

Novokmet, Ana Kundid; Rogošić, Andrijana

Article

Long-term financial effects of quality management system maturity based on ISO 9001 principles

Amfiteatru Economic Journal

Provided in Cooperation with:

The Bucharest University of Economic Studies

Suggested Citation: Novokmet, Ana Kundid; Rogošić, Andrijana (2017) : Long-term financial effects of quality management system maturity based on ISO 9001 principles, Amfiteatru Economic Journal, ISSN 2247-9104, The Bucharest University of Economic Studies, Bucharest, Vol. 19, Iss. Special Issue No. 11, pp. 1003-1016

This Version is available at:

<http://hdl.handle.net/10419/196406>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

LONG-TERM FINANCIAL EFFECTS OF QUALITY MANAGEMENT SYSTEM MATURITY BASED ON ISO 9001 PRINCIPLES

Ana Kundid Novokmet¹ and Andrijana Rogošić^{2*}

¹⁾²⁾ *University of Split, Faculty of Economics, Split, Croatia*

<p>Please cite this article as: Novokmet, A.K. and Rogošić, A., 2017. Long-Term Financial Effects of Quality Management System Maturity Based on ISO 9001 Principles. <i>Amfiteatru Economic</i>, 19(Special No. 11), pp. 1003-1016.</p>	<p>Article History Received: 26 July 2017 Revised: 18 August 2017 Accepted: 18 September 2017</p>
--	---

Abstract

Accounting information was often used to determine the effect of quality management initiatives. Relation between quality management and financial performance of the companies was extensively explored but with the conflicting results. The most recent studies introduced intermediary factors between quality management and financial performance. The objective of this paper is to determine the effect of quality management system maturity of companies on their long-term financial performance. The empirical research was conducted on the large-sized companies in Croatia that hold ISO 9001 certificate. The multivariate statistical analysis was used to support the hypothesis on quality management system maturity adding to companies' financial performance. Results confirmed that the companies with more mature quality management system have better long-term financial outcomes (measured by EBIT margin, ROA, solvency ratio and financial costs ratio) than the companies with the initial maturity stages of quality management system.

Keywords: quality management, accounting information, financial performance, capital structure theory, ISO 9001

JEL Classification: G30, M41, L15

*Corresponding author, **Andrijana Rogošić** – arogosic@efst.hr

Introduction

Improving quality represents for all organisations one of the most important strategies for enhancing performance and competitiveness (Ionciă et al., 2009, p. 402). Quality oriented companies often embrace one of the quality management (QM) frameworks when establishing quality management system (QMS). QMSs take the shape of formal standards (like ISO) or theories and concepts like total quality management (TQM). One of these standards is the ISO 9000 series, which is internationally recognised and designed to demonstrate the capability of an organisation to control the processes that determine the acceptability of the product or service being produced and sold (Ismyrlis and Moschidis, 2015, p. 497). ISO 9000 series of standards provide guidance to achieve sustainable success of management based approach (Olaru et al., 2011, p. 670). Since 1987, the year of issuing the first standards belonging to ISO 9000 family on QM, there were numerous explanations and changes to the year 2008 version, to increase compatibility with other management systems (Nagel-Picioruş, Nagel-Picioruş and Sârbu, 2016, p. 433).

The literature on relation between QM and financial outcomes is abundant but with the conflicting results. Although the assumption that QM should positively affect financial performance has theoretical background, the empirical results often lacked to support it (Powell, 1995; Terziowski, Samson and Dow, 1997; Samson and Terziowski, 1999; Dick, 2000; Lima, Resende and Hasenclever, 2000; Staw and Epstein, 2000; Heras, Dick and Casadesus, 2002; Morris, 2006). The most recent studies on companies that integrated QM (Duh, Hsu and Huang, 2012; Herzallah, Gutiérrez Gutiérrez and Rosas, 2014; Jaca and Psomas, 2015) revealed that there are some intermediary factors that lead to better financial results.

The aim of this paper is to determine does the QMS maturity have an effect on financial performance of companies in a long run. Since many companies in the European Union (EU) use ISO 9001 as QM framework, we developed the QMS maturity metrics based on QM principles. According to ISO 9001 standard following eight QM principles should be applied: customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision-making and mutually beneficial supplier relationships. Evans (2008, p. 37) noticed that “one-dimensional approaches can have some short-term success but do not seem to work well over time.” This means that companies should adopt QM practices based on all of these eight principles in order to achieve benefits in long-term.

The paper is structured as follows. The first section is focused on literature review of relation between QM and financial performance. Also, QMS maturity is defined in this section where different models of its evaluation are presented followed by model development and research hypothesis. Methodology of the empirical research is explained in the second section while the results obtained by relevant statistical tests are explained in the third section. Contribution of this study and practical implications are stated among concluding remarks.

1. Review of the scientific literature

1.1. Quality management and financial performance

Numerous studies placed financial outcomes of QM in the focus of their investigation last three decades (Powell, 1995; Terziowski, Samson and Dow, 1997; Samson and Terziowski, 1999; Dick, 2000; Lima, Resende and Hasenclever, 2000; Staw and Epstein, 2000; Heras, Dick and Casadesus, 2002; Corbett, Montes-Sancho and Kirsch, 2005; Naveh and Marcus,

2005; Morris, 2006; Terlaak and King, 2006). Some of the authors witnessed the beneficial relation between QM and financial performance (Wruck and Jensen, 1994; Hendricks and Singhal, 1997; Ittner and Larcker, 1997; Easton and Jarrell, 1998; Kumar et al., 2007), while the others did not support the assumptions regarding financial outcomes of QM (Powell, 1995; Terziovski, Samson and Dow, 1997; Samson and Terziovski, 1999; Dick, 2000; Lima, Resende and Hasenclever, 2000; Staw and Epstein, 2000; Heras, Dick and Casadesus, 2002; Morris, 2006).

The most recent studies emphasised intermediary role of different variables between QM and financial performance. Herzallah, Gutiérrez Gutiérrez and Rosas (2014) found out that TQM practices have an indirect, positive and significant relationship with financial performance through competitive strategies. Jaca and Psomas (2015) identified key factors of TQM that contributed to better financial performance (among others): top management, process management, employee quality management, customer focus, and employee knowledge and education, which means that successful organisations are oriented towards the human aspect of a company. Duh, Hsu and Huang (2012) performed empirical research, which results suggested that TQM's direct effect on non-financial performance mediated TQM's indirect effect on financial performance.

1.2. Maturity of quality management system

The QMSs seem to differ among companies because of the approach to QM within firms. Li et al. (2002, p. 213) noticed that a number of recent studies have centred on investigating why such varied experiences have been reported and that one line of research considered whether an important underlying issue may involve QM maturity. QM maturity refers to the depth of the organisation's experience with QM.

Some authors like Siow, Yang and Dale (2001) and Wilson and Town (2006) tried to establish levels of QMS maturity although Sower, Quarles and Broussard (2007, p. 124) stated that the most widely accepted maturity model is the one promoted by American Society for Quality (ANSI/ISO/ASQ Q9004-2000 standard). The latter model classifies QMSs based on performance maturity levels. On the first level are organisations with no formal approach while on the second level are firms with problem-based or corrective based systematic approach with minimum data or improvement results available. Stable formal system approach (level 3) refers to the early stage of systematic improvements. Continual improvement is emphasized on the fourth level while the highest level is reserved for the best-in-class performance companies with strongly integrated improvement processes.

Patti, Hartman and Fok (2001, p. 882) acknowledged that an organization may report that it has adopted quality program for a substantial period of time but implemented it quite poorly or superficially. They investigated the depth of QM implementation in US companies and related it with the QM maturity using their own instrument designed for sample of firms that were pursuing the Malcolm Baldrige National Quality Award. The results showed that the increase of QM maturity led to the perception of more dynamic and collegial organisational culture, greater employee empowerment and better organisational performance (Patti, Hartman and Fok, 2001, p. 895).

Hendricks and Singhal (2001) explored the relation between the financial performance from effective implementation of TQM to specific firm characteristics such as firm size, the degree of capital intensity, the degree of firm diversification, the maturity of the TQM implementation, and the timing of the TQM implementation. Their empirical evidence weakly supported the hypotheses that less capital-intensive firms do better than more

capital-intensive firms, and more focused firms do better than more diversified firms. Also, the authors concluded that there are no significant differences between the performance of earlier and later implementation of effective TQM. Hendricks and Singhal (2001, p. 283) stated that “investing to achieve a broader, deeper, and more mature TQM implementation (possibly by targeting an independent TQM award) should also result in higher benefits from TQM implementation”.

Khanna et al. (2004) chose seven enabler variables: leadership, strategic planning, information management, human resource focus, customer and market focus, supplier focus and process management in their model of TQM maturity based on evaluation grades developed by Siow, Yang and Dale (2001) known as “world-class”, “award winners”, “improvers”, “drifters” and „uncommitted“. To sustain (higher) TQM maturity level, it is extremely important to handle the transition phases effectively (Khanna et al., 2004).

1.3. Model development and research hypothesis

The above mentioned numerous studies have conflicting results regarding the financial outcome of QMS implementation. The most recent articles reported that better financial results are achievable but only if intermediary factor between QMS and financial performance is identified (Duh, Hsu and Huang, 2012; Herzallah, Gutiérrez Gutiérrez and Rosas, 2014; Jaca and Psomas, 2015). The relationship between QMS maturity and financial performance has not been comprehensively explored especially in ISO 9001 context. Prior studies show that more mature QMSs (often studied in TQM context) benefit in different ways comparing to those on lower levels of QM maturity (Hendricks and Singhal, 2001; Khanna et al., 2004; Patti, Hartman and Fok, 2001; Sower, Quarles and Broussard, 2007). One of those expected benefits is profitability increase. Additionally, through increased profitability QMS maturity might have far-reaching effect.

According to the capital structure theory, a positive impact of company profitability on its solvency, and consequently to its cost of financing are expected. Thus, besides a positive direct effect of QMS maturity on company profitability, we assumed that QMS maturity indirectly via profitability, adds to company credit capacity (solvency) and financial sources affordability.

Drivers and repercussions of the certain choice of capital structure have been a fruitful theoretical and empirical area since the Modigliani-Miller proposition (Modigliani and Miller, 1958) on the capital structure irrelevance for the company value. However, even nowadays the topic is highly controversial with growing body of literature trying to answer on the focal question: How do companies choose between available funding sources or how do they target a certain level of financial leverage usage? One of the variables which is a must in such studies is certainly profitability. According to the pecking order theory, companies tend to use their profit first i.e. they prefer more internal than external financing sources, after what they consider going into debt, leaving the equity financing as their last option (Myers, 1984; Myers and Majluf, 1984). Thus, more profitable companies will be more solvent as earnings retaining policy (what does not exclude stable dividend policy) builds up their own funds internally what makes their creditors and investors more secure and reduces expected return or the cost of capital (in our research financial costs ratio or the cost of debt). Finally, by using internal financing sources managers temporarily avoid the market discipline of their investors i.e. the pressure to disclose allocation of their investments and bear the consequences in case of unfavourable results.

Another potential explanation about the relation “QMS maturity – the cost of capital” arises. In addition to the indirect relation via profit and internal capital build up with retained earnings, which makes financial sources cheaper due to lower estimated probability of default, there might be a direct effect of QMS maturity to financial sources price due to so called contribution of “soft” indicators to the estimation of the cost of debt, which is performed by various creditors. In bank-based financial systems, it mainly comes down to the role of bank in setting the credit price. QMS maturity based on the eight QM principles leads to greater concern for all stakeholders and consequently builds up reputational capital and causes certain profit persistency. Nowadays, when even environmental implications of loan approval are being estimated as a part of borrowers’ creditworthiness / credit risk, whether for commercial or moral reasons (Thompson and Cowton, 2004), fulfilling the ISO 9001 principles and having more mature QMS should be highly relevant when examining strength, weaknesses, opportunities and threats of one company within the risk appraisal process by commercial banks. Still, there is a large potential or insufficient praxis of incorporating the “soft” information into lending decision-making, according to the study of loan officers in Sweden by Trönberg and Hemlin (2014), as incorporating “soft” information in credit appraisal makes decision process more difficult. However, investment into credit appraisal systems which take into consideration larger amounts of “soft” information is highly recommendable (McCann and McIndoe-Calder, 2015) especially when smaller firms are borrowers and/or when smaller banks are creditors. In the paper, we focus on large companies, but even large companies, which are usually prime clients, have relationships with more than one bank. Even if they would have relations with only one large bank, some qualitative aspects of their business should still be significant for loan granting. For instance, poor quality of products and services could end up with loss of customers, slowdown of production or cause public complaints, lawsuits and penalties that could seriously deteriorate company’s financial performance. Thus, there might be sizeable effects of company’s QMS on its probability of credit default and credit price, which reflects the creditworthiness of the client. On the other hand, if one company is a client of several banks, knowing their client better than other banks, means comparative advantage in defining more competitive credit price and non-price credit terms. To sum up, QMS maturity impacts both, “hard” (quantitative or accounting-based) indicators and potentially acts like “soft” (qualitative) variable in creditworthiness assessments. Previously described linkages between variables are transparent from the figure no. 1.

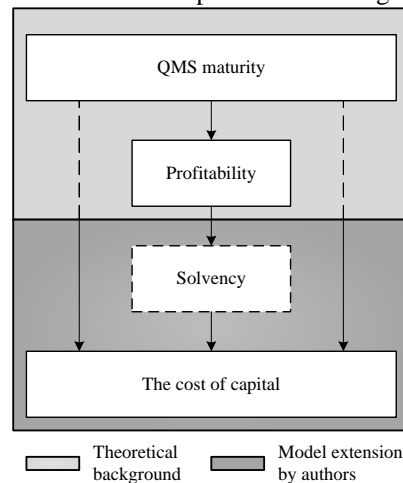


Figure no. 1: Long-term financial effects of QMS maturity – profitability, solvency and the cost of capital in focus

Those insights led to the following hypothesis:

H₁: More mature QMS induces advantageous long-term financial effects.

2. Research methodology

2.1. Measurement instrument

All of the mentioned studies are TQM oriented so companies that use ISO 9001 framework are being neglected and since they are majority in Croatia (and possibly in the EU) we developed evaluation of QMS maturity level based on implementation of the eight ISO 9001 principles. A questionnaire was used as the data collection method for one research variable – QMS maturity. The design of the measurement instrument was based on a comprehensive literature review in the field of QM. The questionnaire consisted of eight sections related to the implementation of each ISO quality principle. The questions were adopted from similar surveys (Saraph, Benson and Schroeder, 1989; Kaynak, 2003; Lakhali, Pasin and Limam, 2006) and adjusted to ISO 9001 framework. We used a 1-5 Likert scale for the items that measured the implementation of those eight QM principles (where 1 was “strongly disagree” and 5 was “strongly agree”). Since survey was made of 38 questions, the maximum score of QMS maturity index was 190.

The financial performance indicators were calculated from accounting information provided by Bureau van Dijk database AMADEUS. The data were taken in euros. According to research suggestions by Wayhan and Balderson (2007) who argued the necessity of longitudinal approach (pre and post QM assessment), we introduced to our model financial performance indicators for multiple time periods (from 2010 to 2014) to measure long-term aspect of QMS maturity. Since, all the financial indicators reported annual values, their mean value for the period 2010-2014 was calculated in order to perform cluster analysis. Most of the above mentioned studies observed only return on assets - ROA and return on sales as measures of financial performance so we went further by employing return on earnings before interest and taxes (EBIT) margin, besides taking into consideration only ROA (using net income). In order to encompass the solvency aspect, we calculated OWNFUNDS_A variable (Shareholders Funds to Total Assets), while the cost of capital effect (financial costs ratio or the cost of debt in subsequent text) was captured with FE_A variable (Financial Expenses to Total Assets).

2.2. Sample description

We focused on the large-sized companies in Croatia since the most recent studies revealed that the extent of usage of QM tools/techniques is wider in larger firms (Ismyrlis and Moschidis, 2015) because QM requires the substantial investments not so accessible to smaller firms (Duh, Hsu and Huang, 2012). Also, small firms are short on human resources and related activities and initiatives like training, education, employee empowerment, and rewarding programmes. Even an early research (Terziovski and Samson, 1999) showed that the size (large size of the company) has a positive effect on the relationship of QM practices and performance. The survey was sent to whole population of large companies (359 organizations) during 2011/2012. The targeted respondents were quality managers and board of directors. The response rate was 27% after three rounds of survey sent by mail (the

first time) and via e-mail (two more times). Because of the missing accounting data for period of 2010-2014 provided by AMADEUS database, the final sample consisted of 77 companies.

3. Results and discussion

The maximum value of the QMS maturity index (190) was recorded for only one company, while the minimum score was 53.

With aim to detect long-term financial effects of QMS maturity, cluster analysis was performed (via SPSS Statistics 23) as its purpose is to group companies i.e. their financial performance (average profitability, solvency and the cost of debt) according to the QMS maturity they possess. More precisely, the K-means clustering technique was adopted, in order to assign each company to a cluster. Tables no. 1 and no. 2 contain results which were persistent in cases of all variables (EBIT margin, ROA, OWNFUNDS_A and FE_A). QMS maturity index was statistically significant (sig.=0,000) for all financial indicators (table no. 2). This implies that in the long-term there are significant differences in financial performance between companies with higher and lower QMS maturity level. In addition, cluster 1 was always composed of 52 companies, while 24 companies were assigned to cluster 2. The mean value of QMS maturity index was 171 for the first cluster, and 120 for the second cluster for all clustering cases (table no. 1). Therefore, companies grouped in the first one could be described as having more mature QMS, while the rest are on the initial stages of QMS (less mature).

Table no. 1: Final cluster centers – QMS maturity index

	Cluster 1	Cluster 2
QMS maturity index	171	120

Table no. 2: ANOVA – QMS maturity index

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
QMS maturity index	42695,054	1	333,540	74	128,006	0,000

Descriptive statistics of clusters discloses noteworthy results. Based on the tables no. 3 and no. 4 companies with higher QMS maturity index have higher (in this case positive) EBIT margin and ROA, while those with lower QMS maturity index are not profitable. More precisely, the mean value of 5-year EBIT margin of more mature companies in QMS sense was 2,95%, while the less mature ones recorded -3,28% (table no. 3). In addition, ROA for companies in the first cluster amounted 0,32%, contrary to the negative mean value of ROA for the second cluster (table no. 4). Thus, our findings are in line with those of Wruck and Jensen (1994), Hendricks and Singhal (1997), Ittner and Larcker (1997), Easton and Jarrell (1998), and Kumar et al. (2007) who confirmed positive linkage of QM and financial performance.

Table no. 3: Descriptive statistics of clusters when average EBIT margin was used to label cases – QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	52	2,9522	12,5434	1,7395
Cluster 2	24	-3,2816	11,7243	2,3932

Table no. 4: Descriptive statistics of clusters when average ROA was used to label cases – QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	52	0,3236	12,9236	1,7922
Cluster 2	23	-3,4204	10,4017	2,1689

Based on the model extension proposed in the section 1.3., we assume that QMS maturity level has far-reaching effect on company financial performance i.e. the one that exceeds profitability aspect. Company’s profitability affects its solvency and consequently the cost of capital. Thus, if QMS maturity contributes to EBIT margin and ROA increase it is indirectly related to the company’s financing policy and its average price. For instance, Pepur, Ćurak and Poposki (2016) found, on the sample of large Croatian companies in the period 2001-2010, that profitability decreases the financial leverage usage. Directly, QMS maturity might be relevant “soft” indicator when assessing the company’s creditworthiness and risk-return relation for bank client (potential or actual debtor). With regards to that, a Pearson correlation between financial indicators is disclosed in the appendix (table no. 1). It is evident that ROA and solvency proxy with OWNFUNDS_A are positively related, while higher profitability and solvency add to financial costs ratio decrease (FE_A). Thus, there are several reasons for the estimation of the effect of QMS maturity on company’s solvency and financial costs ratio.

According to table no. 5, companies with higher QMS maturity index have lower financial leverage usage when compared to companies with less mature QMS. More precisely, companies in the first cluster finance themselves on average with almost 37% of shareholders’ funds, while those in the second cluster do it with 34,68%.

Table no. 5: Descriptive statistics of clusters when average solvency ratio was used to label cases – QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	52	36,8546	54,8217	7,6024
Cluster 2	24	34,6800	30,5403	6,2340

Consequently, the cost of financing (table no. 6) is smaller for the first cluster group (approximately 3,2%) in comparison to the second cluster group (3,53%). These results are consistent with previously discussed indirect effects of QMS maturity level on companies’ solvency (via profitability increase) according to which higher solvency and lower cost of debt are outcomes of more mature QMS.

Table no. 6: Descriptive statistics of clusters when average cost of capital was used to label cases – QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	52	3,1965	3,5749	0,4958
Cluster 2	24	3,5346	2,6214	0,5351

Furthermore, decomposing the QMS maturity index to eight QM principles provides interesting findings, which are consistent with the ones for QMS maturity index. Thus, the following results depict K-means outcomes when Customer (for customer focus), Leadership, Employee (involvement of people), Process (for process approach), System (for system approach to management), Improvement (for continual improvement), Data (for factual approach to decision making) and Supplier (mutually beneficial supplier relationships) maturity indices were used with goal of detecting possible disparities in companies' financial performance. Collinearity among those variables was acceptable to perform simultaneous K-means clustering.

Tables no. 7 and no. 8 contain results which were persistent in cases of all variables (EBIT margin, ROA, OWNFUNDS_A and FE_A). Decomposed QMS maturity indices were statistically significant (sig.=0,000) for all financial indicators (table no. 8). In addition, cluster 1 was always composed of 53 companies, while 23 companies were assigned to cluster 2. According to the mean values of decomposed QMS maturity index it is obvious that companies from the cluster 1 outperformed companies from the cluster 2 in each QM principle (table no. 7).

Table no. 7: Final cluster centers – decomposition of QMS maturity index

	Cluster 1	Cluster 2
CUSTOMER	33	25
LEADERSHIP	23	17
EMPLOYEE	22	14
PROCESS	13	9
SYSTEM	14	9
IMPROVEMENT	26	17
DATA	19	12
SUPPLIER	21	16

Table no. 8: ANOVA – decomposition of QMS maturity index

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
CUSTOMER	973,134	1	15,995	74	60,839	0,000
LEADERSHIP	567,986	1	10,889	74	52,164	0,000
EMPLOYEE	1062,199	1	8,588	74	123,689	0,000
PROCESS	293,781	1	3,208	74	91,569	0,000
SYSTEM	323,912	1	3,679	74	88,043	0,000
IMPROVEMENT	1520,586	1	16,281	74	93,394	0,000
DATA	607,811	1	6,927	74	87,743	0,000
SUPPLIER	396,656	1	10,713	74	37,026	0,000

Moreover, as visible from the tables no. 2-5 in appendix, companies from the cluster 1 are more profitable (EBIT margin is 2,74% and ROA is 0,22%), more solvent (OWNFUNDS_A is 36,37%), and consequently have lower financial costs ratio (FE_A is 3,2%). This proves that thorough implementation of each QM principle leads to higher QMS maturity level that results in financial indicators improvement.

Altogether, the H₁ hypothesis is confirmed as beneficial long-term effects of higher QMS maturity level are proven in several areas of financial performance, despite the presence of the financial crisis and recession in the observed period. For instance, the mean value of EBIT margin for all observed companies was 3,39% in the year 2010, while in the year 2014 it was 0,13%. In addition, the mean value of FE_A was 3,2% in the year 2010 and 3,9% in 2014. Therefore, a conclusion can be made that investing in quality seems to be enormous and long-term comparative advantage, which defies even some global events like financial crisis, and helps to bear the burden of the systemic risk.

Conclusions

When establishing QMS, companies generally shape it using the framework made of theories and concepts like TQM or even more often (especially in the EU) in form of standards such as ISO 9001. Theoretical fundamentals of QM made many scholars to assume the positive impact of QM on financial performance of company, but lot of empirical studies worldwide could not confirm it. This inspired us to perform extended research by introducing wider scope of financial indicators, which go beyond profitability aspect. Furthermore, longitudinal analysis was adopted to confirm the long-term implications of QMS development. Besides that, the following contributions of our approach are detected: 1) introduction of QMS maturity as a driver of beneficial long-term financial performance, 2) new insight to QM from financial institutions point of view (QMS as being relevant in credit risk assessment of banks' corporate clients).

The paper sheds a light on critical factors of QMS success measured by long-term financial performance. Thus, the new framework for QMS maturity metrics that is based on ISO 9001 standard and its principles is herein proposed as an intermediary between QM and financial performance. More precisely, high level of QMS maturity is attainable when company thoroughly and consistently implements all eight ISO 9001 principles (customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision making and mutually beneficial supplier relationships).

The empirical analysis was conducted on the data sample composed of large-sized companies in Croatia, by combining primary data obtained through questionnaire on adoption of QM principles and AMADEUS database of financial indicators. The results confirmed clear disparities between companies with more mature QMS and those on initial QMS development stage, when EBIT margin, ROA, own financing ratio and financial costs ratio approximated long-term financial effects. Higher profitability and solvency as well as lower financial costs are features of companies with higher QMS maturity level. A conclusion on far-reaching benefits from QM principles implementation is made. However, quality practitioners (particularly QM managers) must be aware that holding ISO 9001 certificate does not mean a lot if QM philosophy and principles are not taken seriously and implemented in the business practice. Although, ISO 9001 is commonly perceived only as

the first step to business excellence, this standard offers useful basis for long-term sustainable achievements measured in terms of accounting information and financial ratios.

References

- Corbett, C., Montes-Sancho, M. and Kirsch, D., 2005. The financial impact of ISO 9000 certification in United States: an empirical analysis. *Management Science*, 51(7), pp. 1046–1059.
- Dick, G. P. M., 2000. ISO 9000 certification benefits, reality or myth? *The TQM Magazine*, 12(6), pp. 365-371.
- Duh, R.-R., Hsu, A. W.-H. and Huang, P.-W., 2012. Determinants and performance effect of TQM practices: An integrated model approach. *Total Quality Management & Business Excellence*, 23(6), pp. 689-701.
- Easton, G. S. and Jarrell, S. L., 1998. The effects of total quality management on corporate performance: an empirical investigation. *Journal of Business*, 71(2), pp. 253–307.
- Evans, J. R., 2008. *Quality and performance excellence – management, organization and strategy*. 5th ed. Mason (OH): South-Western.
- Hendricks, K. B. and Singhal, V. R., 1997. Does implementing an effective TQM program actually improve operating performance? Empirical evidence from firms that have won quality awards. *Management Science*, 43, pp. 1258–1274.
- Hendricks, K. B. and Singhal, V. R., 2001. Firm characteristics, total quality management, and financial performance. *Journal of Operations Management*, 19, pp. 269-285.
- Heras, I., Dick, G. and Casadesus, M., 2002. ISO 9000 registration's impact on sales and profitability: a longitudinal analysis of performance before and after accreditation. *The International Journal of Quality & Reliability Management*, 19, pp. 774–791.
- Herzallah, A. M., Gutiérrez Gutiérrez, L. and Rosas, J. F. M., 2014. Total quality management practices, competitive strategies and financial performance: the case of Palestinian industrial SMEs. *Total Quality Management & Business Excellence*, 25(5/6), pp. 635-649.
- Ionciță, M., Negoită, I. M., Petrescu, E.-C. and Ionciță, D. 2009. Using the European model of total quality management to assess the performance of organizations. Case study on educational services. *Amfiteatru Economic*, 11(26), pp. 402-411.
- Ismayrlis, V. and Moschidis, O., 2015. The use of quality management systems, tools, and techniques in ISO 9001:2008 certified companies with multidimensional statistics: the Greek case. *Total Quality Management & Business Excellence*, 26(5), pp. 497-514.
- Ittner, C. D. and Larcker, D., 1997. The performance effects of process management techniques. *Management Science*, 43, pp. 522–534.
- Jaca, C. and Psomas, E., 2015. Total quality management practices and performance outcomes in Spanish service companies. *Total Quality Management & Business Excellence*, 26(9), pp. 958-970.
- Kaynak, H., 2003. The relationship between total quality management practices and their effects on firm performance, *Journal of Operations Management*, 21, pp. 405–435.

- Khanna, V. K., Vrat, P., Shankar, R. and Sahay, B. S., 2004. Managing the transition phases in the TQM journey: a system dynamics approach. *International Journal of Quality & Reliability Management*, 21(5), pp. 518-544.
- Kumar, V., Choisine, F., Grosbois, D. and Kumar, U., 2007. Impact of TQM on company's performance. *International Journal of Quality & Reliability Management*, 26(1), pp. 23-37.
- Lakhal, L., Pasin, F. and Limam, M., 2006. Quality management practices and their impact on performance. *International Journal of Quality & Reliability Management*, 23(6), pp. 625-646.
- Li, J., Fok, W., Fok, L. and Hartman, S., 2002. The impact of QM maturity upon the extent and effectiveness of customer relationship management systems. *Supply Chain Management: An International Journal*, 7(4), pp. 212-224.
- Lima, M., Resende, M. and Hasenclever, L., 2000. Quality certification and performance of Brazilian firms: an empirical study. *International Journal of Production Economics*, 66, pp. 143-147.
- McCann, F. and McIndoe-Calder, T., 2015. Firm size, credit scoring accuracy and banks' production of soft information. *Applied Economics*, 47(33), pp. 3594-3611.
- Modigliani, F. and Miller, M. H., 1958. The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, 48(3), pp. 261-297.
- Morris, P. W., 2006. ISO 9000 and financial performance in the electronics industry. *Journal of American Academy of Business*, 8(2), pp. 227-235.
- Myers, S. C., 1984. The capital structure puzzle. *The Journal of Finance*, 39, pp. 575-592.
- Myers, S. C. and Majluf, N. S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, pp. 187-221.
- Nagel-Picioruș, C., Nagel-Picioruș, L. and Sârbu, R., 2016. Milestones in implementation of an integrated management system in the health sector. Case study Radiologisches Netzwerk Rheinland. *Amfiteatru Economic*, 18(42), pp. 432-445.
- Naveh, E. and Marcus, A., 2005. Achieving competitive advantage through implementing a replicable management standard: installing and using ISO 9000. *Journal of Operations Management*, 24(1), pp. 1-26.
- Olaru, M., Stoleriu, G., Langă, C. and Flood, I., 2011. The impact of the implementation of ISO 9000 quality management system on the customer satisfaction evaluation process by the Romanian SMEs. *Amfiteatru Economic*, 13(Special No. 5), pp. 669-678.
- Patti, A. L., Hartman, S. J. and Fok, L. Y. 2001. Investigating organizational quality management maturity: an instrument validation study. *International Journal of Quality & Reliability Management*, 18(9), pp. 882-899.
- Pepur, S., Ćurak, M. and Poposki, K., 2016. Corporate capital structure: the case of large Croatian companies, *Economic Research-Ekonomska Istraživanja*, 29(1), pp. 498-514.
- Powell, T. C., 1995. Total quality management as competitive advantage: A review and empirical study. *Strategic Management Journal*, 16, pp. 15-37.
- Samson, D. and Terziovski, M., 1999. The relationship between total quality management practices and operational performance. *Journal of Operations Management*, 17, pp. 393-409.

Saraph, J. V., Benson, G. P., and Schroeder, R. G., 1989. An instrument for measuring the critical factors of quality management. *Decision Sciences*, 20, pp. 810–829.

Siow, C. H. R., Yang, J. B. and Dale, B. G., 2001. A new modeling framework for organizational self-assesement: developement and application. *Quality Management Journal*, 8(4), pp. 34-47.

Sower, V. E., Quarles, R. and Broussard, E., 2007. Cost of quality usage and its relationship to quality system maturity. *International Journal of Quality & Reliability Management*, 24(2), pp. 121-140.

Staw, B. and Epstein, L. D., 2000. What bandwagons bring: effects of popular management techniques on corporate performance, reputation and CEO pay. *Administrative Science Quarterly*, 45, pp. 523–556.

Terlaak, A. and King, A. A., 2006. The effect of certification with the ISO 9000 quality management standard: a signaling approach. *Journal of Economic Behavior and Organization*, 60(4), pp. 579–602.

Terziovski, M., Samson, D. and Dow, D., 1997. The business value of quality management systems certification: evidence from Australia and New Zealand. *Journal of Operations Management*, 15, pp. 1–18.

Thompson, P. and Cowton, C. J., 2004. Bringing the environment into bank lending: implications for environmental reporting. *The British Accounting Review*, 36, pp. 197-218.

Trönberg, C.-C. and Hemlin, S., 2014. Lending decision making in banks: A critical incident study of loan officers. *European Management Journal*, 32, pp. 362-372.

Wayhan, V. B. and Balderson, E. L., 2007. TQM and financial performance: a research standard. *Total Quality Management & Business Excellence*, 18(4), pp. 393-401.

Wilson, F. and Town, J. S., 2006. Benchmarking and library quality maturity. *Performance Measurement and Metrics*, 7(2), pp. 75-82.

Wruck, K. H. and Jensen, M. C., 1994. Science, specific knowledge, and total quality management. *Journal of Accounting and Economics*, 18(3), pp. 247-287.

Appendix

Table no. 1: Pearson correlation for financial indicators

		EBIT margin	ROA	OWNFUNDS_A	FE_A
EBIT margin	Correlation	1			
	N	77			
ROA	Correlation	0,652**	1		
	N	76	76		
OWNFUNDS_A	Correlation	0,186	0,625**	1	
	N	77	76	77	
FE_A	Correlation	-0,401**	-0,640**	-0,458**	1
	N	77	76	77	77

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Table no. 2: Descriptive statistics of clusters when average EBIT margin was used to label cases – decomposition of QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	53	2,7422	12,5160	1,7192
Cluster 2	23	-3,0687	11,9403	2,4897

Table no. 3: Descriptive statistics of clusters when average ROA was used to label cases – decomposition of QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	53	0,2231	12,8196	1,7609
Cluster 2	22	-3,3486	10,6406	2,2686

Table no. 4: Descriptive statistics of clusters when average solvency ratio was used to label cases – decomposition of QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	53	36,3745	54,4044	7,4730
Cluster 2	23	35,6918	30,8126	6,4249

Table no. 5 – Descriptive statistics of clusters when average cost of capital was used to label cases – decomposition of QMS maturity index

Cluster Number of Case	N	Mean	Std. Deviation	Std. Error Mean
Cluster 1	53	3,2053	3,5410	0,4864
Cluster 2	23	3,5288	2,6802	0,5589

Source: Authors' calculation.