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SYSTEMATIC BIBLIOMETRIC ANALYSIS OF HORIZONTAL NETWORK OF ENTERPRISES

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Abstract

This paper presents a bibliometric review that points the direction for the research to the theme of quality management in enterprise networks. The goal is to provide a mapping of what has been researched and to identify possible opportunities for studies. To meet the objective, a systematic bibliometric review was conducted, and resulted in identifying the major journals in the field, tools and quality programs, the main models with maturity, plus a gap in research.

Keywords: Quality tools, horizontal networks, Bibliometric analysis.

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1 INTRODUCTION

With the competitive global market, companies have adopted a strategy aimed to a more productive decentralization. For this, they began to focus on their core business, and in parallel, developing a number of other companies (third parties), specialized in activities supporting or supplying the components of the final product. Strong market competition leads competitors to cooperate and to achieve gains in the purchase of raw materials, workforce qualification, greater knowledge of the process, economies of scale and scope, among others (HOFFMANN, LOPES E MEDEIROS,2013).

This environment contributes to the formatting of the new system of industrial organization, culminating in the formation of networks with geographic concentration. There are various denominations and different classifications: industrial districts, clusters, local economic systems, industrial centers, networks of cooperation, local productive systems (LPS's), local production and innovative systems (LPIS's) and local productive arrangements (LPA's).

The development of networks demonstrate that when a group of entrepreneurs is supported by industrial policies they achieved higher productivity, quality, efficiency and organizational structures are leaner and more flexible. Entrepreneurs can achieve synergies in conducting business (NISHIMURA e OKAMURO, 2011).

This theme has been the field of study for many researchers interested in understanding how firms relate to each other, how they cooperate and the advantages gained by the participants of the network. However, there are few relevant studies of the methods needed for companies in the network to obtain greater synergy. Therefore, this issue becomes relevant to the research.

The relationship between the topics covered in the analysis of this article is Quality Management, the in relation to Horizontal Business Networks and Maturity Models that seek to increase competitiveness, and each theme has its own method.

Thus, the aim of this article is to provide a mapping of what is being researched and published in regards to quality management in business networks. Where from the analyzes it was possible to identify a research GAP.

2 THEORETICAL FRAMEWORK

2.1 NETWORKS HORIZONTAL

Horizontal networks are considered in the literature, complex relationships, where competitors choose to cooperate within certain domains, because they are favored by the concentration of efforts, without the lack of restrictions to take strategic actions and decisiveness of its members, and may share the use of technology and similar resources (PORTER, 1990).

AMATO NETO (2000) establish that the greatest difficulty to the establishment of horizontal networks of firms is the low level of long-term planning of the small and medium size organization. It is usually concentrated in one person and factories in the future will have to relate to other organizations to succeed, whether customers, suppliers or even competitors. The same authors emphasize that there is no single model of relationship for all organizations.

Hoffmann, Lopes & Medeiros (2013) pointed out in their studies that for the creation and development of horizontal networks of enterprises a culture of trust; of competence; of information technology is necessary. This way companies will have the ability to develop their activities as planned with agility and ethnics. Where the development of information technology is considered a point of extreme importance for the strengthening of the companies network operations, since it can strengthen the innovation capacity, generating an increase in productivity due to greater efficiency in operations individually and as a whole and should be developed for all companies included in the network.

Studies of Marcon and Moinet, (2000), Candido (2002), Verschoore (2004), Balestrin (2005), Nishimura & Okamuro (2011), Hoffmann, Lopes and Medeiros (2013) indicated that in this type of alliance there is a

heterogeneity, and that these clusters occur between firms in the same level of performance in the supply chain and may involve support institutions that promote the facilitation and development of networks.

Thus, horizontal networks are privileged by cooperation, interdependence, harmony in conflict resolution and less use of formal power. Due to these characteristics, this alliance model has been studied on a greater scale.

2.2 QUALITY TOOLS AND PROGRAMS

The word quality has been widespread in recent times; however, there is some confusion in the use of this term. Quality may be associated with various aspects such as technical performance and durability, customer satisfaction as to suitability for use, degree of conformity of product/service related technical specifications, such as the estimated value, assistance to implementation and verification of the results, others to support the strategic management of the company or even to assist in developing a new project (CARPINETTI, 2010; PALISKA, PAVLETIC and SOKOVI, 2007; LOPES, NUNES, SOUZA and ESTEVES, 2011).

The research of Miguel (2005), Paliska, Pavletic and Sokovi (2007), Taboada, Giner & Benevent (2011), Oliveira et al (2011) show that there has been developed over the years, various tools and programs to assist in improving the quality of processes and products.

For Cetindamar, Wasti and Beyhan (2012) and Paliska, Pavletic and Sokovi (2007), quality tools and methods are programs that can be used in various cases, including endorsement of change and improvement. The tools have a clear role in which they can be used in isolation, such as histogram, Ishikawa, Pareto chart, among others. The programs have a wider application than the tools, which requires more thought and skill. Overall, the programs can be viewed as a set of tools, for example, the SPC (Statistical Process Control) is formed by a set of tools such as; charts, graphs and histograms.

Proper use of tools and quality programs can contribute to improve the quality of processes, products and quality management systems as a whole. Besides keeping these companies in a network with management processes and quality control close to each other, allowing an approximation of maturity levels.

3 METHODOLOGY

Where to Pai et al. (2004), the systematic literature review is a reliable research approach in its scope and explicit presentation of means and results obtained. For Webster and Watson (2002), a systematic review aims to generate structured knowledge about a research topic and can be used to make predictions about the acceptable topic searched.

In order to carry out this literature research the a systematic literature review was executed. The Roadmap method, proposed by Conforto, Amaral and Silva (2011) was used. Where as to the authors guidence there is the need to follow the steps of the 3 phases that are described in Figure 1.

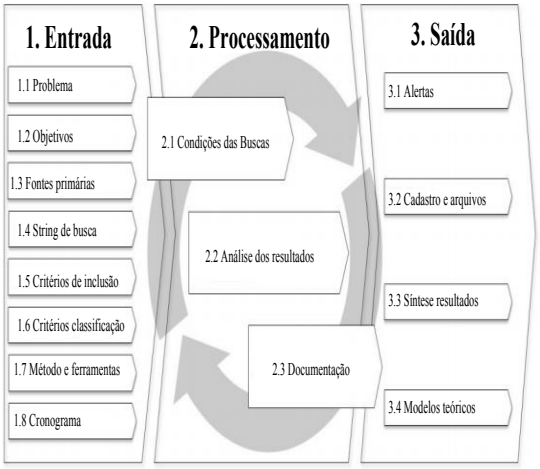

Figure 1: Phases for conducting systematic literature review -RSB Roadmap
Authors: Conforto, Amaral and Silva (2011).

In order to start the research it was necessary to use brainstorming technique with the experts constituents at the Organizational Engineering in Enterprise Networks (Engenharia Organizacional em Redes de Empresas – EORE), of the Graduate Program in Production Engineering (Programa de Pós Graduação em Engenharia de Produção – PPGEP) of the Federal Technological

University of Paraná (Universidade Tecnológica Federal do Paraná – UTFPR), at the Ponta Grossa campus, for the definition of phase 1, according to Conforto, Amaral and Silva (2011), is the starting point to begin a systematic literature search, where the key words and databases were defined.

As for key words, related words establish to horizontal business networks and quality management were used such as: Business networks, cooperation networks, industrial cluster, local productive clusters - clusters, horizontal networks, maturity models, quality tools, management, quality, total quality management.

The defined database that would be used would be the most relevant journals of the Capes

As the defined database that would be used the most relevant journals of the Capes (Coordination for the Improvement of Personnel in Higher Education), such as Cambridge University Press, Scielo, Science Direct Online, Emerald, Oxford University Press, Web of Knowledge e Scopus. These databases were selected by the scope and access to full text of the papers.

To analyze the papers only articles from the period 1994-2013 were selected; duplicate articles and articles that did not present alignment research topic were eliminated. For this the End Note program was used, which according to Fitzgibbons and Meert (2010) is a bibliographic manager software for scientific articles, this software references the Capes journals and organized in groups, eliminating duplicate articles and inserting references in the ABNT (Brazilian Association of Technical Standards)format .

Phase 2 sought to find the papers with relevant topics to the research, following the analysis of the results and documentation. After defining key words, databases and criteria for analysis. In the first filter 155 articles was selected, on this phase only the title was read and selected those relevant to the research and exported to *End Note*.

The second filter, done on the End Note software, was the exclusion of duplicate papers, which found six articles. Then the reading of the summary and exclusion of 78 articles due to the fact that they contained articles relating to other areas that would not assist in implementing the objectives. This resulted in 72 articles, and a full reading (abstract, introduction, results and conclusions) was performed and the exclusion of 26 articles totaling 46 articles that were used. Thenceforth the indexing of the papers was done

4 RESULTS AND ANALYSIS

Forty-five articles covering the following topics were found: tools and quality programs in horizontal networks, published in 30 different journals from 2000 to 2013. It was observed that 21 articles have been published in nine journals, while the remaining was published in only one journal each. Which are detailed in Table 1, the qualification according to CAPES periodicals, which have the highest concentration of articles on the topic.

Several company maturity models of were identified, and they are considered great tools as they allow managers to plan actions necessary for advancement (of a process or project) to greater maturity. The models in Table 2 can be highlighted.

Table 1: Journals that have published more articles about tools and quality programs in horizontal networks of companies.

Periodical	Qualis Classification	Amount of Publications
Research Policy	A1	3
Expert Systems With Applications	A2	3
International Journal of Operations & Production Management	B1	3
Proceedings of the World Congress on Engineering	-	3
Science of the Total Environment	A1	3
Journal of Cleaner Production	A2	2
Industrial Management & Data Systems	A2	2
Journal of Business Research	A2	1

International Journal of Project Management	A2	1

From the analysis of these models a gap in research was identified, as these models have been developed by several specialists, that focused on good practices for project management, however many companies inserted in networks can not apply such models, the fact that they do not develop projects and the model has not been developed for networks, but only a single organization. Where the development of a maturity model for horizontal networks based on quality management can help these companies achieve greater synergy.

Table 2: Maturity models.

*Capability Maturity Model (*CMM*)*
*Project Management Maturity Model (*PMMM*)*
Organizational Project Management Maturity Model (OPM3)
Ecodesign Maturity Model (EcoM2)
Project Management Maturity Model (MMGP)
ISO 9004

After identifying this gap, various tools and programs that directly or indirectly assist the quality management system were identified. Table 3 presents the techniques mostly used in the analyzed papers.

The quality management tools (Table 3) mentioned in the articles analyzed show that these companies use operational tools more frequently, in which these tools are used in the identification process or product failures, but the Kaizen tools, Six Sigma and ISO 9001 (with less use) can be considered as a strategic tool to assist in the results of the whole organization.

Table 3: Tools and programs for Quality

Tools and Programs	Amount
Ishikawa Diagram	18
Histogram	18
PDCA Cycle	17
Pareto	17
Total Quality Management (TQM)	15
5S	15
5W2H	14
Check List	13
Control Chart	13
TPM	8
Kaizen	7
8D	6
Six-Sigma	4
ISO 9000	4

With the identification of the research gap in which companies inserted in horizontal networks have difficulties in the implementation of models aimed at the development of products, the development of a maturity model based on quality management tools is possible, where the lowest levels (operational tools) can server to support in the search for higher levels (strategic tools).

FINAL CONSIDERATIONS

This study sought to identify what is being researched by the authors and published in journals on the topic of quality management in enterprise networks. To fulfill the objective it was necessary to select a theoretical framework to evaluate the scientific validity and to identify research opportunities to collaborate with networks of enterprises and the literature.

To meet the proposed objectives, it was necessary to use a structured instrument for the selection of articles on the topic of quality management in enterprise networks. The instrument used was the RBS Roadmap, which was divided into stages and filters applied for the selection.

With the aid of the instrument, a portfolio composed of 45 articles from 30 different journals with Qualis classification A1, A2, B1 could be obtained, which identified a research gap. Where the vast difficulty of horizontal networks is to ensure synergy actions between companies incorporated in the network, and to assist in this synergy network companies should be at similar maturity levels. The maturity models found in the literature have their focus on project management (most of the companies operating in the network do not develop) and especially difficult to implement it the network, because such models have been developed for companies that relate only to customers and suppliers.

Due to these considerations, it is suggested as future work the development of maturity models for business networks based on the Quality Management System. Both horizontal business network and the of quality management systems have as a priority the increase of competitiveness, as well as many other points in common.

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