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ORGANIZATIONAL CULTURE AS A FACTOR IN THE SUCCESSFUL IMPLEMENTATION OF THE TQM CONCEPT

Organizaciona kultura kao faktor uspešne
implementacije TQM koncepta

Abstract

Continuous work on quality improvement in all business domains, based on employee teamwork and process orientation, is one of the key predictors of maintaining and improving the company's existing competitive position. Organizational culture, as a key factor of the company's internal environment, is an important determinant of the implementation of the concept of total quality management (TQM concept), which is directly reflected in the generation of TQM performance improvement. The conducted empirical research includes a sample of 64 manufacturing companies, with a certified quality management system, in the territory of the Republic of Serbia. Their business practice indicated the existence of a strong direct correlation between the dimensions of organizational culture – the principles of the TQM concept – TQM performance, which is an indicator of the significant impact of organizational culture on generating improvements in any domain of implementing the quality management philosophy and reaching the level of business excellence. The contribution of the paper is reflected in the expansion of the knowledge base and a better understanding of the mutual relationship between internal organizational relations and the quality improvement process.

Keywords: *organizational culture, TQM concept, principles, performance, Serbia*

Sažetak

Kontinuiran rad na unapređenju kvaliteta u svim domenima poslovanja, zasnovan na timskom radu zaposlenih i procesnoj orijentaciji, jedan je od ključnih prediktora kako održavanja, tako i unapređenja postojeće konkurentske pozicije preduzeća. Organizaciona kultura, kao ključni faktor internog okruženja preduzeća, važna je determinanta implementacije principa koncepta totalnog upravljanja kvalitetom (TQM koncepta), što se direktno odražava na generisanje unapređenja performansi istog. Sprovedeno empirijsko istraživanje obuhvata uzorak od 64 proizvodnih preduzeća, sa sertifikovanim sistemom menadžmenta kvalitetom, na teritoriji Republike Srbije. Njihova poslovna praksa ukazala je na postojanje jake direktne korelacije na relaciji dimenzije organizacione kulture – principi TQM koncepta – performanse TQM, što je pokazatelj značajnog uticaja organizacione kulture na generisanje unapređenja u bilo kom domenu implementacije filozofije menadžmenta kvalitetom i dostizanja nivoa poslovne izvrsnosti. Doprinos rada se ogleda u širenju baze znanja i boljem razumevanju međusobnog odnosa internih organizacionih relacija i procesa unapređenja kvaliteta.

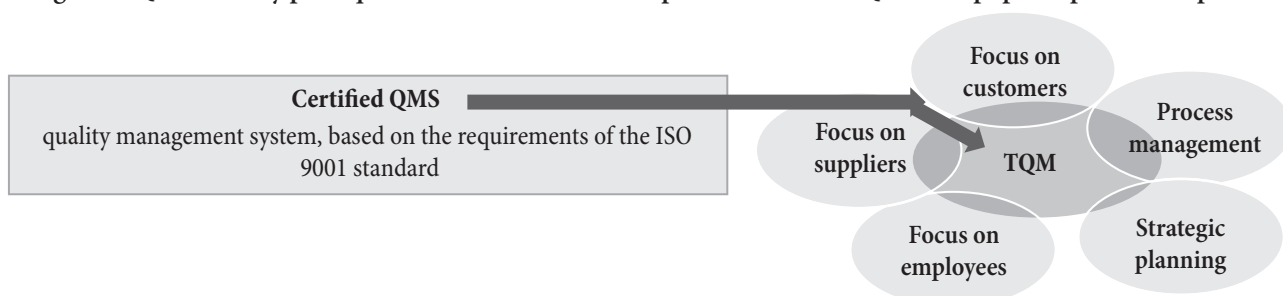
Ključne reči: *organizaciona kultura, TQM koncept, principi, performanse, Srbija*

Introduction

Generating business excellence is a key goal of the implementation of the total quality management concept (TQM concept) [8], [18], [33], [42], [49]. The principles of the TQM concept are aimed at running a company based on a vision, creating a sustainable future, continuously developing the organization's capabilities, achieving success through the teamwork of talented people, working to maintain long-term partnership relationships with suppliers and customers, encouraging creativity/innovation and effectively adapting to recognized changes [27]. Operating in accordance with the principles of TQM reflects the company's aspiration to generate business excellence, and each of the listed objectives of TQM implementation is an important determinant of key performance [8], [18], [42], [44].

Organizational design dimensions are a predictor of generating improvements in all domains of quality management [2], [6], [14], [23], [24]. Organizational culture, as a contextual dimension of organizational design, is the most important factor of the internal environment, and determines the willingness of a company and its employees to make a maximum commitment to the successful implementation of TQM principles, and thus the generation of quality improvement in all business domains [1], [6], [28], [40]. The subject of the research is the examination of the role and importance of the organizational culture of a company in the implementation of the TQM concept. The goal of the research is to clarify which determinants of organizational culture in Serbian production companies should be corrected and improved in order to generate business excellence by improving quality in all business domains.

Figure 1: QMS as a key prerequisite for the successful implementation of TQM concept principles in companies



Source: [6], [17], [35], [39]

The work is structured in five logically connected units. The first part analyzes the implementation of the principles of the TQM concept aimed at improving the company's competitive advantage, while TQM performance is the focus of the second part of the work. The third part analyzes organizational culture as a key factor of the internal environment of the company, and then the fourth part examines the influence of the dimensions on the implementation of the TQM concept. The fifth part of the paper presents the results of the empirical research and the discussion of its results in the context of the influence of the organizational culture dimensions on the observance of the principles and improvement in TQM performance.

The principles of the TQM concept as a factor of the company's competitive advantage

In modern conditions of competition, the implementation of TQM is the basis of long-term business success [20], [44] and contributes to improving competitive advantage on domestic and global markets [8], [18], [42]. The concept puts in the foreground the orientation towards continuous improvement in the quality in all domains of business, based on teamwork, integration of processes and continuous improvement in business activities [1], [31].

The continuous improvement of business activities is the basis of the TQM philosophy, along with the identification of factors that influence the implementation of the concept, and thus competitiveness: focus on customers, integration of all processes through the establishment of efficient process management, involvement of the entire organization, the process of planning and improvement in the domain of all work and business activities [38], [47].

The basic principles of the TQM concept implementation (Figure 1) are based on the previously listed factors: process management, focus on suppliers, focus on customers, focus on employees, and strategic planning [6], [17], [35], [39].

Ahire, Waller and Golhar [5] investigated the implementation of the TQM concept by manufacturing companies and concluded that for the generation of business excellence it is not important that all companies, manufacturing and service, formally implement the concept, but that they adhere to the principles on which it is based in business [4], [5]. The implementation of TQM principles improves operational performance, which positively affects financial performance, customer satisfaction, and the satisfaction of all other stakeholders [19], [21], [43]. The positive impact of operations in accordance with TQM principles on the performance of research and development activities of manufacturing companies has also been proven [38]. The level of all indicators of organizational performance is higher in manufacturing companies that operate in accordance with the TQM philosophy compared to those that do not adhere to it [2], [7], [9], [16], [19], [20], [21]. It can be concluded that the implementation of TQM in the operations of manufacturing companies is one of the key prerequisites for improving competitiveness.

The results of the research show that a strong correlation between the establishment of an efficient and effective QMS – the successful implementation of the TQM principles is an important part of the most successful company management system in the current conditions of uncertainty. It is impossible to survive on the market if the company, with certified quality management, does not continuously work to improve quality beyond customer expectations, with a continuous aspiration to improve quality in all domains of business [30]. The international standard ISO 9001 defines the requirements for the quality

management system in business organizations. The quality management system, based on the requirements of the ISO 9001 standard, is focused on ensuring efficiency and functionality with the aim of performing production and providing services in accordance with consumer needs and the law [53]. A certified quality management system is a key prerequisite for the successful implementation of the principles of the TQM concept [9], [19]. QMS and ISO 9001 principles significantly intertwine with TQM principles and are aimed at achieving success in the market.

Chinese companies have the status of leaders in the field of ISO 9001 certification at the global level (the period 2020-2021). Italy and Germany are leaders in this domain in Europe [54]. In the period 2007-2011, according to the results of the World Bank research, Serbia had the status of a leader in the region in terms of the number of industrial companies with ISO 9001 certification (Table 1). According to data for 2020, 3,092 companies in the industrial sector with ISO 9001 certification were registered in Serbia [53].

How rigorous the controls are in the field of compliance with the requirements of the ISO 9001 standard is best illustrated by the fact that the largest loss of certificates at the global level was recorded in the period 2017-2018, with the largest losses recorded in the following countries [54]: China (97,305 certificates), Germany (17,176 certificates), Great Britain (11,044 certificates), Japan (10,695 certificates) and Italy (9,852 certificate). In Serbia, the biggest drop in the number of certificates was recorded in the period 2016-2017 (from 921,760 to 746,204 certificates in all sectors of the economy) [55].

Serbian manufacturing companies that have a certified QMS are included in the research. Recertification of QMS is carried out every year and it is a signal of respect for the principles of QMS and TQM. Companies that strive for continuous quality improvement adapt their business to

Table 1: Number of ISO 9001 certificates in the industrial sector in the Balkan countries - period 2007-2011

	ISO 9001				
Albania	23	43	155	52	164
Bosnia and Herzegovina	652	811	909	944	1,119
Croatia	2,073	2,302	2,567	2,102	2,117
Macedonia	255	271	no data	no data	no data
Montenegro	136	160	157	85	146
Serbia	1,987	2,091	2,733	1,790	2,868

Source: [53]

the requirements of the ISO 9001 standard, with the aim of achieving business excellence by applying Deming's PDCA cycle (planning - realization - measurement - improvement) in process management [25]. The Foundation for the Culture of Quality and Excellence (FQCE), a non-profit organization that awards the National Award for Business Excellence, has defined the criteria for achieving the "Oscar of Quality", which are based on the cycle described above. FQCE emphasizes the importance of designing processes in the organization in accordance with the principles of the PDCA cycle, the requirements of management system and the criteria of business excellence, whereby all the listed principles form the basis of the implementation of the TQM concept and business success [55].

Total quality management performance

Doing business in accordance with the principles of QMS and the TQM principles is the main predictor of improvements in the performance of total quality management [5], [10]. TQM performance is a determinant of organizational performance [2], [9], [18], [27], [30] and affects qualitative indicators of business performance: quality, flexibility, cost efficiency, timeliness of quality product delivery, and innovation [1], [10], [46], [47].

The key performance indicators of the success in the TQM concept implementation are [6], [17], [21], [29], [32]:

- *Quality improvement* – by internal and external QMS checks, companies measure progress in the field of process management, quality management systems and operations in accordance with the principles of TQM and achieving business excellence every year. Each of the previously listed verification criteria is a signal of the level of quality improvement in all business domains.
- *Cost reduction* – improvements in the domain of process management and compliance with the procedures defined by QMS, in the performance of work activities (especially production activities) directly affect the reduction in business costs. The norms for all production activities of a company are precisely defined by QMS procedures, and the observance of the given norms and continuous work

on improvements in that domain directly affect the reduction in scrap and the shortening of the time for performing work operations, which is a significant determinant of cost savings in manufacturing companies. The TQM implementation also indicates the importance of building long-term relationships with suppliers, which leads to significant savings in acquisition costs of strategic raw materials (more favorable commercial conditions), and thus the reduction in business costs.

- *Flexibility improvement* – the importance of a quick and efficient response to changes, primarily in the external environment, was particularly evident in the conditions of the Covid-19 pandemic and current geopolitical circumstances. It is a big challenge for companies to analyze opportunities from the environment, register and categorize risks, and define how to treat each of them. The methodology of the risk management system is defined by the requirements of the ISO 9001 standard, and companies that have a certified quality management system annually define a risk register, updating it if there are changes in the domain of internal and external environmental factors.
- *Delivery effectiveness* – TQM performance that overlaps with supply chain management performance. This performance indicator is the main signal of the impact of the implementation of the TQM concept on the establishment of efficient and effective supply chain management (SCM), i.e. the impact of compliance with TQM principles on the generation of timely delivery of quality products to customers at acceptable costs. Delivery effectiveness is determined by three indicators - quality improvement, cost reduction, and delivery efficiency, and affects the fifth qualitative indicator - customer satisfaction. This indicator points to the success in making improvements in the domain of supply chain management and customer satisfaction in all aspects of delivery.
- *Customer satisfaction* – it is about the joint performance of the successful implementation of the TQM concept, the establishment of successful supply chain management, and the generation of efficient

and effective customer relationship management (CRM). Customer surveys and detailed analyses of their satisfaction with product quality, price policy, delivery terms, payment methods, complaints handling, and staff cooperation provide a signal on which aspects should be worked on in the coming year. Improvement in customer satisfaction with all determinants of business cooperation depends on improvement in quality, reduction of costs, improvement in flexibility and efficiency of delivery.

Each of the listed performance indicators of the TQM concept implementation reflects the degree of progress in the domain of reaching the level of business excellence. They are predominantly measured by qualitative indicators and are a reflection of the company's overall success in responding to the requirements of the ISO 9001 quality management standard, which is reflected in the principles of TQM and improved competitive position. There is a strong correlation among all qualitative performance indicators of the implementation of the TQM concept, which implies that the improvement in the performance of any indicator directly affects the improvement in other indicators. The analysis of the performance of the TQM concept also proves its strong connection with the performance of SCM and CRM.

Organizational culture as a key factor in the company's internal environment

Organizational culture represents a set of values, norms and attitudes shared by employees in a company, which determines their behavior and decision-making [12], [26]. The analysis of organizational culture examines behavior and decisions in a company, which implies that this contextual dimension of organizational design has the status of a key factor of the internal environment that dominantly determines human resource management [3], [15], [40], [50]. Organizational culture is a source of a company's competitive advantage only if the level of employee homogeneity is very high, i.e. if all employees understand and interpret phenomena inside and outside the company in approximately the same way [12], [26], [34]. Successful companies view organizational culture

as a means of influencing the behavior and habits of employees [41]. Organizational culture can also be a brake on the growth and development of a specific company if it discourages changes and prevents business flexibility, and therefore an effective reaction to changes in the market.

Deal and Kennedy consider risk-taking a key dimension of organizational culture [13]. Lopez, Peon and Ordas confirm, emphasizing the role of communication methods in the organization [23]. In some studies, the speed of the organization's response to changes, the control mechanism, the reward system, the progress and development of employees, and the focus on goals were singled out as important dimensions of organizational design [11], [14]. Rad combines the results of all previous research on the key dimensions of organizational culture and defines them as follows [39]:

- *Entrepreneurship* – management's ability to productively combine resources, while taking risks.
- *Risk taking* – solving problems using unconventional methods, with the risk of making mistakes.
- *Stability* – the degree to which employees value stability and job security.
- *Collectivism* – collectivism, as opposed to individualism, promotes teamwork based on joint problem solving and the realization of tasks through the exchange of knowledge.
- *Power distance* – the degree of inequality in the distribution of power within the organization.

Each of the dimensions reflects the key characteristics of organizational culture in a specific company and affects the quality of all domains of business, and thus the efficiency and effectiveness of business.

The influence of the dimensions of organizational culture on the success in the implementation of the TQM concept

Organizational culture and the implementation of the TQM concept have crystallized as important determinants of competitive advantage through the results of numerous studies [8], [18], [26], [29], [33], [34]. The performance of the successful implementation of the TQM concept

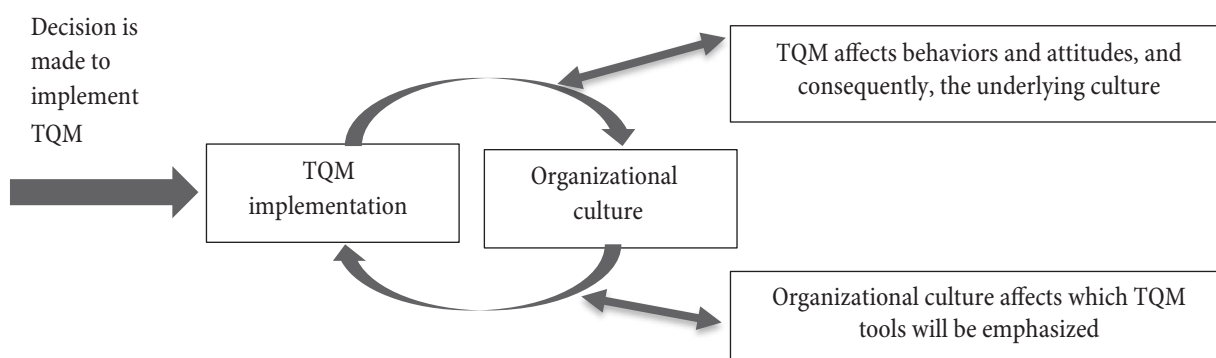
partially coincides with qualitative indicators of business performance, which indicates the influence of organizational culture on their improvement [51].

The analysis of interdependence in the relationship between organizational culture and the TQM concept implementation has been a topic of research for decades. Rad indicated the existence of a statistically significant influence of the dimensions of organizational culture on the performance in the implementation of the TQM concept, with the conclusion that TQM requires a qualitatively oriented organizational culture, based on entrepreneurship, organizational learning, teamwork, a tendency to take risks, open communication, and a desire to continuous improvements in all domains of business [39]. Jancikova and Brychta came to similar conclusions as Rad, highlighting the importance of interdependence in the relationship between organizational culture dimensions and the performance of the TQM concept for generating a company's competitive advantage [17]. The statistically significant influence of organizational culture on the implementation of the TQM concept was also proven on the example of the business practices of Jordanian companies [16], where the authors paid special attention to the influence of norms and values within the company on the successful implementation of the TQM concept. The interdependence of the relationship between organizational culture - knowledge management - implementation of the TQM concept has been proven in research in the public sector of Pakistan [28]. The authors confirmed Pool's conclusions from 2000 [37] that for the successful implementation of the TQM concept, it is important that organizational culture of a company

promotes the values of continuous learning. Therefore, the successful implementation of TQM and the achievement of business excellence are based on the support of an adequate organizational culture.

Sousa-Poza et al. [45] indicated the existence of a strong mutual interdependence in the relationship between the implementation of the TQM concept and organizational culture (Figure 2). The successful implementation of the TQM concept directly affects the content of organizational culture, while the content of organizational culture determines the success and functionality of the TQM concept [45]. It is precisely on this interdependence that the generation of performance improvement of the TQM concept is based. Rad presented it in the simplest way with the influence of dimensions of organizational culture on the realization of the principles of the TQM concept [39], while Janickova and Brychta in the research from 2009 indicated the existence of a direct influence of the dimensions of organizational culture on the performance of the TQM concept [17]. Both studies conclude that the dimensions of organizational culture statistically significantly determine the success of the TQM concept, while all improvements in the field of its implementation require certain changes in the content of the dimensions of organizational culture. The conclusions of the research of Sousa-Poza et al. [45], Rad [39] and Janickova and Brychta [17] are the basis for defining the initial research model in this paper because it most fully covers the interdependence in the relationship between the dimensions of organizational culture – principles of the TQM concept – TQM performance concept, which will crystallize what needs to be corrected and improved

Figure 2: The link between TQM and organizational culture



Source: [45]

in the field of organizational culture in order to generate the level of business excellence, based on constant work on improving the determinants of the TQM concept in the company.

Empirical research on the influence of dimensions of organizational culture on the performance in the implementation of the TQM concept

Research methodology

The analysis of the influence of dimensions of organizational culture on the implementation of the TQM concept was carried out on a sample of 64 companies (Table 2) dominated by the technological phase of the business (chemical production, production of metal semi-products, and production of spare parts from the domain of electronics, pneumatics and hydraulics), with a certified QMS, in the territory of the Republic of Serbia. The focus was on companies that are familiar with and implement the requirements of the ISO 9001 management system/standard in their operations, operate in accordance with the goals of establishing efficient and effective management processes, and strive to reach the level of business excellence through quality improvement in all business domains. In the structure of the sample, 20% are production companies that are members of the FQCE organization and that continuously work on improving business excellence in accordance with the criteria of this organization. The data was collected by surveying employees who belong to top and operational management during the period September-October 2022. Top and operational management is the target research group because this

segment of employees is best acquainted with the level of implementation of QMS, process management, TQM, and business excellence criteria. Interviews with employees during the research showed that employees with higher education in the production sector of the economy in Serbia are more familiar with the principles of QMS and TQM, while employees with secondary and lower education are rarely familiar with the same (Figure 3). Employees who perform work tasks on machines in production have the lowest level of knowledge in the domain of QMS and are familiar only with the procedures in performing their work tasks. All employees have an opinion about the dimensions of organizational culture, but due to the lack of knowledge of other variables important for research, the focus was on employees who have knowledge about organizational culture, QMS, TQM, process management and business excellence.

Table 2: Profile of surveyed manufacturing companies (n=64)

Profile of surveyed companies	Number of companies (n)	Percentage (%)
<i>Company size</i>		
Big companies	22	34%
Medium companies	42	66%
<i>Headquarters of the company (statistical region in Serbia)</i>		
Belgrade	23	36%
Eastern Serbia	7	11%
Western Serbia	13	21%
Southern Serbia	6	9%
Central Serbia	6	9%
Vojvodina	9	14%
<i>Length of business</i>		
up to 10 years	14	22%
10-20 years	29	45%
over 20 years	21	33%

Source: Output from SPSS

Figure 3: Knowledge of the principles/requirements of QMS, the requirements of the ISO 9001 standard, the principles/requirements of the TQM concept and the criteria for achieving the level of business excellence by employees in surveyed manufacturing companies in the Republic of Serbia

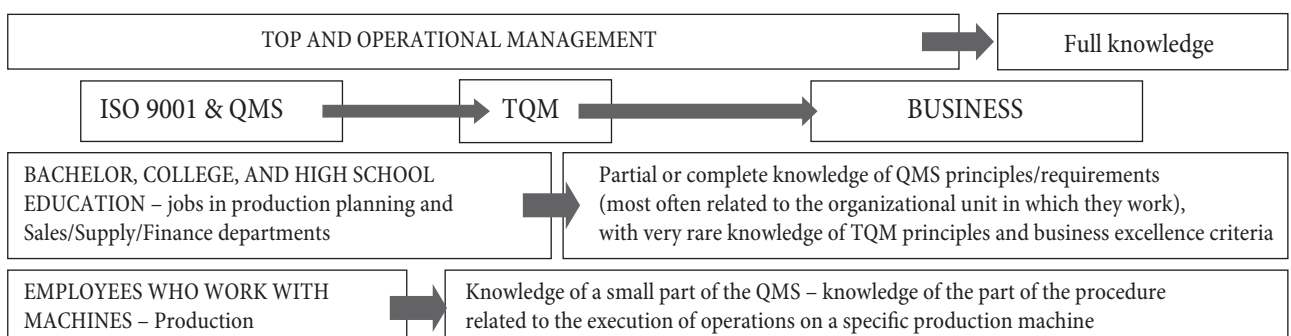
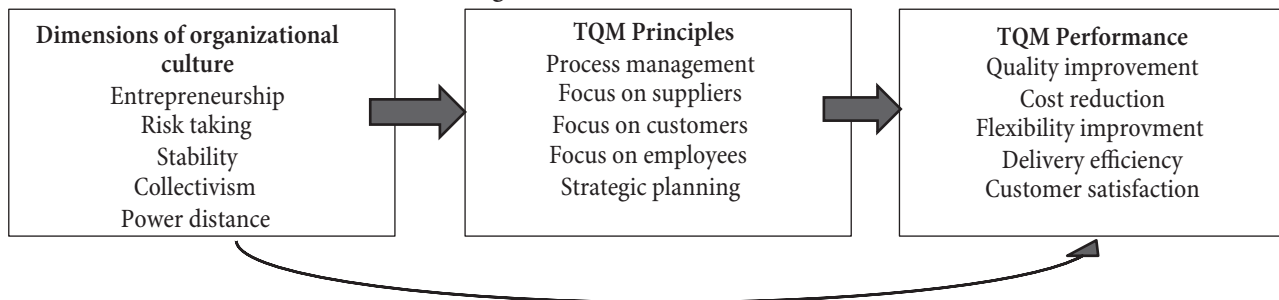


Figure 4: Initial research model



Source: [17], [39], [45]

The simplified initial research model is shown in Figure 4. The dimensions of organizational culture have the status of independent variables, while the principles and performance of the implementation of the TQM concept have the status of dependent variables. The following hypotheses will be tested in the paper:

- H_1 : Dimensions of organizational culture statistically significantly determine the respect and implementation of TQM principles by manufacturing companies in the Republic of Serbia.
- H_2 : Respecting the principles of the TQM concept implementation is a key predictor of generating improvements in the domain of TQM performance.
- H_3 : The dimensions of organizational culture of Serbian manufacturing companies have a statistically significant impact on performance as indicators of the success in the implementation of the TQM concept.

Each of the variables is assessed through five statements using a five-point Likert scale, where a score of 1 means absolute disagreement with the given statement, and a score of 5 absolute agreement. SPSS statistical software and the application of descriptive, correlation and regression analysis were used to process and analyze the collected data. First, a descriptive statistical analysis was conducted on the entire sample with the aim of assessing the homogeneity of the data across companies. In the second step, a correlation analysis was carried out in order to see in detail the correlation and the strength of the connection between all the variables that are the subject of the research. After that, a regression analysis was carried out with the aim of identifying the dimension of organizational culture which dominantly determines

the respect for the principles of implementation of the TQM concept and the generation of improvement in its performance, and therefore the fulfillment of the criteria for reaching the level of business excellence of manufacturing companies in the Republic of Serbia.

Statistical analyses

The obtained results of the descriptive statistical analysis are presented in Table 3. For each of the variables, the arithmetic mean and standard deviation were calculated by implementing descriptive statistics. First, the statements related to the independent variable “dimensions of organizational culture” are listed, followed by the statements for the dependent variables “principles of the TQM concept” and “performance of the TQM concept.”

Table 3 presents the dominant characteristics of the organizational culture of Serbian manufacturing companies with a certified QMS, as well as the current state of success in the implementation of the TQM concept. When it comes to the organizational culture of the surveyed companies, it can be concluded that entrepreneurship (combining resources in a productive way) and a sense of stability among employees are key dimensions of organizational culture in most companies (arithmetic mean 3.94). Propensity to take risks and collectivism also play a significant role (arithmetic means 3.61 and 3.81), while the least expressed dimension is the existence of a high-power distance within the organization (2.48). The representatives of the surveyed companies expressed their opinion after filling out the questionnaire that they predominantly strive to satisfy demands and needs of employees because they are aware of the importance of

Table 3: Results of descriptive statistical analysis for all variables

Variables	Statements	Mean	Standard deviation
Dimensions of organizational structure	Entrepreneurship	3.94	0.68
	Risk taking	3.61	0.74
	Stability	3.94	0.76
	Collectivism	3.81	0.75
	Power distance	2.48	1.18
TQM Principles	Process management	3.91	0.71
	Focus on suppliers	3.92	0.72
	Focus on employees	4.04	0.70
	Focus on customers	3.89	0.69
	Strategic planning	3.54	0.84
TQM performance	Quality improvement	3.92	0.69
	Cost reduction	3.55	0.77
	Improving flexibility	3.54	0.86
	Delivery efficiency	3.85	0.68
	Customer satisfaction	3.87	0.67

Source: Output from SPSS

employee satisfaction for generating their motivation to contribute to the successful implementation of the TQM concept and improvement in business performance. The results of the survey showed this – the focus on employees, as a principle of the TQM concept, was rated with the highest average score of 4.04. The part of the questionnaire that refers to the principles of TQM implementation signals that the surveyed companies pay significant attention to process management, supplier relationship management and customer relationship management. Ratings in the domain of current performance of the TQM concept, as well as the principles of its implementation (range of ratings 3.54-3.92), are a signal that there is significant room for improvement, which is one of the key challenges for the top and operational management of the surveyed companies in the coming period. The standard deviation values, for all statements, are in the range 0.67-1.18, which indicates a similar degree of disagreement (heterogeneity) of the respondents in the evaluations of all fifteen statements.

For each of the findings that determine independent and dependent variables, a reliability analysis was performed using the Cronbach's alpha coefficient, and values over 0.90 are a signal of a high degree of reliability. After descriptive statistics and analysis of the reliability of the findings, a correlational statistical analysis was conducted with the aim of identifying the relationship that exists between them. The relationship between the variables themselves, but also between the determinants of the variables, was

considered. All statistically significant correlations are shown in tables 4, 5 and 6 with the mark ** (** indicates $p \leq 0.1$). Table 4 indicates the existence of a statistically significant and strong correlation between dimensions of organizational culture, TQM principles and TQM performance. There is a statistically significant correlation among all dimensions of organizational culture (Table 5), among all TQM principles (Table 5) and among all performance indicators of TQM concept implementation (Table 6). Stability and collectivism are dimensions of organizational culture that have the strongest positive statistical relationship with the implementation principles of the TQM concept and the realized level of performance (r is in the range 0.754-0.862). The existence of a high-power distance is the only dimension of organizational culture with a statistically significant and strong negative correlation with all the principles and performance of the TQM concept, but also a negative connection with other dimensions of organizational culture. The results of the correlational statistical analysis, when looking at the determinants of organizational culture and TQM principles, showed the existence of the strongest relationships in the following relations: entrepreneurship - management processes ($r = 0.924$), collectivism-focus on customers ($r = 0.828$) and stability-focus on suppliers ($r = 0.814$). Power distance correlates most negatively with the principles focus on employees ($r = 0.755$), focus on customers ($r = 0.744$), and focus on suppliers ($r = 0.733$).

The analysis of the links between the dimensions of organizational culture and the performance in the implementation of the TQM concept showed the existence of statistically the strongest positive correlations on the following relations: collectivism – delivery efficiency ($r = 0.860$), stability – delivery efficiency ($r = 0.852$), collectivism – customer satisfaction ($r = 0.842$), and stability – customer satisfaction ($r = 0.830$). Stability and collectivism correlate most positively with quality improvement and cost reduction as TQM performance. Power distance has the most statistically significant negative correlation with delivery efficiency and customer satisfaction. Tables 5 and 6 crystallized stability and collectivism as dimensions of organizational culture with the highest statistically

significant and positive relationship with all principles of TQM concept implementation and TQM performance indicators. These dimensions of organizational culture are actually the basis for stimulating the motivation of employees to contribute maximally to respecting the principles of the TQM concept, which is dominantly manifested through the improvement in quality in all domains of business, cost reduction, delivery efficiency and customer satisfaction, and thus the generation of business excellence in these criteria.

After the correlation analysis, two regression analyzes were conducted with the aim of identifying the dimension of organizational culture with the greatest impact on the respect for the implementation principles of the TQM

Table 4: Correlation statistical analysis results - relationship between variables

	Organizational culture's dimensions	TQM Principles	TQM Performance
Organizational culture's dimensions	1	0.852**	0.846**
TQM Principles	0.852**	1	0.968**
TQM Performance	0.846**	0.968**	1

Source: Output from SPSS

Table 5: Results of correlational statistical analysis - the relationship between the dimensions of organizational culture and the principles of TQM

	1	2	3	4	5	6	7	8	9	10	
1 Entrepreneurship	1	.779**	.717**	.711**	-.739**	.924**	.792**	.714**	.744**	.742**	
2 Risk taking	.779**	1	.632**	.546**	-.649**	.761**	.653**	.614**	.580**	.739**	
3 Stability	.717**	.632**	1	.867**	-.768**	.794**	.814**	.782**	.811**	.754**	
4 Collectivism	.711**	.546**	.867**	1	-.684**	.745**	.805**	.800**	.828**	.696**	
5 Power distance	-.739**	-.649**	-.768**	-.684**	1	-.715**	-.733**	-.755**	-.744**	-.667**	
6 Process management	.924**	.761**	.794**	.745**	-.715**	1	.798**	.655**	.750**	.752**	
7 Focus on suppliers	.792**	.653**	.814**	.805**	-.733**	.798**	1	.752**	.965**	.719**	
8 Focus on employees	.714**	.614**	.782**	.800**	-.755**	.655**	.752**	1	.789**	.672**	
9 Focus on customers	.744**	.580**	.811**	.828**	-.744**	.750**	.965**	.789**	1	.657**	
10 Strategic planning	.742**	.739**	.754**	.696**	-.667**	.752**	.719**	.672**	.657**	1	

Source: Output from SPSS

Table 6: The results of correlational statistical analysis - the relationship between the dimensions of organizational culture and the performance of the TQM concept

	1	2	3	4	5	11	12	13	14	15	
1 Entrepreneurship	1	.779**	.717**	.711**	-.739**	.822**	.777**	.755**	.747**	.761**	
2 Risk taking	.779**	1	.632**	.546**	-.649**	.678**	.688**	.779**	.594**	.618**	
3 Stability	.717**	.632**	1	.867**	-.768**	.809**	.794**	.763**	.852**	.830**	
4 Collectivism	.711**	.546**	.867**	1	-.684**	.800**	.831**	.649**	.860**	.842**	
5 Power distance	-.739**	-.649**	-.768**	-.684**	1	-.715**	-.697**	-.724**	-.776**	-.775**	
11 Quality improvement	.822**	.678**	.809**	.800**	-.715**	1	.783**	.664**	.927**	.944**	
12 Cost reduction	.777**	.688**	.794**	.831**	-.697**	.783**	1	.708**	.805**	.797**	
13 Improving flexibility	.755**	.779**	.763**	.649**	-.724**	.664**	.708**	1	.617**	.609**	
14 Delivery efficiency	.747**	.594**	.852**	.860**	-.776**	.927**	.805**	.617**	1	.980**	
15 Customer satisfaction	.761**	.618**	.830**	.842**	-.775**	.944**	.797**	.609**	.980**	1	

Source: Output from SPSS

concept and its achieved performance. Table 7 presents the regression coefficients for the analysis in which TQM principles have the status of a dependent variable. The model defined in this way explains 92.3% of the variance of the dependent variable ($R^2 = 0.923$; $p < 0.01$).

Entrepreneurship, collectivism and stability are the dimensions of organizational culture with the greatest influence on the observance of TQM principles in the surveyed manufacturing companies. Observing the results of correlation and regression analysis in parallel, it can be concluded that the management's ability to manage resources in a productive way (entrepreneurship) dominantly determines strategic planning in all business domains and the establishment of efficient and effective management of all processes within the company. Strategic planning is an important segment of process management, as evidenced by the highest correlation between these two TQM principles, and the way a specific company manages processes determines its policy towards employees and the technique of developing relations with customers and suppliers. Collectivism and stability, by looking at the correlation and regression analysis in parallel, crystallized as key determinants of respect for other TQM principles: focus on suppliers, focus on employees and focus on customers. The focus on employees actually reflects the degree of collectivism and stability, and this interdependence is a key source of generating employees' motivation to contribute to the development of long-term partnership

relations with customers and suppliers, but also to the realization of management process goals. A summary conclusion can be drawn that there is a strong connection and influence in the following relation: entrepreneurship - strategic planning - process management - tactics towards stakeholders - focus on employees - degree of motivation of employees - contribution of employees to the development of long-term partnership relations with suppliers and customers - contribution of employees to the realization of goals management processes.

The regression analysis was repeated for the performance in the implementation of the TQM concept as a dependent variable (Table 8). The influence of each of the organizational culture dimensions on TQM performance was examined. This model is statistically significant and explains 92.2% of the variance of the dependent variable ($R^2 = 0.922$; $p < 0.01$).

The dimensions of organizational culture that dominantly determine the observance of TQM principles actually have the greatest influence on the level of performance in the implementation of this concept. The influence of entrepreneurship on strategic planning and process management is reflected in the improvement in quality in all domains of business (which actually confirms the firm connection of process management with the quality management system), reduction in business costs and flexibility (quick and efficient reaction to changes in the environment is a feature of risk management that

Table 7: Table of regression coefficients (TQM principles as dependent variable)

	Unstandardized coefficients		Standardized coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
Entrepreneurship	.317	.076	.331	4.157	.000	3.944
Risk taking	.103	.059	.116	1.746	.087	2.753
Stability	.226	.081	.263	2.797	.007	5.511
Collectivism	.232	.074	.267	3.131	.003	4.518
Power distance	-.057	.039	-.102	-1.466	.149	3.003

Source: Output from SPSS

Table 8: Table of regression coefficients (TQM performance as a dependent variable)

	Unstandardized coefficients		Standardized coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
Entrepreneurship	.228	.078	.235	2.931	.005	3.944
Risk taking	.131	.060	.145	2.168	.035	2.753
Stability	.228	.083	.261	2.757	.008	5.511
Collectivism	.274	.076	.310	3.619	.001	4.518
Power distance	-.076	.040	-.134	-1.922	.061	3.003

Source: Output from SPSS

tightly overlaps with process management and QMS). Stability and collectivism determine the motivation of employees to contribute to the successful realization of management goals, processes and the building of long-term partner relationships with suppliers and customers, which spills over into the performance level of the TQM concept, and thus the realization of the goals of supply chain management, management of relations with suppliers, and management of relations with to customers – timely delivery of a quality product at acceptable costs to satisfied customers.

Discussion of the obtained results

Summarizing the conclusions of the previously conducted analyses, conclusions are drawn about the initial hypotheses:

- Dimensions of organizational culture statistically significantly determine the respect and implementation of TQM principles by manufacturing companies in Serbia - *confirmed hypothesis H1*. The results of the correlational statistical analysis indicated the existence of a statistically significant correlation between all dimensions of organizational culture and all principles of successful implementation of the TQM concept. Entrepreneurship, risk taking, stability, and collectivism statistically significantly positively correlate with each of the TQM principles: process management, supplier focus, employee focus, customer focus, and strategic planning. Expressed unevenness in the distribution of power within the company is the only dimension of organizational culture that has an inverse (negative) interdependence with each of the TQM principles, but also with each of the other dimensions of organizational culture. Correlation analysis showed that there is the largest negative correlation – the negative relationship between high power distance and entrepreneurship, a sense of stability among employees and respect for the principle of focus on employees, which is a signal of the negative effect of uneven distribution of power on the generation of employees' motivation to make a maximum commitment to respect TQM principles. Entrepreneurship, collectivism and a sense of stability

are the dimensions of organizational culture with the greatest impact on generating respect for TQM principles, which is a signal of the importance of the workforce as a resource for the success of the company's operations.

- Respecting the principles of implementation of the TQM concept is a key predictor of generating improvements in the domain of TQM performance - *confirmed hypothesis H₂*. The results of the correlation analysis crystallized the existence of a statistically significant and very strong correlation between the respect for the implementation principles of the TQM concept and the level of its performance ($r = 0.968$). Establishing efficient and effective process management and strategic planning within the same, focus on employees, efforts to build long-term partnership relations with suppliers and customers directly lead to improvement in flexibility, cost reduction, delivery efficiency, customer satisfaction and generation of quality improvement in all domains of business. It is precisely in this interdependence that the existence of a solid positive interdependence between the implementation of the TQM concept and many domains of management is depicted: risk management, process management, supplier relationship management, customer relationship management, and supply chain management. It is the improvements in all previously listed management domains that are the key to generating business excellence of the surveyed manufacturing companies.
- The dimensions of the organizational culture of Serbian manufacturing companies have a statistically significant impact on performance as indicators of the success in the implementation of the TQM concept – *confirmed hypothesis H₃*. All dimensions of organizational culture are statistically significantly related to TQM performance indicators, with power distance being the only one with a negative impact. In fact, the influence of dimensions of organizational culture on the observance of TQM principles is reflected on the level of TQM performance, which further confirms hypothesis H₂. Entrepreneurship, stability and collectivism are the dimensions of

organizational culture that most determine TQM performance indicators, which actually reflects the importance of employees and generating their motivation for improvements in any aspect of the TQM concept implementation.

It can be concluded that using resources in a productive way (entrepreneurship), a sense of competence among employees and collectivism are an important factor in respecting all TQM principles, which translates into quality improvement in all business domains, flexibility, cost reduction and building long-term partner relationships with suppliers and customers (delivery efficiency and customer satisfaction). Correlation and regression analysis proved a strong connection in the following relationship: entrepreneurship - strategic planning - management processes - tactics towards stakeholders - focus on employees - degree of motivation of employees - contribution of employees to the development of long-term partnership relations with suppliers and customers - contribution of employees to the realization of management goals, processes, management supplier relations, customer relationship management and supply chain management. Proven interdependence is a signal of the importance of improving entrepreneurship and collectivism/sense of stability among employees for generating their motivation for maximum contribution to generating quality improvement in all business domains because employees are the most valuable resource of any company. The existence of a significant unevenness in the distribution of power within a company is the main brake on progress in the field of implementing the TQM concept because it significantly negatively determines the collectivism and sense of stability of employees, and therefore their motivation and productivity. This confirms the research conclusions that were used to define the initial research model of Sousa-Poza et al. [45], Rad [39] and Janickova and Brychta [17]. The previously listed research studies partially analyzed the interdependence of the relationship between organizational culture - TQM principles and organizational culture - TQM performance, and this research summarized previously used research models, which fully crystallized the relationship between the dimensions of organizational culture - implementation of TQM principles - the level of realized TQM performance - reaching the level of

business excellence. In addition to the strong connection between the dimension of organizational culture - TQM principles - TQM performance, the business practice of Serbian manufacturing companies has proven a strong connection between the following areas of management: risk management - process management - QMS - TQM - supply chain management (which combines SCM and CRM). It can be concluded that the organizational culture of a company significantly determines all variables of the previously described interdependence, which confirms the results of earlier research that organizational culture, as a key factor of the internal environment, is an important determinant of the company's competitive advantage (confirmed research results of sources [8], [19], [42], [44], [49]).

The collection of data for the implementation of previously explained statistical analyzes indicated the problem of ignorance of the determinants of QMS and TQM by a large number of employees in Serbian manufacturing companies. It is very important to conduct training and development in this domain at all levels of organizational structure because knowledge of the principles and criteria of these concepts is necessary so that employees are aware of their importance, and therefore of their own contribution to their successful implementation. Without knowledge of the principles and requirements of the QMS and TQM concepts on the part of the company's employees, it is not possible to generate long-term sustainable improvements in these domains, which significantly determines the long-term competitive positioning of any of the surveyed manufacturing companies in the Republic of Serbia.

Theoretical/practical implications, limitations and further research directions

The scientific contribution of the research is reflected in the detailed elucidation of interdependence in relation to the dimension of organizational culture - respect for the principles of the TQM concept - the level of realized TQM performance, with special reference to drawing conclusions about the importance of organizational culture, as the most important factor of internal environment, for generating improvement in all domains of management.

tightly linked to the successful implementation of the TQM concept: risk management, process management, supplier relationship management, customer relationship management, and supply chain management. The practical contribution of the research is reflected in giving guidelines to the management of the surveyed Serbian production companies, which dimensions of organizational culture should be focused on if they strive to improve quality in all business domains, i.e. generating efficiency and effectiveness in all previously listed management domains, which will directly affect reaching the highest level of TQM performance. The main limitation of the study is in the structure of the sample, i.e. research based on the views of top and operational management. The research signaled the existence of significant ignorance of the principles and requirements of ISO 9001, QMS and TQM by employees, which is a signal of the need for additional training and improvement in this domain because without the necessary knowledge of employees, despite improvements in the domain of organizational culture, it is impossible to generate any long-term advancement in any field of management.

Monitoring the evolution of dimensions of organizational culture, along with the analysis of how this evolution is reflected in the generation of improvements in the level of TQM performance, would significantly improve research in the field of interdependence of organizational culture and the implementation of the TQM concept. Future research should move in the direction of considering the importance of acquiring new and improving the existing knowledge of employees in the domain of QMS and TQM for generating efficiency and effectiveness in all domains of management, which will be reflected in the successful implementation of the principles of the TQM concept and the generation of levels business excellence. Research in the aforementioned directions, with a stronger connection of qualitative and quantitative research on this topic, would fully round off the analysis of interdependence in the relationship between organizational culture and the successful implementation of the TQM concept, which would clearly crystallize the key internal organizational predictors of generating the level of business excellence of the company.

Conclusion

Organizational culture, as the most important factor of the internal environment, is an important determinant of generating efficiency and effectiveness in all domains of management, which is directly maintained on the success of the implementation of the quality management system and the principles of the concept of total quality management. Entrepreneurship, collectivism and a sense of stability among employees, along with a more even distribution of power within the company, are the most important predictors of successful implementation of the TQM concept, which is directly reflected in the level of its performance: improvement in quality, improvement in flexibility, reduction of costs, delivery efficiency and customer satisfaction. The analysis of respect for the principles of implementation and the level of performance of TQM in Serbian production companies indicated the existence of significant room for improvement, especially in the area of knowledge of the principles and requirements of QMS and TQM by employees. It is not possible, despite improvements in the domain of organizational culture, to generate long-term sustainable improvements in all domains of management without adequate training and improvement of employees in the field of ISO 9001, QMS and TQM, which significantly determines the long-term competitive positioning of any of the surveyed manufacturing companies in the Republic of Serbia.

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