

Identification of important areas of research in field of quality management

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Abstract: *The work arised like results of preliminary research which conduct by authors for necessities of production doctoral dissertation on Mechanical faculty in Podgorica. Work presented research in quality management areas through aspect of category, methods for data collecting, methods for data analysing and academics disciplins or areas. The target of this work is to point out the most significant and not enough research areas of quality management systems through rewiev and analysing doctoral dissertation research which is available on Internet. Based on different kind of corellations which is defining and present in table, the conclusion is make whit target to point out significant and inherents quality management areas.*

Keywords: *Quality management systems, doctoral research*

1. INTRODUCTION

In research and expert environment in Montenegro and Serbia the idea about quality management standards and other standards is accepted, throughout their acceptance, research and implementation till merging them into integral model on firm level relating different size and sector, balanced with global accepted concept of "product" which by the standard ISO 9000:2000 merges four generic products. Approval about this can be found in fact, that today in Montenegro and Serbia in Universities in Podgorica, Kragujevac, Beograd, Novi Sad and etc. it is well known sub-system (centres, institutes and etc.) in general in Mechanical University, that are oriented on quality management system and which completeness in every moment can be attested by employees' references (eminent university professors, assistants and etc.). Also it can be proven by great number of realised projects from this area that it helps in great part in firm's performance improvement, as well as dispersal of globally accepted, international business practice.

Terminology about quality is dated

from period of old era [1] , but in modern time throughout institialisation and standards MIL, BS, Z and others, arrive to concept of first international accepted ISO 9000 standards from 1996, apropos after revision in 2000 that are actual ISO 9000:2000 quality management system. Today, there is great focus on merging those standards with those of environmental protection, protection and security in the work, control of food production and other integral management system. Quality standards are developing like internal norms and specialized norms for certain fields. Those standards are developed by expert groups for requested information activities and possibilities realisation for comparison by the same level accordingly by the same requests of those standards. For example, it can be, developed standards for environment protection and security in ECO hotels standards systems [2], standards in European high education [3], and etc. Those processes go with fact about standards importance and their presence and disposal.

Steadiness of quality management systems indicates even structure of international

organisation ISO moreover, number of countries (more than 150) that are presented in work of this organisation as principles (consensus, voluntariness, general development, two-third majority for adoption and etc) that are accepted during standards adoption [4]. Even if quality standards are voluntary, it gives confidence what is shown by positive world researches and expert practices, in implementation of those standards. Furthermore this is underlined in present time by clear improvements that could be measured that presents requested condition for recertification concerning those standards.

Standards' impact on financial results in firms around the world makes great contradictions. Still, in the literature is widely accepted argument concerning significant effect of standards on firm's increase on financial power and on important competition advantages. [4,5,6,7,8,9,10,11] what induce the importance of standard implementation in the firm.

Support for quality standard importance is indicated by the number of successful firms that are certified by those standards. They adopted their business with quality standards and like this they improve their business what induce that they reach positive results. Following this way of business, firms demonstrated that they are ready to cut with communist - imperialistic way of doing business and adopt more modern, more flexible business conditions. Also national institutions, journals, national prizes for quality, workshops and etc. support those orientations or mechanical terminologies focused on "quality standards". Cooperation setup and development with great number of international organisations and institutions are elements that indicate on disposal and importance of quality management. Here, quality management is focused in sense of changes for further development and analysis of doctoral dissertations around the world aiming to show justification apropos of presence of this subject

in high science-academic researches.

2. REVIEW OF DOCTORAL DISSERTATION CONCERNING MANAGEMENT QUALITY SUBJECT

The second section of this research is based on researches that are implemented in department of "Quantitative analysis and operation management" University of Cincinnati, Ohio and department of "Business management" University of Bradley in Illinois. For this research we used data about doctoral dissertation reached from search of international electronic database of doctoral dissertation's abstract. The research is conducted concerning three key words: quality, management and TQM. As result we have 530 doctoral dissertation's abstract concerning quality management subject. This data include period of 20 years. During 1980's researches are usually based on comparison of quality among certain national firms or comparison of similar firm on international level, for example American and Japanese firms.

Later, beginning of 1990's, researches were following in the direction of theoretical and practical aspects. Different authors tried to develop practical approach. For review and doctoral dissertation analysis, from the point of view of quality management we can include method for data collection, method for data analysing and academic disciplines, distinguish in table 1 could be accepted.

Categories of doctoral dissertation are described in the table 2 [3].

If we take for this analysis only period of last 20 years, than the situation of dissertation development could be presented as in figure 1 [3] or individually by categories and years as in table 3 [3].

Table 1

Category	Method for data analysis
<ul style="list-style-type: none"> • Leadership • Strategic planning • Customer and market orientation • Information and analysis • Human resources • Process management • Business results • Implementation • Noting • Others 	<ul style="list-style-type: none"> • Matematical modelisation /simulation • Varieties testing • Regressions • Factors/Cluster analysis • Structural equation for modeling • ANOVA/MANOVA/ANCOVA • Frame/concepts/history • Statistic description/quantitative methods • Multi-structure methods • Others
Method for data collection	Academic disciplines (areas)
<ul style="list-style-type: none"> • Review and research • Detailed analysis of cases • Secondary data • Interview • Expert table /Delphi/ • Others 	<ul style="list-style-type: none"> • General management • Operation management • Education • Health • Engineering • Marketing • Social science • Public sector • Others

Table 2

Categories	Category description
Leadership	Way in which experienced leaders use firm's value and performance
Strategic planning	Direction in which firm develop business strategy
Customer and market orientation	How firm understands customer's request, expectations and priorities including trade and relation with customer to realise his satisfaction
Information and analysis	How firms select, direct, and effectly use information and data as a support for key processes and creation of action paln.
Human resources	Approach that help employees to develop and and reach maximal effectivness, to develop environment povoljno for the best results reachment, business varaities, complete participation, internal communication and self and firm's development
Process management	Research focused on how firms disgn and develop their key processes and services and how they direct those processes with processes that are correlate with external sides.
Business results	Research focused on how firms improve performance of key business aras and how they realise linkage with managerial practice inside firm.
Implementation	How did firms implement quality management and how is the effect of quality management
Noting	Researchs focus on measuring how certain implemented strategies of quality management impact on firm's performance
Others	Reserches that do not belong to some of above categories

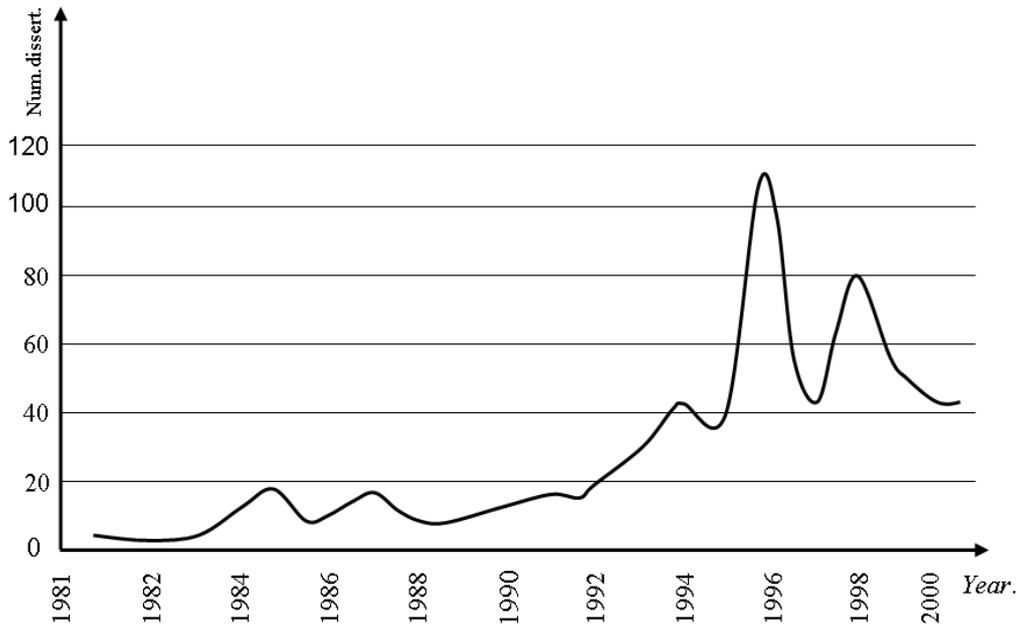


Figure 1. Dissertation by year-graphical review

Table 3

Categories	Years																		Ukupno	%
	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98		
Leadership	0	0	1	2	1	0	0	1	0	0	0	3	2	4	8	3	3	6	35	6.5
Strategic planning	0	0	0	0	1	1	0	2	2	0	1	2	1	1	5	0	7	1	24	4.6
Customer and market orientation	0	0	0	0	0	0	0	0	0	0	1	1	3	5	19	5	8	0	42	8.0
Information and analysis	0	0	0	0	0	0	0	0	0	2	1	0	1	1	6	3	5	2	21	4.0
Human resources	0	0	2	8	2	2	2	2	2	3	3	7	4	7	15	8	9	9	85	16.3
Process management	2	0	0	2	2	5	5	1	2	3	2	6	7	8	22	11	2	0	85	15.3
Business results	0	2	0	0	1	0	3	0	0	0	0	1	0	1	1	2	0	0	12	2.1
Implementation	0	0	4	5	1	10	0	3	4	6	7	8	18	14	28	13	20	9	150	28.7
Noting	1	0	0	0	0	0	0	5	3	2	2	4	6	3	7	0	25	13	71	13.6
Others	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	2	0	5	1.0
Total	3	2	7	17	8	18	10	14	13	16	17	32	42	44	111	45	79	40	530	100

Further distinguish or matricial view of research can be implemented through relation of categorical-academic disciplines (table 4), and relation category-method of data collection (table 5) [3].

Based on these reserches, furthermore on previously presented tables or matric views, we can start analysis of reserches that are needed for doctoral dissertation. One aspect of

those analyses are presented in third section of this paper. As results we can conclude concerning quality management disposal in doctoral dissertation, as well conclusion concern certain fields that are the most interseting for furher research, the areas that are not yet researched.

Table 4

Category	Academic area (disciplines)									Total
	Management in general	Operation management	Education	Health	Engineering	Marketing	Social science	Public sector	Others	
<i>Leadership</i>	16	0	10	1	0	1	3	4	0	35
<i>Strategic planning</i>	12	3	3	1	0	5	0	0	0	24
<i>Customer and market orientation</i>	8	1	7	6	2	13	2	3	0	42
<i>Information and analysis</i>	3	4	7	1	3	0	0	0	3	21
<i>Human resources</i>	47	2	14	6	0	1	7	8	0	85
<i>Process management</i>	10	40	3	2	25	0	0	0	5	85
<i>Business results</i>	6	3	2	0	1	0	0	0	0	12
<i>Implementacija</i>	54	7	46	19	3	0	9	12	0	150
<i>Noting</i>	16	5	23	13	2	2	2	7	1	71
<i>Others</i>	3	0	0	1	0	0	1	0	0	5
Total	175	65	115	50	36	22	24	34	9	530

Table 5

Category	Method for data collection						Total
	Review and informing	Detailed research	Secondary data	Interview	Work with groups/delphi/Expert table	Others	
<i>Leadership</i>	20	9	0	2	2	2	35
<i>Strategic planning</i>	10	4	2	1	1	6	24
<i>Customer and market orientation</i>	26	8	1	1	0	6	42
<i>Information and analysis</i>	9	6	1	0	0	5	21
<i>Human resources</i>	39	30	4	7	3	2	85
<i>Process management</i>	13	12	3	1	5	51	85
<i>Business results</i>	3	5	1	0	0	3	12
<i>Implementacija</i>	53	66	5	5	4	17	150
<i>Noting</i>	31	19	3	6	3	9	71
<i>Others</i>	2	0	0	1	0	2	5
Total	204	164	20	23	18	101	530

Also we can conclude about focus on quality management research.

3. ONE REVIEW (ANALYSIS) ON QUALITY MANAGEMENT RESEARCH AREA WITH OBJECTIVE TO IDENTIFY INTERESTING AREA FOR FURTHER RESEARCH

Relating presented results in second section we can start with their analysis with objective to define certain conclusion and to identify parts that are not researched enough and parts that are interesting for further research. That is the period between 1980 and 1994, when we had symptomatic increase of curve or increase of researches in area of quality management and also the period after 1994. The beginning is described with small number of dissertation what is normal if we know that this is the period when there were only the light signs for ISO 9000 appearance in 1996. From 1994 to 2000 number of researches had parabolic increase and decrease trend, with maximum in 1996, moreover the year when the first ISO 9000 was implemented. After that we have decrease in interesting for doctoral research in area of quality management. How the figure 1 includes only period before the first revision of ISO 9000 standard, following previous understanding and the fact that the revised series of ISO 9000 standard bring great changes concerning quality management, regard to the novelties that of course increased interest, it was expected that the research trend curve again had rush jump in period around 2000, more precisely year when it was accepted new version series of ISO 9000 standards. As a support for this goes the fact that if we look table 3 and line that represents research categories "Customer and market orientation" we can see increase trend in this area. Because that standard brings basic changes especially in this area, then we can expect further research increase. Furthermore, from the table 3 we can see very negative relation concerning researches on customer satisfaction, because from period 1981 and 1991, there was no research relation to this subject.

It is important to underline that the majority of dissertation are concerned on category "Implementation" which includes adoption of different methodologies, implementation and impact of quality management. We can understand this as a

global approach and not enough researched in detailed analysis in certain categories of quality management, for example processes management, customer satisfaction, human resources and others important segments for whole system. The lowest number of dissertation is done for subject of "Collection and information analysis" and "Business results". This fact is justified concerning those categories. Moreover, as a useful research it is possible to create research basing on data collection and their analysis, and basing on those results and their analysis one can conclude how firm can improve performance of key processes and like that realized a positive business result.

Information adoption and use, relating to researches that are focused how do firms find information, how do they analyses them and how do they use them for improvement of key processes and action plan, were not presented till 1990, when we have increase trend of dissertation and till 2000 it reaches number of 21 dissertation or 4%. This is very small part for the total number and this indicates on not enough researches which is especially today, moreover in information time, knowledge and informatics technology is very important. Low research number concerning elaboration and use information of different shape and having certain conclusions relating implementation of certain measures and action plan, there is low number of methods that are useful for analysis of that information. This fact supports reality that in Montenegro and of course in the world, there is low level of software that gives real results for request of documentation automation. Audit processes automation is done by recommendation from already existed standards [14]. Furthermore, following this we can once again support the fact that software construction concerning decision support or artificial intelligence basing certain detailed information or experiences during business for management quality requests.

From the table 5 we can notice that as methods for data collection use interview method, expertise table and method of secondary data, moreover data collection basing on competitive consultants form firm. This can indicate that request for those methods are established in research, individually or with combination with other methods, with their use or paralleled comparison of their significance

and receiving correct results. Furthermore, from the point of academic research (table 4) the most dispose research are from the management and education while the others area are equally presented. It is interesting that in engineering area, from the point of doctoral research, does not take care about business results or key processes improvement, what is indicated by only on dissertation on this subject.

4. CONCLUSION

Among different research opinions relating quality area, for doctoral dissertation's needs, moreover perquisites aspects about doctoral dissertation subjects (not) concerning not-certification, number of 530 dissertation for the period of last 20 years denied all factors in that direction. This number and variety of research areas or research subjects indicate on global acceptance of quality management and give wide space for researchers from different fields. In addition for this also product classification (ISO 9000:2000 certification) on four generic products that include process material, services, hardware and software, what help those facilities of analysis and borders go wider in modern time. Based by presented data and analysis in this research, we can show important increase in interests concerning quality management, especially in the period of standard adoption and revision. Furthermore,

we can distinguish areas that are not exploited enough what makes them more interesting. Some of them are: in the area of publishing and information analysis for key process of performance improvement and creation of action plan. Those are exactly areas that authors of this research are focused with objective to create doctoral dissertation in Mechanical University in Podgorica aiming realisation of further efforts in this direction, how it can help to firms to create on process modelling of systematic structure assures positive business results and do business in balance with new and modern, globally accepted business conditions. Concerning realization of competitive and financial advantages inside firm, it is necessary to realise research concerning impact of quality management on financial firm's improvement. Research shows that for data method collecting, it is important to use methods of expert analysis and method of secondary data, how they will reach real image about firm's condition and how firm will orient itself to implementation of "real experiments" aiming to get better conclusion. Using this way firm can makes a step further from potential laboratory experiments and conditions that are often (especially in our condition) cannot be completely satisfied taking into account the state of economy and investment of laboratory capacity. In this sense, it acts in balance with real problems and in direction of their resolution and science achievement as very important, what is not very often these days.

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Received: 19.06.2008

Accepted: 30.08.2008

Open for discussion: 1 Year

