  - V7: Number of improvements (indicators representing improvements in organisation: average percentage of realisation of proposals for improvement, average net savings based on realised proposals for improvements, average net reward for realised proposals for improvements - 3 items).
  - V8: Realisation of improvements (2 items - the number of received proposals for improvements and the number of employees proposing improvements per 100 employees).
  - V9: Benchmarking and peer assessment (the internal approaches for encouraging continuous improvements: benchmarking, peer assessments, presentation of TQM system on conferences, use of BSC, Investors in people standard - 5 items).
  - V10: 20 Keys and Six Sigma (internal approaches for encouraging continuous improvements: the use of 20 keys, six sigma, and mutual audits with suppliers / customers - 3 items).
  - V11: ISO 9001 audits and process indicators (the internal approaches for encouraging continuous improvements - 3 items).
  - V12: ISO 17025 audits and EFQM self-assessments (internal approaches for encouraging continuous improvements: use of ISO 17025 audits and EFQM self-assessment - 2 items).
  - V13: NQA assessments (the participation in NQA recognition schemes: SBEP projects, quality awards, NQA and EEA - 5 items).
  - V14: ISO 9001 certification and ISO 17025 accreditation - (2 items).
  - V15: Participation on conferences, trainings and seminars (approaches for upgrading TQM knowledge using literature and internet, trainings, seminars and conferences - 3 items).
  - V16: Upgrade TQM knowledge by peer assessment (participation in NQA competitions, employees as auditors/assessors, regular benchmarking, best practice exchange and peer assessments - 4 items).
  - V17: Employee satisfaction (the monitoring of employee satisfaction, personal interview, regular meetings leaders with employees and informal meetings - 4 items).
  - V18: Leadership, values and communication (the impact of leadership on TQM: leadership style, value system and open communication in the organisation - 3 items).
  - V19: Financial indicators - comprises Return on Assets - ROA and Return on Equity - ROE (2 items) (Kern Pipan et al., 2011).

The factor analysis was used as follows: factors with eigenvalues  $> 1$ ; factor loading  $> 0.3$ ; correlations of items with factors  $> 0.3$  and factors with variance explained  $> 10\%$ . The reliability of all 19 latent variables was calculated using Cronbach's alpha (0.7), which was acceptable for further research. The Kaiser-Meyer-Olkin (KMO) indicator was calculated to assess sample size adequacy (0.5), which was acceptable for further research (Hair et al., 2006).

## Results

Table II shows the summary of factor analysis resulting in 19 latent variables and statistically significant differences between the three group means ( $p < 0.05$ ) obtained via ANOVA: Approaches for knowledge transfer and innovativeness (V4), Realisation of improvements (V8), Benchmarking and peer assessment (V9), ISO 17025 audits and EFQM self-assessments (V12), NQA assessments (V13), Upgrade TQM knowledge by peer assessment (V16) and Financial indicators (Return on Assets - ROA and Return on Equity – ROE) (V19). Data were validated using Post Hoc Tests (Bonferonni), which confirmed significant statistical differences in favour of the SBEP subgroup in the following cases: Benchmarking and peer assessment (V9), NQA assessments (V13) and Upgrade TQM knowledge by peer assessment (V16).

It can be seen that the SBEP group outperformed the other two groups of companies in following: “Benchmarking and peer assessment (V9)” (benchmarking, peer assessments, presentation of TQM system on conferences, use of BSC, Investors in people standard). These findings indicated that SBEP applicants use more QM tools and approaches for benchmarking activities and people involvement than the other two groups, which supports H3 and partly H1.

Table II: 19 latent variables ( $V_i$ ), number of items ( $I$ ), eigenvalue and construct validity (\* rotated squared loadings), mean values of groups, Wilk's lambda and ANOVA ( $p < 0.05$ )

$V_i$	$I$	Eigen-value*	Explained Variance	Factor loading	Mean SBEP	Mean Top Group	Mean Control Group	Wilk's lambda	F	p
V1 -	3	1.379	45.968	0.727– 0.602	0.217	-0.004	-0.123	0.985	0.833	0.438
V2	3	1.438	47.929	0.826– 0.344	0.312	0.007	-0.193	0.966	1.876	0.158
V3	4	2.062	51.548	0.842– 0.425	-0.009	-0.052	0.070	0.997	0.160	0.852
<b>V4</b>	<b>5</b>	<b>3.231</b>	<b>32.231</b>	<b>0.842– 0.425</b>	<b>0.565</b>	<b>-0.019</b>	<b>-0.310</b>	<b>0.898</b>	<b>6.063</b>	<b>0.003</b>
V5	5	2.795	27.954	0.885– 0.420	0.205	-0.164	0.080	0.977	1.257	0.289
V6	4	3.075	76.887	0.902– 0.863	0.383	-0.174	-0.012	0.956	2.485	0.088
V7	3	1.489	49.637	0.727– 0.680	0.203	-0.007	-0.111	0.987	0.714	0.492
<b>V8</b>	<b>2</b>	<b>1.462</b>	<b>73.100</b>	<b>0.855– 0.855</b>	<b>0.454</b>	<b>-0.097</b>	<b>-0.148</b>	<b>0.944</b>	<b>3.148</b>	<b>0.047</b>
<b>V9</b>	<b>5</b>	<b>2.355</b>	<b>18.119</b>	<b>0.771– 0.506</b>	<b>0.662</b>	<b>-0.117</b>	<b>-0.247</b>	<b>0.880</b>	<b>7.311</b>	<b>0.001</b>
V10	3	2.219	17.072	0.828– 0.555	0.142	0.032	-0.123	0.990	0.548	0.580
V11	3	2.120	16.310	0.823– 0.640	0.188	-0.144	0.067	0.982	0.993	0.374
<b>V12</b>	<b>2</b>	<b>1.330</b>	<b>10.232</b>	<b>0.846– 0.452</b>	<b>0.455</b>	<b>0.039</b>	<b>-0.317</b>	<b>0.920</b>	<b>4.668</b>	<b>0.011</b>
<b>V13</b>	<b>5</b>	<b>2.884</b>	<b>41.201</b>	<b>0.854– 0.489</b>	<b>1.112</b>	<b>-0.263</b>	<b>-0.332</b>	<b>0.669</b>	<b>26.431</b>	<b>0.000</b>
V14	2	1.261	18.016	0.779– 0.717	-0.046	0.062	-0.050	0.997	0.164	0.849

V15	3	2.544	36.337	0.917– 0.838	-0.076	0.068	-0.039	0.996	0.203	0.817
<b>V16</b>	<b>4</b>	<b>1.914</b>	<b>27.348</b>	<b>0.790– 0.487</b>	<b>0.870</b>	<b>-0.138</b>	<b>-0.344</b>	<b>0.790</b>	<b>14.250</b>	<b>0.000</b>
V17	4	2.518	35.970	0.833– 0.714	0.275	0.025	-0.194	0.970	1.635	0.200
V18	3	1.954	27.916	0.894– 0.666	0.056	-0.047	0.025	0.998	0.098	0.907
<b>V19</b>	<b>2</b>	<b>1.769</b>	<b>88.437</b>	<b>0.940– 0.940</b>	<b>0.262</b>	<b>0.307</b>	<b>-0.532</b>	<b>0.843</b>	<b>9.963</b>	<b>0.000</b>

Furthermore, the findings indicate that the SBEP group obtained higher results in the use of QM tools and approaches for “Upgrade TQM knowledge by peer assessment (V16)” (containing participation on NQA, employees as auditors/assessors, regular benchmarking, best practice exchange and peer assessments), which partly supports H1 and H3.

Discriminant analysis was performed to study the use of different tools and approaches for the systematic implementation of TQM in the sample and to investigate differences between the subgroups. The variate for a discriminant analysis, also known as the discriminant function takes the following form (Hair et al., 2006):

$$Z_{jk} = a + w_1 X_{1k} + w_2 X_{2k} + \dots + w_n X_{nk}$$

where

$Z_{jk}$  = discriminant Z score of discriminant function j for object k

$a$  = intercept

$w_i$  = discriminant coefficient for independent variable i

$X_{ik}$  = independent variable i for object k

(1)

Using discriminant analysis, determining whether the studied sample of Slovenian companies could be classified according their use of TQM tools and approaches was attempted. Table III shows that 100% of the differences between the groups with first two discriminant functions can be explained; 73.1% with the first and 27.1% with the second discriminant function.

Table III: *Function (F), eigenvalue (E), % of variance (V), cumulative % of variance and canonical correlation coefficient*

F	E	% of V	Cumulative %	Canonical Correlation
1	0.731	73	73	0.650
2	0.271	27	100	0.461

Moreover, it can be ascertained that the three subgroups of companies are best differentiated (in a statistical manner) by two discriminant functions; Table IV shows correlations between the discriminant variables included in the analysis and the selected discriminant function.

Table IV: *Wilk's lambda (WL)*

Test of Function(s)	WL	Chi-square	df	p
1 through 2	0.455	7.207	38	0.000
2	0.787	23.462	18	0.173

Table V shows variables ordered by absolute size of correlation within function. The largest absolute correlation between each variable and any discriminant function is marked with an asterisk (\*).

Table V: *Pooled within-groups correlations between discriminating variables (V) and standardised canonical discriminant functions*

Vi	Function	
	1	2
V13	0.817(*)	-0.159
V16	0.604(*)	0.030
V9	0.433(*)	-0.002
V4	0.382(*)	0.157
V12	0.315(*)	0.233
V8	0.283(*)	-0.035
V6	0.219(*)	-0.206
V2	0.207(*)	0.118
V17	0.186(*)	0.140
V1	0.141(*)	0.064
V7	0.131(*)	0.054
V19	0.250	0.721(*)
V5	0.102	-0.243(*)
V11	0.094	-0.211(*)
V10	0.099	0.107(*)
V15	-0.036	0.103(*)
V14	-0.018	0.102(*)
V3	-0.016	-0.102(*)
V18	0.027	-0.069(*)

The first discriminant function is best explained by importance of: “NQA assessments” (V13), “Upgrade TQM knowledge by peer assessment” (V16), “Benchmarking and peer assessment” (V9) and “Approaches for knowledge transfer and innovativeness” (V4). A rather negative connection can be observed in connection with the use of “Approaches for knowledge transfer and innovativeness” (V5), “ISO 9001 audits and process indicators” (V11), “Invested days of training per employee” (V3) and “Leadership, values and communication” (V18). Therefore, it can be ascertained that the first discriminant function mainly indicates the importance of NQA, recognition and peer assessment, whereas the second discriminant function mainly indicates the importance of financial indicators.

Table VI shows classification result of discriminant analysis in which the results can be seen according to their characteristics described in 19 items.

Table VI: *Result of discriminant analysis showing original and predicted classification*

Original groups	Predicted groups			
	Group 1	Group 2	Group 3	Total
SBEP	16 (70%)	6 (26%)	1 (4%)	23 (100%)
Top Group	5 (10%)	32 (67%)	11 (23%)	48 (100%)
Control Group	4 (10%)	9 (23%)	26 (67%)	39 (100%)
Total	25 (23%)	47 (43%)	38 (35%)	110 (100%)

Table VII presents statistically significant differences in favour of Group 1: “Financial resources in TQM, education and R&D” (V2), “Approaches for knowledge transfer and innovativeness” (V4), “Approaches for rewarding of improvements” (V5), “Measurement of improvements” (V6), “Number of improvements” (V7), “Realisation of improvements” (V8), which supports H1; “Benchmarking and peer assessment” (V9), which supports H3; “ISO 9001 audits and process indicators” (V11), “ISO 17025 audits and EFQM self-assessment” (V12), “NQA assessments” V13, which partly supports H2; “Upgrade TQM knowledge by peer assessment” (V16) and “Employee satisfaction” (V17), which supports H1, and “Financial indicators” (V19), which supports H4.

Table VII: Test of Equality of Group Means of variables (V), Wilk's lambda (WL) and mean values of three groups ( $p < 0.05$ )

Vi	Group 1	Group 2	Group 3	WL	F	P
V1	0.302	0.035	-0.185	0.962	2.085	0.129
<b>V2</b>	<b>0.423</b>	<b>0.027</b>	<b>-0.244</b>	<b>0.930</b>	<b>4.005</b>	<b>0.021</b>
V3	0.253	-0.088	-0.072	0.980	1.092	0.339
<b>V4</b>	<b>0.769</b>	<b>-0.305</b>	<b>-0.190</b>	<b>0.813</b>	<b>12.312</b>	<b>0.000</b>
<b>V5</b>	<b>0.284</b>	<b>-0.595</b>	<b>0.274</b>	<b>0.833</b>	<b>10.708</b>	<b>0.000</b>
<b>V6</b>	<b>0.539</b>	<b>-0.606</b>	<b>0.147</b>	<b>0.803</b>	<b>13.134</b>	<b>0.000</b>
<b>V7</b>	<b>0.727</b>	<b>-0.351</b>	<b>-0.135</b>	<b>0.826</b>	<b>11.255</b>	<b>0.000</b>
<b>V8</b>	<b>0.623</b>	<b>-0.254</b>	<b>-0.149</b>	<b>0.877</b>	<b>7.530</b>	<b>0.001</b>
<b>V9</b>	<b>0.878</b>	<b>-0.400</b>	<b>-0.181</b>	<b>0.750</b>	<b>17.834</b>	<b>0.000</b>
V10	0.215	0.020	-0.128	0.981	1.011	0.367
<b>V11</b>	<b>0.249</b>	<b>-0.396</b>	<b>0.150</b>	<b>0.925</b>	<b>4.357</b>	<b>0.015</b>
<b>V12</b>	<b>0.626</b>	<b>0.298</b>	<b>-0.545</b>	<b>0.745</b>	<b>18.343</b>	<b>0.000</b>
<b>V13</b>	<b>1.169</b>	<b>-0.286</b>	<b>-0.416</b>	<b>0.570</b>	<b>40.393</b>	<b>0.000</b>
V14	0.311	-0.030	-0.144	0.967	1.804	0.170
V15	0.056	-0.062	0.015	0.998	0.111	0.895
<b>V16</b>	<b>1.313</b>	<b>-0.225</b>	<b>-0.536</b>	<b>0.444</b>	<b>67.079</b>	<b>0.000</b>
<b>V17</b>	<b>0.324</b>	<b>0.290</b>	<b>-0.379</b>	<b>0.883</b>	<b>7.063</b>	<b>0.001</b>
V18	-0.036	0.113	-0.062	0.994	0.328	0.721
<b>V19</b>	<b>0.520</b>	<b>0.201</b>	<b>-0.419</b>	<b>0.843</b>	<b>9.928</b>	<b>0.000</b>

The results of the comparison presented in Table II show that, in general, the mean values of the SBEP group exceed the other two groups. When a comparison between predicted groups of companies (Table VII) is made, it can be seen that Group 1 (consisting of 70% SBEP) generally has an overall higher mean values compared with other subgroups of companies. Based on the results (Tables II and VII), it can be concluded that the SBEP group is more related to external assessment, (which partly supports H2) and less to financial indicators where the top group leads (which partly supports H4).

### Discussion and conclusions

*This paper presents the results of a survey conducted on a sample of Slovenian companies with the aim of studying their use of TQM tools and approaches, especially within NQA applicants and its relation to people involvement, external recognition, benchmarking and financial results. Using discriminant analysis, it was shown that the SBEP group is more related to external assessment and the top group to financial results, whereas the control group is less related to external assessment and to financial results. The interesting findings of our research are that the significant differences in mean values, confirmed in favour of SBEP group of companies (Table II) and Group 1 companies (Table VII) as compared to other groups in the survey, are the importance of using:*

- "Benchmarking and peer assessment", which confirms the suggestions of other authors studying the relationship between benchmarking activities and companies NQA applicants (Vokurka et al., 2000; Mann and Grigg, 2004) and also supports H3;
- "NQA assessments", which confirms the results reported by other authors studying positive

impact of NQA on the use of QM tools and approaches for external recognition (Leonard and McAdam, 2003; Angell and Corbrett, 2009) and supports H2;

- “Upgrade TQM knowledge by peer assessment”, which confirm the findings of several authors studying the link between TQM and people involvement (Jimenez and Costa 2009; Vouzas and Gotzamani, 2005) and partly supports H1.

In the case of “Financial indicators” (V19), our findings did not confirm significant differences in mean values of SBEP group of companies (Table II) as compared to the top group of companies. However, the results confirmed significant differences in mean values in favour of Group 1 companies (Table VII), which confirms the results reported by authors investigating positive financial effects of companies, i.e. NQA winners (Hendricks and Singhal 2001; York and Miree, 2004; Boutler et al., 2005) and partly supports H4.

The results comparing SBEP and EEA average scores showed that EEA outperformed SBEP significantly, especially with criteria describing leadership, people results and customer results (Kern Pipan et al., 2011). It is not clear to what extent Slovenian companies have actually implemented TQM into their business performance, but it is obvious that (with some rare exceptions), the average results with SBEP cannot represent excellence as compared with EEA.

Nevertheless, many authors reported that management commitment, organisational culture, team work, values and communication had a significant influence on the successful introduction of TQM in the companies (Peters and Waterman, 1982; Robinson and Schroeder, 2004; Dalgaard-Park and Dalgaard, 2007; Jimenez and Costa, 2009; Choi et al., 2012). However, our findings showed, in contrast, that all three studied groups had used almost similar attitudes related to training, education, standards and managerial implications on the TQM process. Similar findings were reported by Tari and Sabater (2004) who studied the use of TQM tools in Spanish certified companies and found no connection with the leadership commitment. The results of this study partly support H1 in terms of people involvement in TQM process. However, Dalgaard-Park and Dalgaard (2007) pointed out that the BEM (such as EFQM and MBNQA) in the future should be used more like a business/management control model in which the main aim is improvement, not an award application. Under this condition, the BEM is regarded as one of the best management control models, which definitely can help companies in improving competitiveness and the financial performance (Dalgaard-Park and Dalgaard, 2007). However, the findings also showed that leaders in Slovenian companies, although some of them are applying and even winning SBEP, have not taken advantage of the EFQM model and its full potential in terms of management commitment, communication, values and training of the people. The lack of perceived importance with regard to management commitment, values, training and communication seen in all examined companies may be of utmost importance for a breakthrough in TQM implementation and an increase of the competitiveness and business performance in Slovenian companies.

### **Limitations and Future Research**

One limitation of this study is related to the size of the sample, which is rather small (110 companies), and the fact that the survey conducted in the year 2006 (before the economic crisis). Nevertheless, the authors do not believe that the size of the sample has affected the findings of the study. The authors also believe that a repeated survey could provide additional perspectives about the development of the TQM and positive effects of SBEP on reached quality excellence level and business performance after the crisis.

On the basis of our research, it can be concluded that, the companies that took part in the NQA have higher mean scores of observed variables as compared to the other two groups. Bearing in mind the previously mentioned positive contribution of TQM on GDP (CEBR, 2012), the authors recommend that companies systematically introduce TQM systems based on BEMs, which are also correlated with the findings of this research done on a representative sample in Slovenian companies. However, the current situation and crisis that the Slovenian economy has been facing for some time could be another impulse that level of quality performance in the companies in this region is rather behind to those levels on which European companies operate.

Nevertheless, further studies should focus not only on implementation of TQM tools and approaches, but more on management commitment, innovations and its impacts on successful TQM implementation in companies. This would contribute to a better understanding and use of TQM principles and help to improve organisational performance in the companies and strengthen the competitiveness of the Slovenian economy.

### **Acknowledgements**

The authors sincerely acknowledge all the support of the Metrology Institute of Republic Slovenia (MIRS) in carrying out empirical study.

## References

- Angell, C.L. and Corbett, L.M. (2009), "The Quest for Business Excellence: Evidence from New Zealand's Award Winners", *International Journal of Operations and Production Management*, Vol. 29 No. 2, pp. 170-199.
- Boutler, L., Bendell, T., Abas, H., Dalgaard, J. and Singhal, V. (2005), "Report on EFQM and BQF funded Study into the Impact of the Effective Implementation of Organizational Excellence Strategies on Key Performance Results", Centre of Quality Excellence, The University of Leicester.
- CEBR. (2012), "The contribution of QM to the UK economy", Centre for Economics and Business Research (CEBR).
- Choi, B., Kim, J., Leem, B., Lee, C.Y. and Hong, H.K. (2012). "Empirical analysis of the relationship between Six Sigma management activities and corporate competitiveness: Focusing on Samsung Group in Korea", *International Journal of Operations & Production Management*, Vol. 32 No 5, pp. 528-550.
- Crosby, P.B. (1980), *Quality is free*. ISBN 0070145121, New American Library, New York.
- Dahlgaard, J.J. and Dahlgaard-Park, S.M. (2006), "Lean production, six sigma quality and company culture", *TQM Magazine*, Vol 18 No 3, pp. 263-281.
- Dahlgaard-Park and S.M., Dahlgaard, J.J. (2007), "Excellence—25 years evolution", *Journal of Management History*, Vol 13 No 4, pp. 371-393.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006), *Multivariate Data Analysis*. Sixth Edition, Pearson, Prentice Hall, New Jersey, ISBN 0-13-032929-0.
- Hendricks, K.B. and Singhal, V.R. (2001), "Firm Characteristics, Total Quality Management and Financial Performance", *Journal of Operations Management*, Vol 19 No 3, pp. 269-285.
- Ishikawa, K. (1985), *What is Total Quality Control?*, The Japanese Way. Prentice-Hall International, Inc., Englewood Cliffs, N.J..
- Jimenez, J.D. and Martinez, C. M. (2009), "The performance effect of HRM and TQM: a study in Spanish Organizations", *International Journal of Operations & Production Management*, Vol 29 No 12, pp. 1266-1289.
- Juran, J.M. (1995). *Managerial Breakthrough: The Classic Book on Improving Management Performance*. McGraw-Hill Inc. New York.
- Kern Pipan, K., Gomišček, B., Kljajić, M. and Jesenko, M. (2011), "An empirical study on comparing total QM (TQM) items on national quality award applicants in Slovenia", *Academic Journals, African Journal of Business Management*, Vol 5 No 33, pp.12829-12840.
- Kern Pipan, K., Gomišček, B. and Mayer, J. (2012), "Exploratory study of quality and excellence approaches and continuous improvement from the perspective of new institutionalism", *Journal for East European Management Studies*, Vol. 17 No 3, pp. 313-332.
- Leonard, R. and Adam, D. (2003), "An Evaluative Framework for TQM Dynamics in Organizations", *International Journal of Operations & Production Management*, Vol 23 No 6, pp. 652-677.
- Lu, D., Betts, A. and Croom, S. (2011), "Re-investigating business excellence: Values, meas-

ures and a framework”, *Total Quality Management*, Vol 22 No 12, pp. 1263-1276.

Mann, R. and Grigg, N. (2004). “Helping the Kiwi to Fly: Creating World-Class Organizations in New Zealand Through a Benchmarking Initiative”, *Total Quality Management*, Vol. 15 No. 5-6, pp. 707-718.

Oakland, J.S. and Tanner, S.J. (2008), ”The relationship between Business Excellence and Performance – An empirical study using Kanji’s Leadership Excellence Model”, *Total Quality Management*, Vol. 19 No. 7-8, pp. 733-749.

Peters, T.J. and Waterman, R.H. (1982), *In Search of Excellence, Lessons from America’s Best-Run Companies*, Harper & Row, Publishers Inc., New York.

York, K.M. and Miree, C.E. (2004), “Causation or Covariation: An Empirical Re-Examination of the Link Between TQM and Financial Performance”, *Journal of Operations Management*, Vol. 22 No. 3, pp. 291-311.

Robinson, A. and Schroeder, D.M. (2004). *Ideas Are Free: How the Idea Revolution is Liberating People and Transforming Organizations*, Berrett-Koehler Publishers, Inc., San Francisco.

Tari, J.J., Molina, J.F. and Castejón, J. L. (2007), “The relationship between QM practices and their effects on quality outcomes”, *European Journal of Operational Research*, Vol 183 No 2, pp. 483-501.

Vokurka, R.J., Stadnig, G. L. and Brazeal, J. (2000), “A Comparative Analysis of National and Regional Quality Awards”, *Quality Progress*, Vol 3 No 88, pp. 41-49.

Vouzas, F. and Gotzamani, K. (2005), “Best practices of selected Greek organizations on their road to business excellence; the contribution of the new ISO 9000:2000 series of standards”, *The TQM Magazine*, Vol 17 No 3, pp. 259-266.