A QUALITATIVE RESEARCH INSTRUMENT TO ANALYZE ORGANIZATIONAL CLUSTERS' COMPETITIVENESS FACTORS

UM INSTRUMENTO DE PESQUISA QUALITATIVO PARA ANALISAR FATORES DE COMPETITIVIDADE DE CONGLOMERADOS ORGANIZACIONAIS

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ABSTRACT

Clusters are geographic concentrations of interconnected companies, suppliers, service providers, and institutions working together at economically linked activities in a particular sector. Clusters play an important role to improve development through associative organizational forms. Many factors contribute to clusters' competitiveness (e.g. trust and collaboration among firms, and cluster governance). However, the literature about these factors is broad and their definitions vary according to different disciplines. Moreover, these factors were object of study in industrial settings. Therefore, the purpose of this article is to present a qualitative research instrument to analyze clusters' competitiveness factors. The final instrument created is a continuity of the work published by Rigoni and Saccol (2012) and it was empirically tested it in a cluster of flower growers. Most of the competitiveness factors of our instrument stemmed from the literature, while others emerged from the field, contributing to foster the development of theory on clusters' competitiveness. This instrument has several applications, such as to qualitatively analyze the level of competitiveness of clusters, helping their members adopt a cluster approach, and assisting police makers to design more effective cluster development policies.

Keywords: clusters, competitiveness factors, qualitative research instrument.

RESUMO

Clusters são concentrações geográficas de empresas, de fornecedores de insumos e serviços e de instituições, todos trabalhando conectados e em conjunto em atividades de um setor específico. Os clusters têm um importante papel para incrementar o desenvolvimento econômico por meio de formas organizacionais associativas. Muitos fatores contribuem para a competitividade dos clusters (por exemplo, a confiança e a colaboração entre firmas e a governança). Contudo, a literatura sobre esse tema é vasta e a e sua definição varia de acordo com as diferentes disciplinas. Neste contexto, o propósito deste artigo é apresentar um instrumento de pesquisa qualitativo para analisar os fatores competitivos de clusters. O instrumento final criado é uma continuidade do trabalho publicado por Rigoni e Saccol

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(2012) e foi empiricamente testado em um cluster de produtores de flores. A maior parte dos fatores competitivos do nosso instrumento de pesquisa origina-se da literatura, mas outros emergiram do campo. A elaboração deste instrumento deverá fortalecer um desenvolvimento dos fundamentos teóricos da competitividade de clusters. O instrumento também poderá ser adotado para analisar, qualitativamente, o nível de competitividade de clusters, apoiando seus integrantes na adoção de uma abordagem de clusters e assistindo os formuladores de políticas públicas na elaboração de políticas para o desenvolvimento de clusters mais efetivos.

Palavras-chave: conjunto de empresas inter-relacionadas, clusters, fatores de competitividade, instrumento de pesquisa qualitativo.

INTRODUCTION

Organizational contexts had evolved substantially with the emergence of more complex organizational forms. We witnessed an increase of the frequency in which firms enter into collaborative and associative relationships. These partnerships change geographies, industries and value chains. However, while the world of practice has been dramatically changing its efforts and actions beyond the boundaries of the firm, our organizational theories still have a strong intra firm bias (Gulati *et al.*, 2012).

Clusters are socioeconomic entities characterized by geographic concentrations of interconnected firms, specialized suppliers, service providers, and institutions (e.g. universities, governmental agencies, trade associations) working together in economically linked activities (Baptista and Swann, 1998; Maskell, 2001; Morosini, 2004). The physical proximity of economic agents can promote certain forms of commonality and increases the frequency and impact of interactions and knowledge exchange. In this type of association, firms can cooperate but also compete with each other. Clusters usually have a social-cultural identity associated to their geographical location and they play an important role to regional and national development (European Commission, 2012).

The collective synergies generated by the participation of firms in local productive conglomerates effectively strengthens the chances of their survival and growth, particularly small and medium companies, becoming an important source of lasting competitive advantages (Cassiolato and Lastres, 2001).

Many factors contribute to clusters' competitiveness, such as: collaboration, coopetition (a mixture of cooperation and competition among firms), trust and innovation (Bengtsson and Kock, 2000; Morosini, 2004). For example, the theory of relational economy emphasizes the agents and the economic action as a social action in interorganizational relationships, and the processes created by the agents (Bathelt and Glückler, 2011). In addition, different disciplines (e.g. Economy or Management) frequently define the same factor in different ways (Aziz and Norhashim, 2008).

Coutinho and Ferraz (1994) stated that cluster competitiveness is a complex construct formed by groups of factors that conditions their performance. Among these groups, there are those compounds by factors internal to the firms (strategic management, innovation capacity, productivity capacity and human resources), those related to the structural nature (industry structure) and those of systemic nature (macroeconomics, financial, political and institutional factors).

Several articles present a variety of concepts and elements that can be considered as cluster competitiveness factors: vertical and horizontal mobility (Blasio and Di Addario, 2005); cluster strengths (regional employment) (Baptista and Swann, 1998); innovation (Baptista and Swann, 1998; Zelbst *et al.*, 2010); pipeline (Bathelt *et al.*, 2004); benchmarking events (Morosini, 2004); knowledge creation (Tallman *et al.*, 2004); etc. Problems emerge when heterogeneous set of concepts emerge from the field. This makes the analysis of cluster competitiveness factors a difficult task to establish regional development policies (European Comission, 2012; SDPI, 2013), considering the information asymmetries between entrepreneurs and policy makers.

Therefore, the purpose of this article is to present a qualitative research instrument to analyze clusters' competitiveness factors. The final instrument created is a continuity of the work published by Rigoni and Saccol (2012) and it was empirically tested it in a cluster of flower growers. The elaboration of an instrument to support the process of cluster analysis is welcome to obtain a common view among the participants (Hospers *et al.*, 2009). It also constitutes a good instrument to foster the development of a new business philosophy among cluster participants (Vasilescu, 2009).

Previous research concerning the development of instruments for cluster analysis emphasized quantitative approaches, assuming the availability of quantitative data (Arthurs *et al.*, 2009). For example, previous research developed in Brazil studied industrial clusters or tourism clusters (Ferreira and Cunha, 2008; Cunha and Cunha, 2005) making it difficult to establish efficient policies for other types of cluster. Moreover, no instruments had been developed to analyse the competitiveness of

the flower business using a large set of intervening elements (Anefalos and Guilhoto, 2003; Pereira and Carvalho, 2008).

Therefore, the instrument presented in this paper aims at contributing to the analysis of cluster competitiveness by considering:

(i) qualitative data, since frequently there are no quantitative data available about a cluster and the quantitative data can be not enough to understand the intricacies of competitive factors;

(ii) a comprehensive set of elements that are related to cluster competitiveness. Not only specific variables (such as innovation or knowledge exchange), but with a broad perspective on the complex elements that are related to clusters' development.

Depending on the nature of each cluster, some factors are more important than others. Therefore, the intention with a broad qualitative instrument is to explore the range of elements that different types of clusters appoint as more important to be analysed in their situations, not only industrial but also of other nature, for instance, agricultural.

The questions addressed in our study are the following: (i) what are the factors that influence the level of competitiveness of a cluster? (ii) how can we operationalize these factors in order to analyze, qualitatively, the competitiveness level of a cluster? Our goal is to present a qualitative research instrument to analyze clusters' competitiveness factors. This means developing an instrument that can be used to evaluate how specific factors influence cluster competitiveness. To attain such goal, it is necessary to identify, together with clusters' representatives, which the most relevant competitive factors that will serve as indicators of success in a possible attempt to increase the cluster competitiveness are.

As Kirk and Miller (1986, p. 30) state, *asking the wrong questions is the source of most validity errors in qualitative research.* Therefore, we took a careful process of construct definition, in order to build, operationalize, and empirically validate our qualitative research instrument.

Rigoni and Saccol (2012) have previously proposed an initial version of this instrument. Our study developed their research and we now present the validation process of this instrument in an agribusiness cluster of flower growers, located in the South of Brazil. The cluster agents face problems such as perishability of flowers, a large number of small and not well-structured businesses in the agglomeration, not enough available data about the cluster, and not well-structured organizations. Only few flowers producers integrate formal associations, however, these associations did not offer specialized services to their members. Consequently, the adoption of validated research instrument is a first step towards identifying which factors deserve more priority and it may help participants to improve the decision-making process to develop the cluster. A great influence to work in this context is because firms of this cluster are planning to strengthen the relationships

among them to share resources and cooperate in some business processes. Participants of the cluster intend to reach new market shares, and they want to innovate in order to obtain competitive gains. Taken all of this into account, we decided to establish a partnership with the main sector association.

Another potential issue of a specific and validated research instrument is its adoption by public decision makers to design enhanced policies to promote regional development, fostering interorganizational relationships based on competitiveness analysis in not industrial clusters. The literature review performed revealed that the existing models and instruments to analyze the competitiveness of clusters are in their majority developed for industrial clusters (Karaev *et al.*, 2007; Van Der Linde, 2003).

Furthermore, the development of this research instrument is part of a larger research project involving the design and application of mobile/ubiquitous information technology to support collaborative business processes in clusters.

In order to accomplish our objectives, in the following section we present cluster competitiveness elements obtained from the literature that grounds this research. In the subsequent section, we describe the research method adopted and the validation process accomplished. We then present the research instrument obtained and the theoretical and practical contributions resulting from the development of this qualitative competitiveness analysis instrument. As concluding remarks, we address future studies.

CLUSTER COMPETITIVENESS

Lübeck *et al.* (2012) classify the different forms of territorial agglomerations of firms according to the different degrees of their development and integration of its agents. According to these authors, there are four types of agglomerations in order of increasing development: industrial districts, clusters, Local Productive Arrangements (LPA, in Portuguese: APL) and Local Systems of Production and Innovation (LSPI, in Portuguese: SLPIs). Their definitions are:

- **Industrial districts** are characterized by a large number of companies involved in the various stages of production of a homogeneous product, in which the coordination and control of the process does not follow fixed rules or hierarchical mechanisms and are delimited only by demand and productive capacity.
- **Cluster** is a geographic concentration of interconnected companies and institutions for the same production chain, in which each company maintains its independence.
- **Local Productive Arrangements (APL)** are geographical clusters of economic, political and social agents that belong to the same production chain and/or economic sector and present articulation, interaction, cooperation and learning in a non-hierarchical structure.

• **Local Systems of Production and Innovation (SLPI)** is the next stage to an APL. It consists of geographically concentrated clusters, characterized by intense ties and interactions that generate positive externalities for all the established companies and the region. They create or introduce technological innovations, exchange knowledge, products and processes, coordinated by an institutional framework that foster and organize them to leverage their competitiveness.

This article (and the qualitative instrument developed on it) focuses on clusters, which, according to Morosini (2004), is defined as a social community, in which there is a high probability of occurring intensive face-to-face contacts, sharing of values, behaviors, codes and languages. Among a variety of cluster characteristics, two outstand: (i) a skilled poll of work force in one or several specific geographical regions and (ii) a delimited knowledge base related to a common "sphere of business" (Blasio and Di Addario, 2005; Morosini, 2004; Porter, 1998a). There is also an economic role played by institutions within the cluster. In many cases, local associations of entrepreneurs and/or local government create specialized service centers, strengthen infrastructure, and launch initiatives for supporting the cluster.

Cluster governance is responsible for enhancing or creating economic value within and across economic agents through the leadership of individuals or institutions that act as a strategic reference. External factors of a cluster refer to macro and micro environmental factors surrounding it, for example, external competitors, and regulatory frames (Morosini, 2004). Internal factors refer to factors that shape the internal characteristics of the firm, as resources, processes and capabilities (Morosini, 2004). Firms located in specific geographic areas are able to establish inter-firm linkages, which in turn enhance knowledge sharing with previous existing or spin-off firms. Such strategy is an alternative to substitute vertical integration of activities that do not constitute a firm's core business.

According to Schmitz (1997), the proximity of organizations enables two types of competitive factors called externalities and joint actions. Externalities are those factors that are at hand to every organization located near the agglomeration. There is no cost associated to use these factors. Joint actions are deliberated actions among firms to enable a capacity that they could not get alone, it means, firms can obtain synergy to compete collaboratively.

The same concept of geographic concentration of firms lead to the concept of externalities. They are non-commercial interdependences with institutions, local associations of entrepreneurs and/or local government. These agents alone or together create specialized service centers, strengthen infrastructure, and launch initiatives for supporting the cluster. All of these externalities contribute to collective efficiency.

Schmitz (1997) corroborates Marshall (1920) in what he calls three firm-level externalities to attribute industrial growth to clusters' localization:
• Labour market pooling: sectorial and geographical concentration creates a pool of specialized skills benefiting both workers and firms (Blasio and Di Addario, 2005);
• Intermediate inputs: where enterprises of the cluster can support more specialized local suppliers of inputs and services;
• Technological spillovers: clustering facilitates the fast diffusion of knowledge and ideas related to a common "sphere of business" (Morosini, 2004; Porter, 1998a).

According to Schmitz (1997): "externalities are of importance in explaining the growth of contemporary industrial clusters, but there is also a deliberate force at work, namely intentionally pursued join action."

It is well known that making the switch from independent to ordinated or collective action is a nontrivial problem. The costs involved in transforming a situation in which individuals act independently to a new situation in which they coordinate activities can be quite high. The literature calls the result of such effort as governance (Ostrom, 1990).

Governance in locations where there is a concentration of firms is responsible for enhancing or creating economic value within and across economic agents through the leadership of individuals or institutions that act as a strategic reference.

The literature is rich in research about the competitiveness of clusters. However, few articles present specific constructs with the operationalization of variables to evaluate clusters' competitiveness. Among these articles, Morosini (2004) and Zelbst *et al.* (2010) were the most in depth works, and they were considered, among other references, in the literature review performed by Rigoni and Saccol (2012), that is the base for this article. Table 1 points out some constructs based on these two references. These constructs are key to understand the competitiveness of clusters.

Clusters features (e.g. shared values and common views by organizations acting in a cluster, trust and cooperation in their actions, and governance mechanisms) are key factors to understand the process that organizations went through in order to become a cluster.

Actions performed by cluster's economic agents (e.g. firms, suppliers, service providers, trade associations, universities) through collaboration can allow firms to access resources or to perform processes and activities that they would not be able to perform individually. This collaboration, sharing of resources and knowledge exchange are the main forces that lead to the competitiveness of a cluster.

Considering Brazilian references about this issue, we can see that authors such as Lübeck *et al.* (2012) point out a set of elements that influence the development of interorganizational arrangements, such as APLs e SLPIs. Some of these elements are similar to those we have considered, such as: social capital (that

Table 1. *Key constructs on cluster competitiveness.*

Cluster features		
	Subconstructs	Operationalization
Institucional fabric	Social community	System of values and views; Encouragement of technical change; System of values propagation (Morosini, 2004). Cluster size (Baptista and Swann, 1998; Folta *et al.*, 2006).
	Economic agents cohesion	Strong socio-cultural ties across boundaries; Common business code of ethics among cluster members; Common business understanding (Morosini, 2004; Rabellotti, 1995).Trust among cluster's economic agents (Humphrey and Schmitz, 1998). Mutual collaboration in the cluster (industrial atmosphere); Common language (Morosini, 2004; Rabellotti, 1995; Tallman *et al.*, 2004). Density of network competition (Ruffoni, 2010). Density of network interaction (Keeble *et al.*, 1999).
Cluster governance	Leadership	Cluster leaders; Leaders acceptance (Morosini, 2004).
	Leader roles	Knowledge sharing coordination; Coaching future leaders; Dispute arbitration; Vision and driving change (Morosini, 2004).
	Institutional roles	Help to provide coordination mechanisms inside the cluster; Manage coordination mechanisms inside the cluster (European Commission, 2012; Keeble *et al.*, 1999; Morosini, 2004; Porter, 1998a).
Competitiveness factors		
External factors	External factors	Main product and service markets; Key demographic trends; Main legal and regulatory frameworks (Morosini, 2004; Porter, 1998a, 1998b, 2000). Main foreign suppliers external to the cluster (Van Der Linde, 2003).
Internal factors	Internal factors	Human resources; Capital resources; Logistic resources; Technology (Baptista and Swann, 1998; Blasio and Di Addario, 2005; European Commission, 2012; Morosini, 2004; Porter, 1998a, 2000; Zelbst *et al.*, 2010).
	Key processes	Research & Development; Supply chain management; Production; Human Resources management; Marketing/Sales (Baptista and Swann, 1998; Blasio and Di Addario, 2005; European Commission, 2012; Morosini, 2004; Porter, 1998a, 2000; Pouder and John,1996; Zelbst *et al.*, 2010). Finance Management; Information Management (Stair and Reynolds, 2011).
Knowledge interaction	Knowledge interaction	Knowledge creation/sharing; Common educational facilities; Common educational approaches; Common institute specializations (Bathelt *et al.*, 2004; Morosini, 2004; Pinch *et al.*, 2003; Tallman *et al.*, 2004); Horizontal mobility; Vertical mobility (spin-offs); Blurred information disclosure to outsiders (Blasio and Di Addario, 2005; Maskell, 2001; Morosini, 2004; Porter, 1998a; 2000; Pouder and John, 1996). Pipeline; Formal Employees Education Level; Wage level (Bathelt *et al.*, 2004; McDonald *et al.*, 2007; Morosini, 2004; Tallman *et al.*, 2004; Zelbst *et al.*, 2010). Cluster Benchmarking Events (Morosini, 2004; Porter, 1998a).

Source: Adapted from Rigoni and Saccol (2012).

emphasize the presence of business cooperation structures for the local/regional development, such as business associations); business networks (which demonstrate the existence and the efficiency and effectiveness of cooperative activities between companies); innovation (innovation and production levels higher than the average obtained in the country); public policies (the way governments encourage the development of the region by capital investments in interorganizational arrangements); territorial concentration indicators and finally, local economic indicators (HDI, economic growth, unemployment, education, etc.).

The work of Campeão (2004) investigated a Local Production System (SLP) in the agribusiness sector and proposed a model about the development of this type of interorganizational arrangement, highlighting the importance of the following factors: Human Capital; Organizational Capital and Institutional Capital.

The Human Capital encompasses aspects associated with human resources in the local environment and the social relation among individuals and firms. It includes the following elements: cultural similarity; attachment to the area; entrepreneurship; professional competence; industrial culture; professional commitment; solidarity; social interaction and environmental awareness. The Human Capital factor is similar to the *Social Community* element of the *Institutional Fabric*

construct and the Human Resources element of the *Internal Factors* construct of our instrument (see Table 1). Importantly, our instrument does not deal with the attachment to the area and does not consider environmental awareness issues.

The Organizational Capital refers to the power that certain strategic actions taken by a particular company have to influence an entire productive system. It is related to organizations that act directly on the segment of the production of raw materials and/or agro-processing segment for the dominant product of the local production system, and it is not emphasized in our instrument, because it is focused on the common processes and synergies among cluster firms, horizontally.

Finally, the Institutional Capital is related to public and private institutions (government agencies and institutions, technology centers, universities, technical schools, professional associations, financial system, etc.) that provide technological support, infrastructure, financial and social support as well as the legal framework formed by the laws and governmental policies. Some of the elements of Institutional Capital are considered in the constructs *institutional fabric* of our instrument.

Therefore, we can see that many of the elements we consider are similar to those from other models that assess the development of interorganizational arrangements in the Brazilian context, but we believe that our perspective on clusters and the way we selected the factors from the literature we have reviewed can complement and contribute with this literature.

THE INSTRUMENT VALIDATION PROCESS

The process of creation and validation of the qualitative instrument to assess cluster competitiveness consists in the research method of this study. We adopted the methodology focused on the validation of open questionnaires presented by Benson and Clark (1982). This methodology guided the development process of the qualitative research instrument and the achievement of construct and content validity (Bacharach, 1989), and it consists of 4 phases and 17 steps (Table 2).

We also adopted the criteria presented by Kirk and Miller (1986) as an epistemological foundation of the validation process of the qualitative instrument. These authors posit that reflexivity, triangulation, surprise, informant feedback, clarity, richness and detailing of descriptions and analysis, as well as the construction of a *corpus* of evidences are important criteria to obtain apparent validity, instrumental and theoretical validity in qualitative research settings. The four main steps indicated by Benson and Clark (1982) guided the description of the validation process performed in our study.

PLANNING PHASE OF THE RESEARCH INSTRUMENT

The main objective of the research instrument is to analyse clusters' competitiveness factors. Our work is the continuity of the work Rigoni and Saccol (2012) started and published

Table 2. *The development and validation methodology adopted.*

Phases	Steps	Procedures adopted in our research
Planning	Set purpose of the instrument; identify and define the research domain; review literature on constructs and variables of interest; give open-ended questions to target group; interpret open-ended comments; write objectives; select item format.	Goals definitions Comprehensive literature review
Construction	Develop table of specifications; write pool items; do content validation; provide qualitative evaluation by judges; develop new items.	Constructs and items definition, and their operationalization Focus group with 9 postgraduate students (Master and PhD students) Experts panel (02 experts)
Evaluation	Prepare instrument for first pilot testing; do first pilot test; debrief subjects; revise instrument.	Empirical setting (cluster of flower growers) was contacted and secondary data about it were analyzed Pilot test with one of the cluster leaders to increase the instrument face validity
Validation	Administer instrument for validation; analyze qualitative data for validation.	Research instrument application in the flower growers' cluster Data collection for triangulation (informal conversations, observation, field notes, etc.) Transcription and data codification Analysis of results (content analysis, triangulation) Final adjustments in the instrument.

Source: Based on Benson and Clark (1982).

which had already performed the planning phase and involved a literature review to build the theoretical background for the definition of constructs to assess cluster competiveness factors. Initially, the instrument consisted of seven constructs containing 56 operational definitions that we detailed and validated.

Due to the great number of elements related to cluster competitiveness found in the literature review, we took some procedures in order to identify which were the more important ones.

CONSTRUCTION PHASE OF THE RESEARCH INSTRUMENT

Based on the comprehensive literature review, we pooled a set of constructs and items with their operationalization, constituting the first draft of the research instrument. Several judges evaluated this draft. Seven Master and two PhD students participated in a focus group during a meeting of a research group on organizational networks. During this focus group, we treated redundancies and missing elements, generating an improved second draft of the research instrument.

This draft was analysed by two experts with academic and practical expertise on clusters (a PhD in Economics and the other in Management) who suggested a set of improvements. After performing these improvements, we obtained a first version of the research instrument that was ready to empirical testing.

EVALUATION AND VALIDATION PHASES OF THE RESEARCH INSTRUMENT

The next step was to test the research instrument in a real cluster – an agribusiness cluster of flower growers. First, in order to get familiarity with the cluster and its specific business language, we analysed secondary data (industry reports, academic studies and websites) about this cluster. We also started a partnership with AFLORI (2013), the most important association of this cluster. This partnership allowed us to obtain valuable contacts for data collection and to gather important information concerning cluster firms locations, number of employees, involvement of firms in cluster associations, the main business processes, the technology used, etc.

The qualitative research instrument empirically tested was the modified version of the original instrument presented by Rigoni and Saccol (2012) as previously reported. It consisted of a semi-structured interview questionnaire with 46 open questions (divided into 6 constructs). However, differently from Rigoni and Saccol (2012), this instrument did not include the performance construct. Considering its very complex nature, this construct needs, as already mentioned, further theoretical and empirical development.

The choice for open questions was motivated by the lack of consensus on the constructs and variables in the literature and by the possibility to ask interviewees for more explanation

if the questions or answers were unclear. Frankfort-Nachmias and Nachmias (1996) and Creswell (2003) also recommend this choice.

We also developed a specific semi-structured questionnaire that wholesalers and retailers answered. With this practice, we involved agents that perform commercial activities that influence on production activities. Although such agents do not produce, their role is to search for business opportunities for the cluster flowers and this in turn influence cluster competitiveness.

Although we established partnership with the most representative association of the sector (AFLORI, 2013), during the validation process, some of the cluster participants showed a very suspicious attitude towards the researchers. To deal with this situation, we included an undergraduate student of our research group in the data gathering process. She lives in the geographic area of the cluster and she was familiar with the cluster's cultural background. This strategy provided an "atmosphere" of trust, creating a communication channel among cluster members and the researchers.

We performed twenty-three (23) interviews with flower growers, suppliers, wholesalers, retailers, and representatives of governmental agencies and associations (see Table 2). We choose the number of interviews following Sandberg (2000) who stated that the variation of a phenomenon reaches theoretical saturation around the twentieth participant. Saturation means that new data will be in accordance with already identified categories and further data collection will be no longer necessary.

For each interviewee, the process of data gathering consisted in two parts: the first part was the interview itself; the second part consisted in an interactive process where the researchers outlined a draft about interviewee perceptions referring about the cluster dynamic. This interactive process generates a draft about the cluster interaction dynamic that serves as input to return to the field, to collect more data and enhancing it to the next interviewee. From this process, although not intended, a collaborative sense making process emerged. Weick *et al.* (2005) claimed that sense making involves a process that turns circumstances into a situation that is understood explicitly in words and serves as a springboard to align contradictory perceptions.

When the data gathering process and the interactive discussion process initiated, a considerable number of contradictory perceptions emerged. Taking into account the different agents perceptions concerning the dynamics of the cluster, the participants enabled a shared view. Such common view (shared knowledge) empowered participants to understand better the industry to which they belong.

The interviews performed had an average length of one hour, and they occurred *in loco*, at flower farms and at wholesalers and retailers' offices (see Table 3). After performing the interviews, we transcribed and codified data for analysis.

As explained before, we performed additional observations and informal conversations during the data collection process. The entire development and validation process of the research instrument lasted one year and a half. During this period, the researchers participated in formal meetings of cluster associations and informal meetings with cluster representatives (see Table 4). One of the researchers also visited another flower cluster in Brazil, located at Holambra, in the State of São Paulo, and participated in some meetings held by the Brazilian Flowers Institute (IBRAFLOR).

The social interaction during the data collection process was crucial to understand the idiosyncrasies of the cluster and to create proximity and trust between researchers and cluster members. Without this intensive interaction, it could be difficult to understand the cluster complexity and its specific features, as well as its competitiveness factors. To analyse other

Table 3. *Interview details.*

Cluster members interviewed	Number of interviews	Duration (in hours)
Flower growers (agriculturers)	9	16:29
Input suppliers (seeds, breeders, fertilizers, materials to hothouses, supplements, etc.)	6	05:45
Flowers wholesalers	3	02:15
Flowers retailers	3	04:56
Representatives of governmental agencies and associations related to the flower cluster	2	06:52
Total	23	36:17

Source: Research data.

Table 4. *Informal meetings with cluster members and associations.*

Type of meeting/participants	Duration (in hours, approximately)
First informal meeting between the research team and a representative of the cluster association (AFLORI), in order to present the research goals.	02:00
Informal meeting (barbecue) with 30 members of the flower cluster; conversation with cluster representative members, flower producers, suppliers, etc.	04:00
Meeting at AFLORI to get a list of cluster members to start data collection.	01:00
Presentation of a preliminary summary about the cluster competitiveness level (information gathered with the research instrument) to main leaders of the cluster as part of the institutional partnership.	03:00
Proposition of a solution based on Information Technology to mitigate cluster competitive problems in an event organized by Entreflores (another cluster association).	02:00
Visit at the Holambra flower cluster (considered the most organized flower cluster in Brazil), in order to understand their production and commercial processes.	12:00
Visit to the biggest flower producer at Holambra.	01:00
Participation in an IBRAFLOR meeting.	03:00
Participation in an AFLORI meeting.	04:00
Participation in a meeting of the cluster of flower growers promoted by the Brazilian Ministry of Agriculture. One of the researchers was a panellist in this meeting.	06:00
Participation in a meeting of the cluster of flower growers promoted by the Brazilian Ministry of Agriculture – one of the researchers participated as a consultant.	05:00
Total duration	43:00

Source: Research data.

forms of interactions, we catalogued 74 emails exchanged with different members of the cluster during the research process.

The collected data was organized and analysed following the steps indicated by Miles and Huberman (1994): data reduction, data display and conclusion drawings. To obtain a preliminary result, we used content analysis procedures (Bauer and Gaskell, 2011) with the support of the software NVivo9®. All information gathered – transcribed interviews, field notes, emails, sector reports, input suppliers catalogues – was codified and analysed together in order to perform triangulation (Yin, 2010). We categorized and organized these data around the competitiveness factors, in order to validate them, as well as to assess these factors in the analysed cluster.

We reviewed all constructs and classified the items in five categories: constructs, factors or items supported by empirical evidence; constructs, factors or items not supported by empirical evidence; constructs, factors or items that emerged from empirical data; redundant factors or items (removed); and redundant factors or items (included) that support the validation process.

Constructs constitute the main groups of competitiveness factors. Factors are groups of one or more different items, which formed the operational questions used to analyse the competitiveness factors under study.

The process used to validate empirically the research instrument relied on a high or low convergence of the interviewees' answers. Factors or itens that did not find empirical support or were redundant went through a treatment. We excluded merged or reclassified such items to obtain a better fit in their respective construct. To illustrate the analysis performed we present, at Table 5, an example of a validated factor.

The factor *Capital/Financial resources* was validated – since its definition was well understood by respondents – with low variability on their answers.

Table 6 illustrates an example of a factor not supported by empirical evidence since it revealed a great variability of answers.

The factor System of values propagation revealed answers that are redundant with other factors, such as *Entities that exert influence in the cluster* and *coordination mechanisms* inside the cluster. Beyond the redundancy, the interviewees found difficulties in answering such factor because they found it very abstract. Consequently, we merged and readjusted the factors *System of values propagation*, *Entities that exert influence in the cluster* and *cluster coordination mechanisms*.

One explanation to the absence of empirical evidence to some factors is that the literature define several of them making use of abstract terms that respondents find difficulties in comprehending. In such cases, we performed a merge with a more precise factor or a reclassification in another construct to improve the definition of the factor and to make its evaluation easier

An example of emergent constructs, factors or items that emerged from the empirical data is the construct *Cluster Specialization* (see Table 14).

RESULTS: THE VALIDATED INSTRUMENT

Tables 8 to 14 present the results of the process of data analysis and validation of constructs, factors and items. Each table describes a main construct of cluster competitiveness and the validation status of its factors and items, according to our methodological model. Table 7 exhibits the labels adopted to define the validation categories.

Table 8 presents the results of the validation of the *Institutional Fabric*, formed by the constructs *Social Community* and *Economic Agents Cohesion*.

The level of formal education of the cluster members in average is below high school. This fact possibly influenced the

Table 5. *Example of a competitiveness factor supported by empirical evidence.*

Factor	Definition	Empirical evidence
Capital/ Financial resources	Sharing of working capital and/or risk/ venture capital among cluster firm; conjoint financing.	• Cluster firms share information about financing opportunities but they do not have any common financial fund.

Source: Research data.

Table 6. *Example of a factor not supported by empirical evidence.*

Factor	Definition	Empirical evidence
System of values propagation	Institutions that spread the system of values within the cluster	• It is difficult to assess the factor "system of values" since it is abstract

Source: Research data.

Table 7. *Labels used to define the validation categories.*

Categories of Validation (CV)	Actions
(i) Constructs, factors or items supported	Validated
(ii) Constructs, factors or items not supported	Not validated
(iii) *Emergent constructs, factors or items*	Validated
(iv) *Redundant and reclassified constructs, factors or items*	*Validated (Removed)*→
(v) *Redundant and reclassified constructs, factors or items*	*Validated (Included)*←

Source: Research data.

Table 8. *Validation of Institutional Fabric.*

Institutional fabric	Items	CV
	Social Community	
Cluster size	• Number of active firms in the cluster (current year)?	i
System of values and views	• *Which cluster players have common market/business values?*	*iv*→
Encouragement of technical change	• *Which system of values and market/business view motivate technological changes and innovation?*	*iv*→
Density of interactions in the network	• With how many firms, institutions and associations does your firm [a cluster participant] interact with (formally and informally)?	ii
Competitive network market share density	• How many cluster firms directly compete against your [a cluster participant] market share?	ii
Competitive network resources share densityw	• How many cluster firms directly compete against yours [a cluster participant] for material resources?	ii
Competitive service provider share density	• How many cluster firms directly compete against yours [a cluster participant] for services resources?	ii
	Economic Agents Cohesion	
Socio-cultural ties across boundaries	• Do cluster economic agents have a similar cultural and social background?	i
Common business code of ethics among cluster members	• Is there a business code of ethics among cluster economic agents?	i
	• Is this code explicit or implicit?	i
	• Do cluster economic agents obey this code?	i
Trust among the economic agents	• In general, what is the degree of trust between the cluster firms?	i
	• To what extent the participants are willing to preserve the collective interests over the individual ones?	i
Mutual collaboration in the cluster (industrial atmosphere)	• In general, do the cluster participants collaborate with each other? How? Or why not?	i
Common language	• Is there a standard technological terminology accepted by cluster's participants?	i
	• Are there a standard business and organizational terminologies accepted by cluster's participants?	i
	• *What are the characteristics of the business and organizational terminologies?*	iii
Common business understanding	• Do firms share a common business understanding about how the competition works in the industry?	i
Competitive density of the network	• How many firms directly compete against your firm [a cluster participant] for resources or market share?	ii
Density of interactions in the network	• How many firms, institutions and associations does your firm [a cluster participant] interact (formally and informally) with?	ii

Source: Research data.

answers to the factors *System of Values and Views* and *Common Business Understanding* that were interpreted in a very similar manner by respondents. So *System of Values* was classified (iv). The analysis of the factor *Encouragement of technical change* revealed that the perception of lower risks has a positive effect on technological innovation. We detected that a *Common business understanding* by the economic agents diminishes the perception of risk. Therefore, the factor *Encouragement of technical change* was classified (iv).

We excluded factors classified (ii) – Density of interactions in the network, Density of market share in the network, Density of resources share in the network, Density of com-petitiveness in the network and Density of interactions in the network – from the research instrument. This deliberation occurred after observing contradictions in the interviews signalizing that such factors should be collected through a quantitative instrument.

This occurred because our primary objective to validate a qualitative instrument considering the contradictions observed and the questions formulated by the interviewees we identified that the nature of these factors is more suited to be collected through a quantitative instrument.

We detailed the results of the validation of *Cluster Governance*, formed by the constructs *Individual Leadership, Leader*

Table 9. *Validation of Cluster's Governance.*

Cluster Governance	Items	CV
	Leadership	
Cluster leaders	• Do cluster firms know their leaders (economic agents that are a reference for their peers) within the cluster?	i
Leadership Acceptance	• How do cluster firms, institutions and skilled professionals accept these leaders?	i
	Leader roles	
Knowledge sharing coordination	• Do leaders stimulate knowledge sharing among cluster firms?	i
Coaching future leaders	• Do present cluster leaders prepare their successors?	i
Dispute arbitration	• Do leaders intermediate or solve disputes between cluster firms? How?	i
Vision and driving change	• Do cluster leaders usually provide information about future market scenarios? How?	i
	• Do leaders help create a long range planning for the cluster?	i
Mobilization of economic and institutional agendas	• *When necessary, do leaders mobilize the agents and institutions that may support the cluster reach its goals?*	iii
	Structure of Cluster representative institutions (*iii*)	
Public recognition of the cluster	• *Does public entities (e.g. government) recognize the cluster?*	iii
	• *What are the main associations, institutions, industrial groups or members inside or outside the cluster that exert influence on its actions?*	iii
Quality management in the cluster	• *Does the cluster have some specific Quality Management association or institution that sets standards or supervises the quality of products and processes in the cluster?*	iii
Structure of cluster representatives	• *Does the cluster has well-structured entities to facilitate the achievement of collective goals (e.g. with a headquarters and a team of professionals)?*	iii
	• *Does the cluster have well-structured entities to prospect new business for the cluster (e.g. with a headquarters and a team of professionals)?*	iii
	Institutional roles	
System of values propagation	• Do cluster institutions and associations (i.e. universities, R&D consultancies) spread the system of values within the cluster?	v←
	• Do they collaborate to improve cluster firms cohesion? How?	v←
Management of coordination mechanisms in the cluster	• Do cluster institutions and associations help coordinate actions within the cluster? In what level and how?	i
	• Are there any other initiatives to promote cluster cohesion? What are they?	iv→

Source: Research data.

Table 10. *Validation of the External Factors Construct.*

External Factors	Items	CV
Main product and service markets	• What are the most important groups of consumers or companies that can buy products or services from the cluster?	i
Main competitors external to the cluster	• Who are the external competitors that serve cluster's unmet demands?	i
Portfolio of raw material suppliers	• *What are the available options to buy raw materials (e.g. seeds)?*	iii
Key demographic trends	• What are the demographic trends of the target markets of the cluster?	i
Main legal and regulatory frameworks	• What are the enactments regarding policies and cluster's economic environmental rules?	i

Source: Research data.

Table 11. *Validation of Internal Factors.*

Internal Factors	Items	CV
Resources		
Human resources	• Do cluster firms usually exchange information about human resources (recruitment, training, etc.)? How is it done?	i
	• Do cluster firms share any type of human resources (ex: a pool of labor force, a task force, etc.)?	i
	• *Do cluster firms engage in conjoint human resources management processes (i.e. recruiting, training), etc.?*	v←
Capital/Financial resources	• Do cluster firms usually exchange information about financing?	i
	• Do cluster firms establish partnerships among them (or with other institutions) for financing?	i
	• Do cluster firms have access to risk/venture capital markets?	i
	• Do they collaborate to access these markets?	i
Logistic resources	• Do cluster firms usually share transportation services or other product distribution resources? How?	i
	• How easy it is for customers to access the cluster products?	i
Technology	• Do cluster firms usually share machines or other technologies (ex: computing resources)? How?	i
	• Do cluster firms share knowledge about how to use a technology? How?	i
Processes		
Research & Development	• To what extent do cluster firms work together to innovate or develop products?	i
Supply chain management	• To what extent do firms share common providers of products or services?	i
Production	• To what extent do firms share manufacturing processes?	i
	• Do cluster firms seek to enhance manufacturing processes to obtain better quality standard products?	i
Human Resources Management	• *Do cluster firms share any type of human resources management processes, i.e. recruiting, training, etc.?*	iv→
Marketing/Sales	• *How accurate is the demand forecast of cluster products?*	iii
	• *Do cluster firms collaborate to gather information about demand forecasts for cluster products?*	iii
	• Do cluster firms engage in joint marketing and sales initiatives (e.g. fairs)?	i
	• Do firms engage in internationalization efforts?	i
	• *Does the cluster have a central warehouse or headquarters to conjoint sales?*	iii
	• *Does the cluster have initiatives to improve sale channels with collaborative actions?*	iii
Finance Management	• Do firms participate in joint finance management?	i
	• *Do cluster firms employ standard methods to calculate business operational costs?*	iii

Source: Research data.

roles, Structure of Representative Institutions and *Institutional Roles* at Table 9.

The factor *Public recognition of the cluster* and its items emerged and revealed the importance of the recognition of cluster needs by public entities that can influence the local economy and help develop the cluster.

At Table 10, we present the results of the validation of the construct *External Factors*.

The analysis of data evidenced the importance of the factor *Key demographic trends* to cluster dynamics since it helps the production planning in the cluster, especially the item demand forecast that strongly drives it. Some of the issues that emerged from data were the role of suppliers as market information providers, seasonality of demand and supply, and consumption drivers. These items are intimately related to specific characteristics of the flower growers' cluster. Therefore, each cluster demands adjustment of these factor items (*Key demographic trends*) to its own characteristics.

At Table 11, we present the validation results of *Internal Factors*, formed by the constructs *Resources* and *Processes*.

We moved the item added to *Human Resources* from *Human Resources Management*. We realized this procedure obtained a better factor-item fit.

At Table 12, we present the validation of the construct *Knowledge Sharing*.

Many studies in the literature associate the importance of knowledge, innovation, network and performance. Rodan and Galunic (2004) focused in these aspects in the managerial level, relating both overall performance and innovation generation. They found that while network structure matters, access to heterogeneous knowledge is of equal importance for overall managerial performance and of greater importance for innovation performance. Zaheer and Bell (2005) found that firm's innovative capabilities and its network structure both enhance firm performance. They also suggest firms to develop network-enabled capabilities – capabilities accruing to innovative firms that bridge structural holes.

Taking this into consideration, the creation and transfer of knowledge among cluster agents can be one of the most important collective capacity in a cluster (Rigoni and Saccol, 2012). We found strong empirical evidence to the *Knowledge Sharing* construct presented in our theoretical model. We found empirical support to the *Pipeline* factor through the action of input suppliers, such as breeders, which obtain updated information and knowledge in outside markets and diffuses such knowledge among their customers (the cluster firms).

Table 12. *Validation of the Knowledge Sharing Construct.*

Knowledge Sharing	Items	CV
Information Management	Do cluster firms participate in joint information management?	i
	How do firms share information about cluster and market among them?	i
Knowledge creation/ sharing	What is the extension of knowledge or information that firms exchange among them?	i
	What types of information or knowledge do the firms exchange?	i
	How does this exchange occur?	i
	Do cluster firms collaborate to solve existing problems and/or to adapt themselves to the changing environment?	i
	Do cluster firms exchange knowledge/information with other institutions (e.g. universities or associations)?	i
Pipeline	Do cluster firms exchange information with firms that have their headquarters located outside the cluster?	i
	Do cluster economic agents (firms, institutions, associations, and skilled professionals) exchange information with other entities, such as observatories, outside the cluster?	i
Blurred information disclosure to outsiders	Number of companies located outside the cluster that have at least one local branch in the cluster.	i
Cluster Benchmarking Events	Does the cluster firms visit each other or institutions to learn something?	i
	What kind of knowledge do they search for in these visits?	
	Do cluster associations, institutions or groups perform benchmarking tasks across cluster firms? How often? How?	i
	Do cluster firms, or associated institutions, visit other excellent similar institutions?	i

Source: Research data.

At Table 13, we present the validation of the construct *Human Development*.

The construct *Human Development* resulted from reclassified factors and items from the *Knowledge Creation construct*, in order to better assess factors and items referring to the human development of the cluster. The *Incentives for education* factor emerged from the data.

Table 14 presents the validation of the *Cluster Competitive Potential* construct. The entire construct emerged from the field and was based on the potential contributions from economic agents to the performance of the cluster. Similar elements can be found in Zelbst *et al.* (2010) in the context of a study of regions and their attractiveness to clusters. An important observation is that these elements help understand the cluster performance, contributing directly or indirectly to preserve its industry value chain.

Concerning the reclassified items, three situations occurred. First, two items were moved from Social Community to another item located in the same construct; second, Institutional Roles had its items reclassified to obtain a better comprehension; third, one item located in the Process construct was moved to *Resources*.

The resulting research instrument comprises 12 constructs, 48 factors and 84 items (open questions).

CONCLUDING REMARKS

As already mentioned, our study continued the work of Rigoni and Saccol (2012). The main goal of both studies was to

Table 13. *Validation of the Human Development Construct.*

Human Development	Items	CV
Common research institute specializations and educational facilities	• What are the institutions (e.g. universities or research centers) that generate knowledge to the cluster?	i
	• How is this knowledge presented and applied to the cluster?	i
	• Are there common educational, training and coaching facilities available to cluster workers?	i
Common educational and training approaches	• Are there common educational/training approaches (courses, trainings, trips and technical missions) available to cluster workers?	i
Incentives for education	• *Are there incentives available to qualify cluster workers?*	iii
	• *Are there incentives available to qualify workers of the sales channels?*	iii
Formal education level of employees	• What is the average educational level of cluster workers?	i
Wage level	• What is the average wage level of cluster workers?	i
Horizontal mobility	• Average number of job changes performed by workers along their career within a cluster.	i

Source: Research data.

Table 14. *Validation of the Cluster Competitive Potential Construct.*

Cluster Competitive Potential (iii)	Items	CV
Variety of product portfolio	• *Do the economic agents of the cluster produce a considerable diversity of complementary products?*	iii
Companies focused on their key activities	• *Do cluster firms spend more than 70% of their time with activities directly related to their core production?*	iii
	• *Do cluster firms obtain more than 70% of their revenue from direct or indirect activities related to their core business?*	
Degree of formalization/ professionalization of economic agents	• *Do cluster firms usually pay their taxes on time and obey the tax legislation? To what extent do taxes influence the cluster competitiveness?*	iii
Degree of demand for innovative products	• *What is the level of demand for innovative products from the cluster?*	iii

Source: Research data.

identify what the factors that influence the competitiveness of clusters are and how we can evaluate them empirically and qualitatively.

The main theoretical contribution of our work is a validated qualitative research instrument to evaluate the competitiveness factors of clusters considering we operationalized and tested a large set of elements. This instrument revealed suited to analyze even not well-structured clusters or those who have not enough quantitative data available to analyze competitiveness factors. In the context of this non-industrial agglomeration, we observed that firms depend on factors related to cost considerations and on factors not related to costs, such as inter-firm relationships established and non-contractual conventions (Bathelt and Glückler, 2011). We also observed that some factors could be more important than others, depending on the nature and features of each cluster.

A byproduct of the validation process performed is the assessment of the level of competitiveness of the flower growers' cluster studied. The results of this assessment will be published in a future research paper, complementing other studies focusing clusters of flower growers (Pereira and Carvalho, 2008; Anefalos and Guilhoto, 2003).

Therefore, our contribution to theory development relied on the effort spent to clarify heterogeneous concepts developed in different disciplines, in order to refine construct definitions and to operationalize the factors that influence the competitiveness of clusters, through the consideration of comprehensive qualitative data. The constructs and factors that emerged from the empirical data also contributed to qualify the theory. They revealed new aspects, complementing the previous literature.

Our main methodological contribution is the detailed description of the methodological process to validate qualitative research instruments. The literature concerning qualitative researches seldom describes these processes.

A not intended issue of our research was the process of common understanding of the business practiced in the cluster. This process emerged in the interviews and followed the same sense making patterns proposed by Ntuen *et al.* (2010) – situation awareness, situation understanding, as well as interaction in context. During the data-gathering phase, each interviewee gradually contributed to the construction of a common business understanding about the cluster and the flower industry itself. Our qualitative instrument served as a communication artifact adopted by the participants to rearrange their knowledge in order to get the whole picture about the cluster (Henneberg *et al.*, 2010; Vlaar *et al.*, 2006; Weick *et al.*, 2005). Thus, we highlight two main practical contributions of this common understanding process.

The first concerns the adoption of the qualitative research instrument by researchers and consultants. They now have access to an instrument that can be helpful to promote collaborative sense making as a mean of assessing the level of competitiveness of a cluster. It may support an interactive process where the researcher goes to the field, gathers data, returns to his office, outlines a draft, returns to the field, collects more data while presenting the draft, and so one. This process ends when the draft stabilizes as a cluster portrayal. Researchers, consultants and cluster members become able to understand the points of view of other participants and collaborative initiatives can arise.

The second contribution concerns to government agents, who, by using the same cluster portrayal generated by researchers and consultants, are able to analyze the cluster strengths and weaknesses. Consequently, it enables the development of a better strategy for the cluster because the collective participation already mapped the state of each of the competitiveness factors. The use of the cluster portrayal with a representative cluster association is a good combination in electing which factors are better in the development of new public resources allocation agendas. This is one strategy to develop not well-structured clusters.

Based on the results obtained, we suggest further studies. Since we validated our qualitative research instrument in only one cluster setting, it needs to be applied in other non-industrial clusters, with different local, structural and business contexts, with different characteristics, strengthening its content and construct validity. Therefore, some constructs and factors less relevant in our study may be more relevant for other types of clusters. This is a limitation of our research.

We focused our study to understand how to assess *Cluster features* and *Competitiveness factors*. We deliberately excluded the *Cluster performance* construct motivated by the fact that the literature describes the majority of performance factors on quantitative secondary data sources that governmental agencies and associations usually collect. These data are not yet available for the flower growers' cluster studied and we intend to continue our research developing this construct.

To conclude, we hope that the availability of a qualitative assessment instrument and the discussions presented in this paper about its validation process and its use may foster the theory development on non-industrial cluster competitiveness and support practitioners and government agents in their decision-making processes.

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