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Research Issues Undertaken within Quality Management – Overview of Selected Literature and a Knowledge Map

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Abstract

The issue of quality management, despite its long history, still remains a dynamically developing research discipline and a scientific consideration. Subsequently, this is a very extensive field which encompasses many issues. Thus, this work mainly focuses on identifying research threads undertaken within quality management in selected periodicals. The article describes the undertaken overview and indicates research threads entailed within the analysed subject matter. Moreover, the resultant list of threads was presented in the form of a knowledge map reflecting their coexistence in specific articles. The methods used while preparing this article constitute an overview of the literature and a network analysis.

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Keywords: quality; quality management; research issues; knowledge map

1. Introduction

The concept of ‘quality’ does not have one, unambiguous definition. This idea has been accompanying humans since the beginning of our existence. Egyptians, Greeks, Romans, as well as any other ancient civilization considered quality as a symbol of perfection [1]. Later on, as the society developed, the concept also evolved. As an example Juran defined it as ‘fitness for use‘ [3], Dale, Van der Wiele and Van Iwaarden as ‘fitness for purpose’ [3] again Crosby ‘as conformance to requirements, not as goodness’ [4]. Nowadays meaning of that is created differently, based on a field of study or business it applies to [2]. The sense of that would vary among managers, medical doctors and philosophers. The diversity of definitions of quality transfers to disparate perception of its management. Liepiņa, Lapiņa, Mazais

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define Quality Management (QM) as 'the process whereby certain operations are performed to ensure the achievement of the objectives and improve the company performance'[3]. It is intimated, that this process is made up of successive, locked in a cycle activities, which include: (1) quality planning, (2) quality control, (3) quality assurance and (4) quality improvement [5]. Over the years, along with the evolution of the concept of quality and quality management, research threads related to QM have been changing. Particularly last few years which happened to be the time of an increase in the interest in QM, seem to be noteworthy within the scope of the analysis. Because of that, the author as an objective of her publication took the execution of an analysis of the research threads matched with the subject area of QM during the last fifteen years. In this publication presented are the changes in the field of research threads in period 2001-2016. The analysis was conducted involving publications from bibliographical-abstract data base *Web of Science* and the obtained results have been introduced as maps, created using the program VOSviewer. Accordingly, Section 2 presents the process of searching for the information about the questions co-occurring with the notion of Quality Management, quantitative statement of the publications registered in data base *Web of Science* which are connected with the subject of QM and briefly the software tool used to make the visualizations of the outcome – VOSviewer. The results of a study are shown in relation to certain time periods in Section 3. Finally, the conclusions of the examination and future research implications were presented.

2. Methodology

As the first step of the following examination, it was defined how the number of publications, which included any references to the notion of Quality Management, had changed. One of accessible bibliographical-abstract data bases was chosen for analysis – *Web of Science*. The choice was dictated not only by the comprehensiveness of considered data base, but also by the capability to use information obtained from it in the software VOSviewer.

The analysis began by preparing a summary of the number of publications which included the notion of QM over subsequent years, what is presented in Figure 1. When analysing data, it was noted that the number of interested in the topic of QM has nearly doubled in 2006-2009. The level of approx. 1000 publications achieved back then, remained stable until 2015. This relates to the constant international interest in discussed area and its up-to-date character. It should be noted, that during the first few months of 2016, the number of publications connected with QM reached the amount of 285 [as at June 10, 2016].

Taking into consideration the size of test material, the author used the program VOSviewer to organize and analyse collected data [6]. This software tool enables the user to make a visualization of the connections between multi-element datasets. Created maps may take various forms depending on which of the aspects of presented data the author want to highlight [7]. The form of the network visualizations was used in this Article.

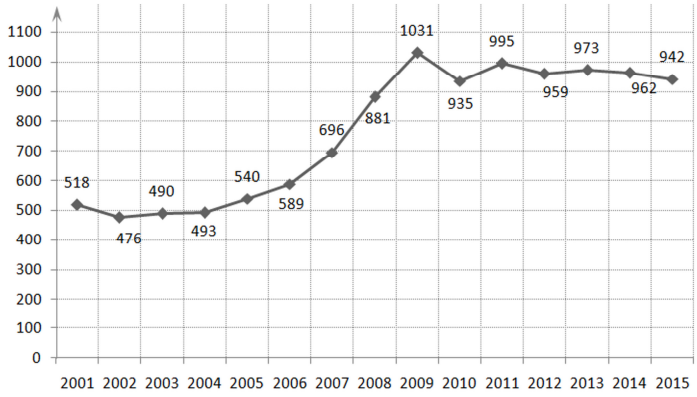

Fig. 1. The number of publications in data base Web of Science connected with the notion of 'Quality Management'.

Four time periods were selected for analysis: 2001-2002, 2005-2006, 2010-2011 and 2015-2016 (before June). The choice of periods between several-year long interruptions resulted from the need to present changes and differences

in combining the notion of Quality Management and other issues. The terminological data set, collected as the result of the first step, was reduced. At this stage, terms like ‘researcher’, ‘survey’, ‘theory’, which are part of nearly every publication, were eliminated, because they do not seem to have any relevant or distinguishing connection with the concept of quality management.

3. Results

The choice of the first time period (2001-2002) was made in view of indicating co-occurrence of the notion of QM and other terms suggesting considerable interest of the researchers in those years. It was the time, when the number of publications about quality management was on nearly constant level of approx. 500 papers. The results obtained using the VOSviewer software are presented in Figure 2.

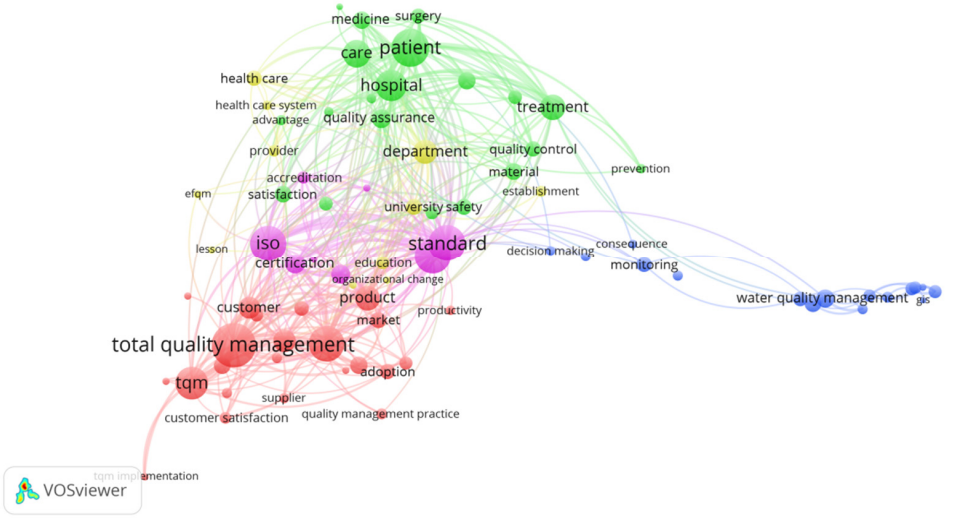

Fig. 2. Map presenting the co-occurrence of terms characterizing analysed articles related to the scope of quality management in 2001-2002.

Figure 2 shows four differently colour-coded clusters of points, which are representing diverse terms co-occurring with the notion of Quality Management in publications. The size of a certain point represents how often was that term used and the lines indicate the strength of the connection between particular phrases. One of the clusters refers to the concept of Total Quality Management (TQM) and its association with the production processes. This collection also includes terms like: “product”, “industry”, “productivity”, “manufacturing”, “customer”, “innovation”, “culture” or “leadership”. The other group constituting separate strands of publications during period under review was created out of phrases connected with concepts of ISO, Quality Management System, “standards” and “certification”. Next cluster represented the stream of quality management in medical treatment. It contains expressions such as “patient”, “hospital”, “treatment”, “diagnosis”, “documentation”, “quality assurance” or “care”. The third cluster represented covering quality management, in the reference to some aspects of the environment. It was focused as well on water quality management as on air quality management. This group also included terms related to monitoring or government activity and their decisions. The last cluster, which is the most scattered one and, for the most part, co-occurring with groups mentioned above, has references to the system of education and health care.

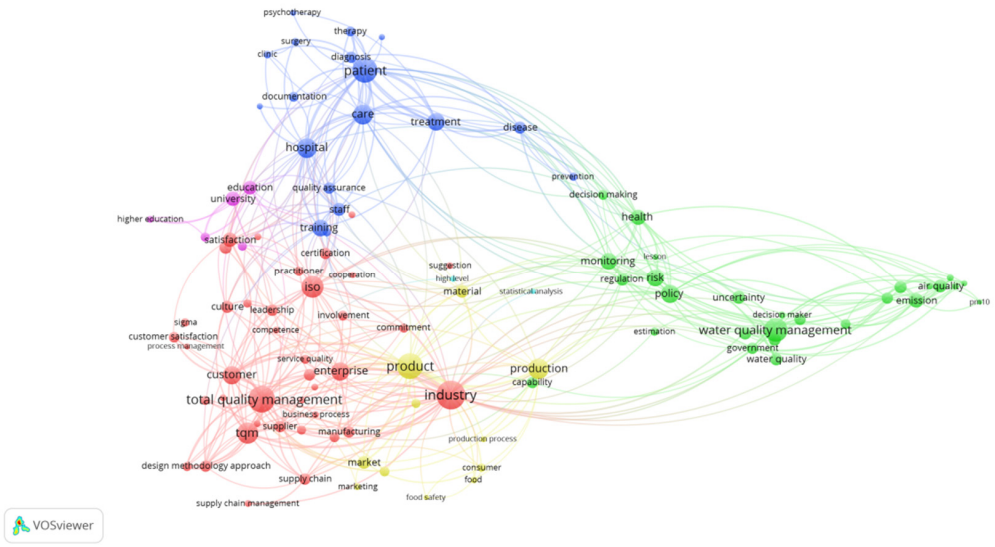

Fig. 3. Map presenting the co-occurrence of terms characterizing analysed articles related to the scope of quality management in 2005-2006.

Over the years 2005-2006 (Fig. 3), five groups where issues related to quality management had been brought up were in evidence. They referred to heath care, pollution of the environment, industry, education and product. It should be noted that in previous years, cases connected with certification were most of the times relevant to industry. Noticeable is also, that researchers became interested in new fields, related to production companies which held the conceptions of Lean, Six Sigma or supply chain management. Many aspects of human resource management (in the scope of industry) were increasingly highlighting. However, terms referring to the water and air purity were mostly focused on the industrial companies' impact on it. It should also be noted that despite continued presence of quality strand connected with medical treatment and environmental protection, many of those publications' aspects were associated with some kind of regulations. Both of mentioned groups include also papers about the risk assessment.

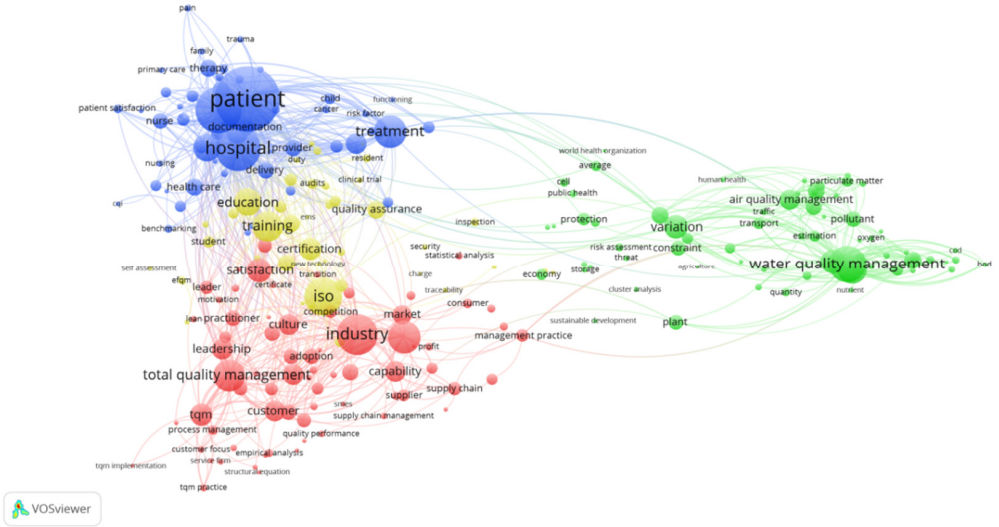

Fig. 4. Map presenting the co-occurrence of terms characterizing analysed articles related to the scope of quality management in 2010-2011.

During the following period (years 2010-2011) the context of quality management was spread, for the most part, over four fields: medical treatment, industry, environmental protection and education (Fig. 4). The largest group of publications refers to the first of mentioned realms, which are all activities connected in any way with healthcare. Without any changes, quality management was still considered in the context of industry, however during this time period, increased interest in topics of leadership, organizational culture and customer satisfaction surveys was much more noticeable. Publications relevant to education, but mainly considered in the context of aspects related to certification or ISO standards, formed another group. The area concerning water and air quality management is still present, however, in comparison with previous periods, the discussions in this respect referred to a lesser extent to the industry, but rather to pollution, which is the effect of the increasing number of cars and urban development.

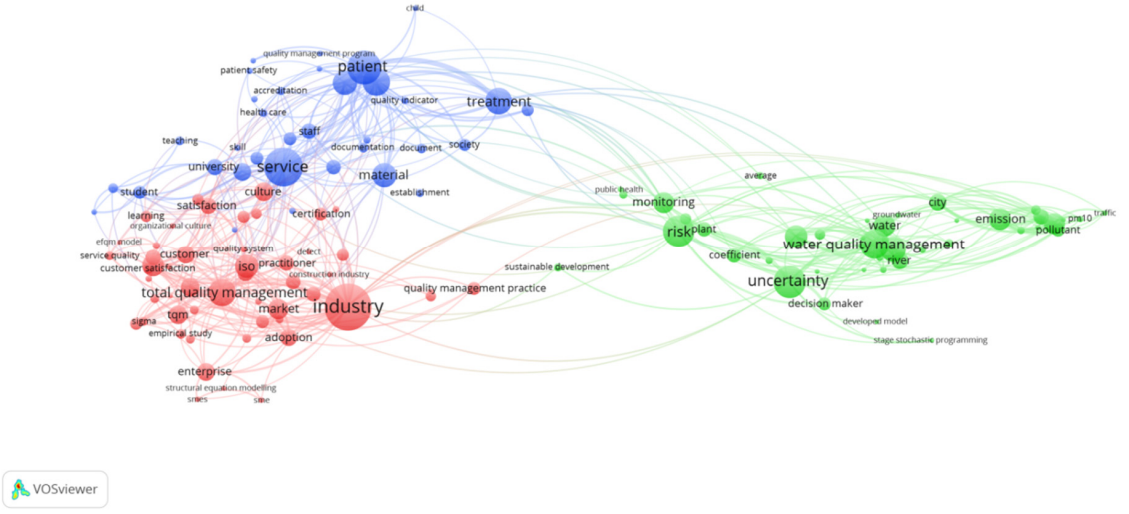

Fig. 5. Map presenting the co-occurrence of terms characterizing analysed articles related to the scope of quality management in 2015-2016.

During the last considered period (from January, 2015 to June, 2016), three streams considered in the context of quality management are noticeable. The first one covers the field of industry. Apart from the classical understanding of quality management closely related to production, significant number of researchers still focuses on elements such as context of human resources, customer satisfaction surveys, connections between QM and logistics or organizational culture. The stream of considerations of quality related to the concepts of Lean or Six Sigma are also much more highlighted. At the same time, it should be noted that the interest in certifications, which is still present, but now mostly considered in the context of the industry companies actions, is decreasing. There is still a large group of publications connected with the topic of protection of water and air quality, however the context of risk and uncertainty analysis is been taken into consideration to a greater extent. Interesting changes are noted in the last cluster of papers – this area is still dominated by the aspect of medical treatment, but now it is combined as well with higher education, as with significant share of other elements related to a wide range of services.

Conclusion

The overall conclusion is that in the field of publications connected with the quality management are noticeable some trends. First one covers terms related to the environmental protection. In this area, dominating are continuously notions corresponding to water and air quality. However, over the last few years, there have been noted some changes, resulting from adjustments in context, which at first was almost exclusively limited to considerations on the environmental degradation caused by industries. Then the attention focused more on urbanization and in the end concentrated on risk and uncertainty analysis.

It should also be noted, that the publication stream related to solutions in quality management in industry is still present. However, also in this field, there are some noticeable trends. Here the place had an evolution from almost dominating control of production to leadership, teamwork and customer satisfaction analysis. It is also clear that there is continuous connection between the area of quality management and conceptions like Lean, Six Sigma or supply chain management. Related context of certifications, which is gradually reduced, is worth mentioning as well.

Still actual, but to a lesser extent compared to the stream referring to industry, is a field of quality management in the context of health care and medical treatment. The strongest interest in this area was noticeable a few years ago, and now the publication intensity around this topic is much lower. A similar comment applies to the quality management in higher education. Over the last years, the relatedness between quality management and a wide range of services is definitely one of the most standing out.

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