

# Collaborative Networking of Researchers in Quality: A Portuguese Case

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## ABSTRACT

**Purpose** – Experience of a Portuguese network of researchers in quality is presented, and future development is discussed based on literature related to business collaborative network.

**Design/methodology/approach** – Literature review based on company's networks was used whenever applicable, and it was adapted to individual networks. A critical analysis of the network is carried out, bearing in mind development along its functioning for 9 years.

**Findings** – The experience shows some positive achievements (ex. a scientific journal), and some difficulties (ex: common projects). However, the most important issues for future sustainability are related to management dimensions like structure, strategy, earnings, relationships and performance.

**Research limitations/implications** – Higher Education Institutions are increasingly competing for resources and students. Small Research and Development (R&D) teams, such as quality, face relatively more difficulties than large ones. Collaborative networking can be a good solution.

**Practical implications** – Conclusions and reflection may interest other countries and regions.

**Social implications** – The weak mutual knowledge among quality researchers, as well as the lack of synergies between groups and individuals, can be a seriously weak point for development and scientific production. Coopetition can be possible and advantageous.

**Originality/value** – Research on quality issues is often carried out in small R&D teams. Collaborative networking can improve both theoretical and practical development.

**Paper type:** Conceptual

**Keywords:** Quality, Network, Collaborative, Research

## **INTRODUCTION**

This paper describes the experience of a Portuguese network of researchers in quality, mainly composed of higher education teachers. It reports the development of the network till now, and reflects on the main results, learned lessons and future perspectives.

In the year of 2010 a small group of researchers carried out the first meeting, aiming to discuss some issues such as the relevance of a Portuguese conference and the adequacy of networking. It was decided to build the RIQUAL (Network of Researchers in Quality), mainly focused on networking and fostering Research and Development (R&D) in younger generations. So, an annual meeting (not a conference) is carried out, where Msc and Phd students are invited to show ongoing or finished thesis and projects. They receive advices and insights from senior members to develop and or improve.

During the last nine years, some initiatives have been developed, highlighting: a) the scientific journal TMQ-Techniques, Methodologies and Quality, the only magazine in Portuguese language dedicated to quality and related areas ([www.publicacoes.apq.pt](http://www.publicacoes.apq.pt)). The journal accepts articles written in Portuguese, Spanish and English; b) Publications website. This platform was designed to accommodate other technical / scientific journals. c) Annual meetings. In 2018 will be held the 9th meeting, which have been happening without interruption. We estimate that they have already been used by about 500 participants. The proceedings of these meetings are published on the publications website. d) The Integrated Information and Corporate Knowledge Platform (IICKP). This platform is being designed to promote cooperation and collaboration among members, as well as to know the technical and technological capacity of territorial or sectorial areas and to promote the development of studies and the practice of benchmarking. A partnership started in 2013 with the Polytechnic Institute of Setúbal, to which the Technological Center of Ceramics and Glass has joined since 2017. d) SCOPE - Center for Organizational Development Studies. The Study Center was constituted as an internal structure of the Portuguese Association for Quality (APQ) as an instrumental for accessing funds, establishment of partnerships and specific projects. e) Quality and Network Observatory. Since early the network has reflected on the need to play some role in the observation and critical analysis of research practices and results in the quality field. In the context of the annual meetings these subjects were discussed and it is hoped that they will continue to find a solution.

Bearing in mind the period of nine years, the main achievements as well as the found difficulties, we considered appropriate to look for other networks, aiming to define the best framework for future development.

The first difficulty came from the literature review, because this is focused on company's networks and not on professionals. So, we used that literature based on companies, and always possible adequate and applicable it was adapted to networks for individuals. Based on the main models of governance, and in the critical analysis of the authors to their own accumulated experience in the coordination of the RIQUAL a model was identified and proposed (Figure 1).

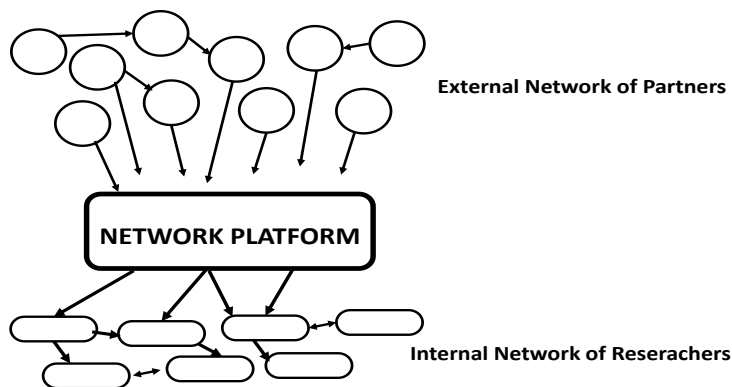


Figure 1 – Future perspective of the network.

Bearing in mind that the members of the RIQUAL are essentially academic researchers, we considered appropriated to characterize the context of higher education institutions and the levels of competitiveness to which they are subject in terms of scientific production, because this type of networking helps.

So, research work and this paper are structured as follow: Firstly, the context of higher education (HE) is characterized as well as the research and development teams in Portugal. The competition between higher education institution (HEI) and also among researchers appears in this context as a new conditioning dimension for research work in quality issues. For small research and development units, such competition becomes even more problematic, and it is compounded if efforts are dispersed and without synergies. In addition, there are other more important issues related to the need for theoretical development of quality, especially in terms of the topics to be researched.

Secondly, some typical purposes are identified for a collaborative network such as some type of observatory-level tasks and carrying out partnership projects. In addition, the network may be in the best position to study the teaching-learning processes in higher education (eg. pedagogical approaches, study cycles conception, success, dropout, employability). It may not be difficult to recognize that quality techniques and methods are taught, but these are not practiced or researched.

Thirdly, the publication of the ISO Standard 44001: 2017, Collaborative business relationship management systems - Requirements and framework proves that collaborative networks can be managed as a management system.

Finally, the issues of cooperation and competition are discussed on the basis of the literature on networking for business, aiming to draw lessons to networks of professionals.

## **THEORETICAL BACKGROUND**

### ***Context of Higher Education Institutions***

Higher Education Institutions (HEIs), in particular Portuguese ones, are faced with a new context characterized by: (1) a market logic with a view to an increasingly better strategic and competitive position; (2) a broad market at European and world level where physical borders are no longer limited, and national and international mobility is assumed as one of the pillars of development; (3) new management models, where resource management and quality are particularly relevant; and (4) a new accreditation processes, both at course level and at institutions level.

The Bologna process, which is the European movement for the modernization of higher education, is naturally one of the main responsible for this new context, providing new perspectives for pedagogical methodologies and practices, increasingly focused on students, autonomous study, in the research capacity and in the accompanying study, consubstantiating "the transition from a system of education based on the transmission of knowledge to a system based on the development of students' competences, in which the components of experimental or project work, among others, and the acquisition of transversal competences must play a decisive role "(Decree-Law no. 107/2008 of 25 June). This movement brought new challenges to HEIs, based on three fundamental pillars: (1) the degree system; (2) quality assurance; and (3) degree recognition and mobility (Heitor, 2009).

These new perspectives are generally considered to be difficult to implement, many of which are in support of the statement that "it is always difficult to change people and institutions. Such changes to be profound and meaningful, require financial and human resources, and require time to be internalized in the culture and institutional practice" (University of Minho, 2008). However, it has been widely recommended by institutions such as the European Association for Quality Assurance in Higher Education (ENQA) and the European Association University (EUA) and it is consensual in the academic and political environment, the need for HEIs to adopt systems of quality and improvement to which effective decision-making processes are associated, so that the improvement

process has a concrete effect on the administrative, financial, scientific and pedagogical activity of these institutions. According to the EUA, there is a need for HEIs to develop a process for quality, with a proper information strategy in order to promote a culture of internal quality, where quality units are not the only ones responsible for this quality but including responsibility of all the elements of the organization.

The important thing is that each HEI sees itself as a truly autonomous institution, defining its quality parameters as long as it has internal and external performance indicators associated with education and research (EUA, 2009). "Higher Education plays or should play a special role in the global challenge for building the new knowledge-based society. Particular attention should be paid to the consolidation of the pillars on which its evolution should be based, namely the pillar of citizenship, the culture pillar, the pillar of science and the pillar of innovation, the latter integrating quality and competitiveness, which are assumed to have efficient management models and timely evaluation" (Simão et al, 2002).

On the other hand, most HEIs are very concerned about traditional approaches to promoting excellence in education, such as diplomas, work experience, copyrights, patents and research activities. They may also not be receptive to new management approaches, such as quality management systems (QMS), identified as coming from the business world (a sufficient sign that they are not applicable to HEIs). Kells (1995) stresses that the academy has been aggressive to external interference on the institution, and on the introduction of new management techniques. Experience has shown that their resistance has been successful. According to Hackman & Wagerman (1995) "Implementation (of QMS) is easy, but the old organizational structures and systems remain untouched and continue to generate the same dynamic of previous behaviour" (p.336).

Supporters of chaos / complexity theory have a very dissonant view, suggesting that instead of trying to repair the old image of the university, we must be involved in a global initiative to link students to multiple sources of information and local and regional reality (Dervitsiotis, 2003; Snyder et al, 2000). Youth tends to view the world as interconnected networks of relationships, while universities often still see it as segmented fields of knowledge and experience.

The academy performs multiple activities, all of which have significant impacts on the quality of teaching-learning systems. First, it develops knowledge at the level of the scientific areas that shape the educational activities. In addition, they educate the teachers themselves as well as the teachers of the teachers.

At the level of the economic and social environment, it holds and develops the knowledge and the instruments for analysing those realities, which conditions the planning activities of the teaching-learning systems and processes. Particularly important, the academy accumulates experience and knowledge in methods and pedagogical approaches, key tools for planning, operation, monitoring, evaluation and improvement of processes.

In the particular case of quality, it also has an increasingly important role in designing new methods for quality control and management. The field of education is a field with relatively little experience in applying the most characteristic techniques and methodologies of quality, so that the academy can not only apply them to itself but also study applications at other levels of education, and sectors of activity, systematizing practices, consolidating and broadening theories and approaches in general and in particular at the level of their teaching processes. This field can take advantage of greater experience in other sectors, adapting existing techniques and methods, and developing new ones, particularly useful to educational institutions.

In spite of the huge and important changes made in organizations, such as main process integrations, the elimination of activities / tasks that did not add value, many organizations did not essentially change their management. According to Walsh (1995), Deming noted that functional departmentalization of the different bodies of an organization constitutes the greatest obstacle to quality improvement. The objectives of processes that provide "customer and organization value" are often overlooked and deprecated in favour of the goals of the traditional functional areas. But Functional areas and processes have to coexist and cooperate (Hammer and Stanton, 1999).

All these characteristics, in our view, reinforce the need for structured approaches, namely approaches that look at HEIs as "a group of groups that are incompletely connected" (Weick, 2003, p.380) in which the functional areas, such as departments or scientific areas, do not appear as a discrete and isolated set of well-defined boundaries, but instead appear as flexible and interconnected groups of information flows, underpinning the adoption of transparent management models that allow the integration of economics and a humanistic vision and give greater decision-making power (Simão, 2002).

Today, quality has new areas of development and therefore new contributions to competitiveness of business and society. The evolution of products, markets and technologies has created new challenges, such as:

- a) The quality of services provided online. In these cases, quality systems must overcome the disadvantages caused by the lack of physical contact with clients / students / stakeholders, in particular through the quality of the site itself and the service delivery platforms.

- b) New structural formats (eg. virtual and multidimensional organizations, cooperation networks). The quality function in this type of organization has to be rethought since there is not a single chain of command and action, the relations being more of cooperation and coordination. Eventual solutions will be to hand over the coordination to one of the partners, or to a joint committee.
- c) Integration of services. In these cases, the situation is similar to the previous one with the advantage of having a stable structure around which several alternatives can be built.
- d) Organization design. This will be an area of activity for some quality professionals.
- e) Quality in unstable environments. The solutions to act in these environments should be as much as possible foreseen. However, since it is difficult to predict, several scenarios must be constructed, according to the forms of management that may be adopted.

The context and the dimension of these challenges imply new forms of organization for the researchers in the quality field, reason why the RIQUAL can be a good case study bringing relevant contribution.

### ***Coopetition***

The competitive environment allows and makes to challenge limits and achieve higher individual or collective performances wherever we are competing (Porter, 2001; Rolo Alves, 2015). However, competition at the level of Higher Education Institutions (HEIs) cannot be leaded solely or fundamentally by conflicts of interest and opportunistic behavior. In a time of networks, competition and concurrency have been replaced by a new market / social area perspective that highlights the joint opportunities, synergies and mutual benefits, and the advantages of a win-win strategy. Therefore, the terms coopetition, co-creation, co-working, are increasingly used. The concept of "network" is a relatively recent paradigm, a new form of co-management or co-operation.

The synergy and performance effects resulting from collaborative strategies represent an asset for all parties that have become more efficient and sustainable (Rolo Alves, 2015). As a consequence of this strategy of collaboration in a competitive environment, the term "coopetition" arises from the combination of the concepts of cooperation and competition and means: cooperate competing (Porter, 1996, Quaresma Dias, 2013). It translates a third approach in the relationship between entities, which simultaneously contemplates rivalry and cooperation, and the two opposing situations can coexist harmoniously (Osarenkhoe, 2010). For the success of cooperative relationships, trust, a key factor in transactions, contributes to important benefits in the cooperative

relations between economic actors and other entities, either at upstream (purchase transactions) or at downstream (sales transactions), facilitating the communication process and contributing positively to the process of innovation and knowledge creation (Zhang and Huo, 2013).

Network flexibility, as proposed by Galbraith (1997), requires the organization to create an external capacity network complementary to its own internal network of competencies, which can even be established with competitors from the perspective of cooptation.

According to Sánchez (2003), the complexity of these phenomena leads the entities to cooperate for: (a) reducing and sharing Research and Development (R&D) costs; (b) ensuring the technology complementary to its key competences; (c) capturing the tacit knowledge and technology of partners; (d) shortening the life cycle of processes and products; (e) sharing the costs of product development; and (f) ensuring access to markets, qualified personnel and financial resources.

Some of the most important aspects of globalization are linked to the new Information and Communication Technologies (ICT). These seem to have been one of the main "engines" of acceleration of the globalization process (Aguin, 2003). In many respects, ICT represents the first "global" technological mutation that our societies have faced in their history (OECD, 1996 cited by Soete, 2000).

The selection of new technological paradigms may focus on the linkages between pure science and technological progress, and based on the criteria and means of research used by economic agents, on the constraints and uncertainties faced by innovators or on the clarification between invention and innovation. The empowerment of ICT in all processes of dematerialization of partnerships is nowadays a national design to which organizations must associate (Coates, 2000).

There are projects, activities or objectives that cannot be achieved individually, leading to the union of efforts between individuals and companies. Networks present themselves as the organizational solution best suited to the contemporary challenges that plague companies and current and future productive needs, which must consider efficiency, agility, resilience and sustainability as the critical goals to be achieved.

According to Ballou (2006), the growing interest in cooperation and partnership relationships arises from the fact that it is not possible for a single company to have control on all flows of materials or services, from raw material source to consumption. For example in R&D, it is not always possible for a group to have enough knowledge and technology to achieve project objectives.

The term network has several meanings and applies to several areas. At the computer level you may want to designate computer systems that are geographically separated from each other,



interconnected by telecommunications, usually permanent. In social terms it means a set of relationships and exchanges between individuals, groups or organizations that share interests, which work mostly through Internet platforms.

In a business perspective it represents: strategic alliances between companies; economic cooperation agreements between countries; interaction between groups; set of contacts that an individual possesses, among others. At the level of organizational networks, it means a strategic interaction between companies (Lopes and Morais, 2012). By analogy, and at the level of a network of researchers, we can say that these are interactions between individuals and groups, who voluntarily accept common purposes, and wish to increase partnerships and synergies. Similar to business, researchers also tend to be part of one or even several networks.

While cross-industry alliances began to intensify in the high-tech industrial sectors since the 1980s (Baldwin, 2013), it is also expected that some forms of cooperation among researchers will develop in response to extra interests (personnel and professional) behind HEIs interests.

According to Vale et al. (2006), Lambert (2008), Bowersox, Closs and Cooper (2009) and Mattos and Laurindo (2012), competitiveness has ceased to occur between companies to occur between organizational networks. The evaluation methods of HEIs and their teachers (much based on the number of publications) have been encouraging competition also in terms of HEIs networks and to some degree among researchers.

Pires (2009), Cho and Soh (2010) and Christopher (2011) corroborate that the optimization of production and business management was shifted from competition between individual companies to competition between supply networks. If this situation holds true for companies, why not for individuals and knowledge workers? These can cooperate independently and autonomously, jointly developing projects and / or acquiring and sharing resources; or they can form a group of researchers that unit forces (eg. networks, associations, alliances, consortia or formal or informal groups). The establishment of partnership relations leads to the flexibility of the "productive" process of research, technical expertise and economies of scale.

The multidisciplinary of quality advises to bring together researchers from several areas of knowledge, develop methodologies for integrating efforts that can synthesize very specialized (vertical) knowledge of an area with specialized knowledge of other areas, in order to obtain cross-horizontal / horizontal knowledge.

To this end, there is a need for integrators / mobilizers who are neutral, credible, and influential and have specialized knowledge to start this process. This element can be an individual, an institution or

a professional association (Carvalho, 2011). In the case under analysis, the Portuguese Association for Quality (APQ) has been playing this role by integrating RIQUAL as an internal structure.

In a virtual collaborative environment each partner contributes with their knowledge and each can reach their individual goal and with it contributes individually to the common goal. It also requires the acceptance of the differences between partners, tolerant attitude, adjustments of part, respect, trust, negotiation and non-hierarchical relations between the parties (Zacharia, Nix and Lusch, 2011; Cao and Zhang, 2011).

Mintzberg and Quinn (2001), Cohen and Roussel (2005), Mariani (2007) and Harrison and Van Hoek (2008) point out that in a hyper-competitive environment, companies should seek to develop relationships that foster sustainable competitive advantages for both parties, in an attempt to overcome their weaknesses or limitations, to the detriment of competition and price war whose impacts are always negative for the whole industry, crushing the profit margins of competitors and their own, translating into losses for both parties.

Similarly, hyper-competition between HEIs and researchers suggests that methodologies be found at individual level. Cooperation is considered to be positive and conducive to networking. At the level of market companies, so-called open innovation is another concept that has been used for activities that transform the needs of markets and society into products and services. At the R&D level it seems easier to call for open research.

The concepts are summarized in Table 1, and forms of cooperation according to the objectives are shown in Table 2.

Table 1 – Concepts

Typology of relationships	Description	Authors
<b>Cooperation</b>	It involves the division of tasks into sub-tasks to be carried out by multidisciplinary or mixed teams, with elements representing the various partners.	RCED (2007); Balestrin e Verschoore (2009); Zacharia, Nix e Lusch (2011); Cao e Zhang (2011)
<b>Collaboration</b>	It involves the division of tasks into independent sub-tasks, performed independently by each partner.	RCED (2007); Zacharia, Nix e Lusch (2011); Cao e Zhang (2011)
<b>Competition</b>	It happens when two or more companies that oppose and compete with each other for the same market, with identical or substitute products or services, strive to maintain leadership and gain market share.	Porter (1999); David (2012); Esteves e Ascensão (2011)
<b>Coopetition</b>	It means to cooperate competing and mirrors the relationship of companies that collaborate in certain projects and compete in others.	Porter (1999); Mariani (2007); Carvalho <i>et al.</i> (2010, 2011); Osarenkhoe (2010); Quaresma Dias (2013)

Source: Rolo (2015).

The presented types of cooperation can be grouped into three distinct areas of cooperation: (1) cooperation for research and development of new products; 2) cooperation in production and logistics; 3) cooperation in marketing and distribution.

Table 2 – Types of cooperation according to objectives

	Objectives
<b>Co-inform</b>	Identification of members and their competences; sources of information that the company uses to promote its own product or process innovations, as well as in promoting and improving communication between partners.
<b>Co-learn</b>	Development of training programs sponsored by the group to meet the interests of the network and employees.
<b>Co-market</b>	Organized activities to promote and sell services and products from the cooperation network.
<b>Co-purchase</b>	Joint acquisition of equipment and other resources.
<b>Co-produce</b>	Alliance to produce a particular product.
<b>Co-sale</b>	Alliance to sell a particular product / service.
<b>Co-lobby</b>	Defence of policies, legislation and programs of interest to the network.

Source: Adapted from Molina and Yoong, *apud* Pereira *et al.* 2007.

Technological innovation is increasingly a collective process with the participation of multiple actors (OECD, 1992, 2005). On the other hand, Pereira (2007, p.39) states that "the concepts of "network" and "community "are inserted in the more general context of collaborative networks, that is, a set of independent organizations or individuals interacting, using intensively collaborative

processes aimed at achieving collective results through the joint execution of tasks, supported by collaborative IT. "

In the present case, researchers start by collaborating on information and learning, and later can collaborate in technological production and in the defence of group interests.

From another perspective, the network can be seen a set of nodes (companies, groups, individuals), each occupying a certain position in the network, that relate to each other through the flows of goods or information.

Casarotto and Pires (2001) present a typology based on flexibility where they distinguish between flexible networks and top-down networks. Considering the boundaries of the network, Wood Jr. and Zuffo (1998) classify organizations without borders into barrier-free, modular or virtual structures.

Roth et al., (2012), in their study on governance and management of interorganizational networks, had the goal to understand how certain conditions can influence the obtained results, analyzing aspects of the network as a whole and not as individual companies or simply relations between companies. In this study, it is emphasized the model called horizontal network, which presents some particular characteristics that distinguish it from other types of networks: there is no central coordination of a large company; decisions are usually taken by consensus or by the majority; most often they are formed by companies of the same sector; members can often be direct competitors. They present three models of network governance (Figure 2) from which, hybrid combinations and models can emerge: shared governance; governance with leading organization, and governance through a network administrative organization.

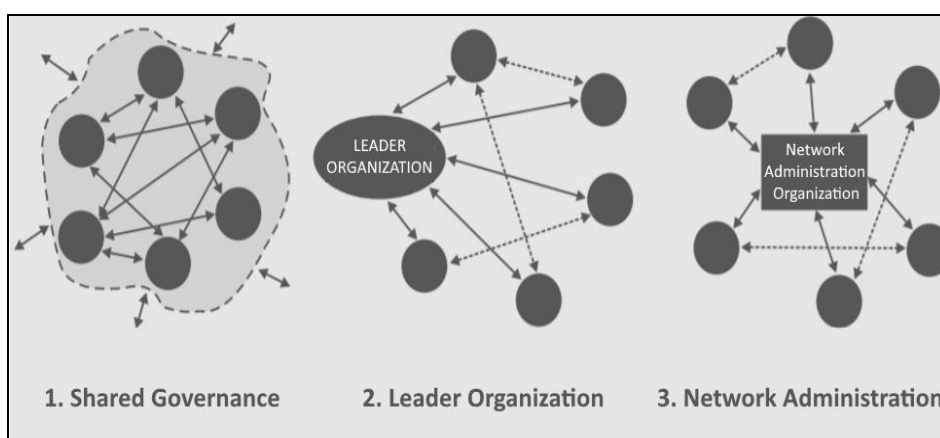


Figure 2 – Network Governance Models.  
Source: Provan e Kenis (2008) apud Roth *et al.*, (2012).

## CONCLUSIONS

The RIQUAL network can claim some success stories, but also less achieved purposes. In the same case are the annual meetings, where the presentations of Msc final thesis and projects (and also PhD students) has been very positive aspects, in many cases the first public presentation experience of the students. The supervisors found out an extra element for student motivation. The scientific journal is another success story, as well as the electronic platform for publications, although the platform not having the desired level of functionality yet. The publication of proceedings had some success, but it has the potential to integrate other events proceedings.

In the second case are the common projects that were less than expected. Main reasons are the dominance of the relationships of researchers to their home research groups.

From another point of view, the RIQUAL operates as an open platform as desired, but experience shows it seems too open, because, for instance, we do not know how many we are. These issues and other needs for fostering common projects request the creation of a management structure. For example, the connection between RIQUAL and the companies and business projects has not yet been successful, because the functional and management structure still needs development. So, we adopt a management model that shows the future perspective of the network (Figure 2). This model allows that the projects (from business companies, entities from the public and social sectors, or the own projects of the network) can be channeled to the network management platform, which will find the best way to respond to them (eg. teams, technologies, resources).

The major challenges remain on the management of the RIQUAL network itself, implying in particular its several dimensions: structure, internal and external relationships, performance evaluation and earnings and the strategic alignment between the “cooperators” and other partners. There is broad agreement that integration and coordination bring benefits to network members and that coordination should be seen as an administrative mechanism to achieve integration.

The "relationships" dimension contemplates the cooperative relationship between the partners of the network, established by long-term contracts based on trust, which is referred by several authors as essential for a real long-term cooperation relationship [Speakman et al. (1998), Lambert et al. (1998), Parsons (2002) quoted by Cunha and Zwicker (2009: 148) McHugh et al., (2003), McLaren et al. (2004); Cohen and Roussel (2004), Vale et al. (2006), Martin (2007) and Carvalho (2011)].

The "earnings" dimension includes benefits. Regarding strategic alignment, some authors consider that companies can be part of different networks simultaneously, relating to customers in several sectors, which may even be competing with each other, so that strategic alignment is not always

easy to achieve. This dimension in RIQUAL has been replaced by common objectives, assuming that distributed benefits underlie cumulative performance and efficiency.

The "Structure" dimension reflects the relationships that are established among the "cooperators", and emerges from the need to define the role of each partner in the network, considering that not all should be integrated; it will be necessary to choose and rank them according to the skills and knowledge. It is preferable to work with a reduced base of researchers, with which it will be possible to integrate processes and activities, contributing to the increase of the collective efficiency (of the network), resulting from the accumulation of individual efficiencies. The information flow should be bidirectional.

Alves Filho et al. cited in Cerra et al. (2008) also consider the cumulative structure and efficiency dimension. The integration of processes and activity is essential as is the maintenance of a two-way flow of information.

The "Performance" dimension will consist of the key indicators defined to monitor network performance and evaluate the impact of defined strategies, assuming that it cannot be managed without measuring. Possible network scorecards may be necessary, using internal and external indicators to the network, based on project-by-project evaluation.

## **LIMITATIONS AND FURTHER DEVELOPMENTS**

A first limitation is related to the nature of the case study research, and the second comes from the auto analysis, because researchers are reflecting over their own experience. However, we consider that both experience and reflection will be useful for other networks of professional and researchers and can motivate other researches to approach this issue.

A third limitation comes from the literature review, being clear that more research is needed on other experiences with networks of professionals and researchers. As few cases are related in literature (most focused on companies) the research of networks of professionals and researchers is a new and innovative field.

The replication of this experience (in Portugal) in other countries would be a test that collaborative research networks is a relevant issue, but also a way for benchmarking between several networks. Additionally, the integration of researchers from other countries, and cooperation with other similar networks would be another potential area.

As further development, we can state that it is clear that this type of networks needs to move from interaction within the network of individuals to interacting with networks of organizations. This perspective is another field to research.

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