The use of Knowledge in Innovation Management: A Farming Producer Cooperation Network Ii Southern Brazil

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ABSTRACT— ***Innovation is seen as a competitive advantage, where acquisition, use and dissemination of knowledge are preponderant factors when adding value and improving products, services and processes. Through a qualitative research on an exploratory case study, this paper aims to analyze the use of knowledge in the innovation management of APROCCIMA (Associação dos Produtores Rurais dos Campos de Cima da Serra) network. There were made, in July of 2013, semi-structured interviews with the 25 producers who constitute the network. The results have shown that knowledge acquisition occurs basically in two ways: a) external: by partnerships that the network has with other research and education institutes, such as EMBRAPA, EMATER, SEBRAE, SENAR and FARSUL and regional universities, and b) internal: by the experience exchange between the partner producers. Once established the use of knowledge, the network aims to implement the existent/acquired technology in their local productive context. The implementations may include from pasture improvement, with more nutritive and productive cultivars to the genetic improvements of the animals through the process of artificial insemination. The main requirements for innovation and use of knowledge, in APROCCIMA network, are present in the uncertainty arising from the existence of technical and economic problems whose solutions are unknown, in need of new technological opportunities, as well, the importance of tacit knowledge as a way of learning in the innovation process.***
Keywords— Knowledge Management, Innovation, Cooperation, Nework.

1. INTRODUCTION

Innovation is seen as a competitive advantage, by the use of knowledge, as a process to add value and as an opening/capacity to enhance, once it is supposed that companies can and have to use external ideas as the same way the internal ideas, and internal and external paths to market in search of improving its technology to create new products and services (CHESBROUGH, 2007).

The knowledge, as innovation basis, has become the most important and indispensable activity of an organization. This effective value knowledge, which is hitched to the capacity of efficiently deal with information and turn into knowledge, as well, its right utilization lets the development of increasingly competitive products and services (SANTIAGO, 1999).

For Kim (1993) it is important to note that the knowledge is the result not only of individual learning, but also from the dynamics among the individuals in the organizations. "The knowledge must be built by itself, often requiring intensive interaction between members of the organization" (NONAKA and TAKEUCHI, 1995, p. 10).

The organizational knowledge emerges when the three processes of information use – creation of meaning, construction of knowledge and decision-making – integrate into a continuous cycle of interpretation, learning and action. In the creation of meaning process, everyone in the organization represent and negotiate beliefs and interpretations to build meanings and common purposes (CHOO, 2003).

For Rodriguez, Dahlman and Salmi (2008), innovation is not limited by the formal research and development activities, neither every research and development (R&D) results in invention and not every invention is derived from formal R&D. On the other hand, innovation and creation of knowledge can be produced through the constant efforts towards to enhance the production or even by chance.

For Choo (2003) in the second process of information use, the construction of knowledge, happens when the organization realize the gaps in its knowledge or its capacities limitation. The search and the creation of knowledge occurs within the derivate parameters of an interpretation of objectives, agendas and priorities of the company.

In addition, finally, in the third process, the rules and preferences in the process are used to compare and evaluate the risks and benefits of untested innovation and not exercised responsibilities. The meanings, commons purposes and new knowledge and responsibilities converge towards the decision making (CHOO, 2003). The author also defends that organizational knowledge is a collective propriety of the process network of information use, whereby the organization members create shared meanings, find out new knowledge and commit to certain action courses.

In the same way are inserted the cooperative networks, as a group of companies created to reduce uncertainties and risks, organizing economic activities from the coordination and cooperation among them (LEON, 1998). Likewise, Malafaia et al., (2007) affirm that the formation of those networks becomes a way for companies organize themselves to compete in local, regional and global scale, reducing the costs and investments, the risks and uncertainties presents in global market.

One of the main advantages of the cooperation networks is in the way to choose the companies, by affinity, something that can constitute an original network in relation to other competitor companies, ensuring a high exclusivity level (RIBAULT; MARTINET; LEBIDOIS, 1995). In this context, the APROCCIMA (Associação de Produtores Rurais dos Campos de Cima da Serra) network is inserted located in the northeastern region of the Rio Grande do Sul state. Eleven rural producers founded in 2006, who were members of an Integration and Exchange of Experience Club (CITE). Nowadays, the network is composed by 31 associate producers and aims goals such as integration, the exchange of experience and technological training, looking for the sustainably in the increase of productivity and quality in the agricultural products, exercising leadership and increasing producer's value in the community (APROCCIMA, 2012).

This article aims to analyze the use of knowledge in the innovation management in the APROCCIMA network. The structure of the research starts from the literature review, where the innovation, knowledge and networks basis are dealt, followed by the methodological aspects, where the collecting and data analysis steps of this research are described. The fourth section refers to the presentation and discussion of the research findings. In the next section are presented the final considerations and conclusions, completing the research in face of its objectives and, finally, the bibliographic references.

2. LITERATURE REVIEW

2.1 Innovation

The first definitions about the innovation requirements were related by Schumpeter (1942), who qualified in four main proprieties: a) The uncertainty generated by the existence of technical and economic problems whose solutions are unknown; b) The increasing dependence on new technological opportunities in scientific knowledge, should be viewed with reservation when considering the importance of tacit knowledge in the innovation process; c) the increasing formalization of Research and Development and execution of activities within enterprises; d) learning through informal troubleshooting production activities and by the efforts to meet the needs of customers.

According to Tidd, Bessant and Pavitt (2008), and Bressant and Tidd (2009), innovation is associated to growth, where new business are created from new ideas, on the competitive advantage generation in that a company can offer. It is seen as a changing process, where new of significantly better products or process may substitute the so far existing ones. For those authors, innovation is classified in four categories: a) Products or services innovation: the changes of a

product or service offered by a company; b) Process innovation: the changes on the ways which products or services are created or distributed; c) Marketing innovation (competitive position): the changes applied to the introduction of products and services in the market; d) Management innovation (organizational – mind proccess): changes in the organizational mindset.

Those categories are confirmed by the Oslo Manual (OECD, 2005), classifying the innovation in four dimensions: product, process, marketing and organizational innovation. Therefore, any enterprise that introduces a product or process innovation is considered a product and process technological innovative organization.

Innovation is also perceived in agricultural activities, especially in mechanical, chemical and genetics areas of its productive bases. Those innovations were observed from the equipment replacements and the incorporation of new labor administration modes and production organization (FREITAS; KHAN; SILVA, 2004). The need for the reorganization of productive factors intensified from the growth of the economy and ways of business management in order to match the organization with international quality and productivity standards (OLAVE; NETO, 2001). In the same way, Souza (1993) mentions the integration between companies is made accordingly with the relative characteristics of the economic transition moments, considering that increasing of intercompany relations and cooperation is connected to the growing trend of the division of labor between companies.

Nelson and Winter (2002) show that innovation comes from competences internally developed by companies, creating differentials in relation to its next competitors. In this sense, Ruas, Antonell and Boff (2005) argue that competence is not located in the resources scope, but in the mobilization of them.

2.2 Knowledge

The history of philosophy, since the Greek age, can be seen as the search for the answer to the question "What is the knowledge?" Although the main differences between rationalism and empiricism, western philosophers agree that knowledge is the "justified true belief", a concept initially introduced by Plato in Meno, Phaedo and Theaetetus (NONAKA; TAKEUCHI, 2002).

The knowledge has been identified as the most important source of competitive advantage and sustainable performance of the organization, as well as a great source of performance excellence in turbulent environments (BITENCOURT, 2010). The environment influences the knowledge where the individual belongs, by the psychological, social, political, and environmental structures, by the physiological processes, needs and previous experiences of each person. The knowledge is the result of learning processes that occur through time, changing permanently over time, generating changes in the individual behavior (FIALHO, 2006 p. 33). For Shreiber et al. (2002), the knowledge is the complete set of information, data, relations that get people to decision making, to the carrying out of tasks and to the creation of new information or knowledge. For Nonaka and Takeuchi (1997, p. 63), values and beliefs integrate the knowledge once they determine, in large part, what the knower sees, absorbs and concludes from their observations.

According to Nonaka and Takeuchi (1997), the knowledge has two ways to express itself, through the tacit knowledge (intangible, inside the individual's mind) and the explicit knowledge (tangible, i.e., existing in physical objects, such as books and documents). These types of knowledge interact through the knowledge spiral, configured as follows: a) socialization: consists in sharing experiences, configuring the interaction from tacit knowledge to tacit; b) externalization: entails the conservation of the resulting knowledge from the action of the tacit knowledge to explicit; c) internalization: it is the incorporation process of the explicit knowledge that becomes tacit; d) combination: consists in the concepts systematization, where the knowledge becomes explicit to explicit. Besides these kinds of knowledge, Ferrari (1983) classifies the types of knowledge as popular, philosophic, religious and scientific knowledge.

2.3 Networks

Leon (1998) states that companies networks are initially made with the objective to reduce uncertainties and risks, organizing economic activities from the coordination and cooperation between the companies. According to Malafaia et al. (2007), the formation of networks becomes a way for companies organize themselves to compete in local, regional and global scale, reducing the costs and investments, the risks and uncertainties presents in global market.

The business networks are classified into three: a) strategic network: developed from a company that controls all activities; b) linear network: existing around the value chain, from the raw materials suppliers to the final costumer; c) dynamic network: characterized by the intense and variable relationship among the companies themselves, including leadership (CORRÊA, 1999).

The business network's advantages are classified into three: a) each one of the companies that compose the network can develop itself in a certain specialization, while the level of the whole network makes the permanence of all the know-

how of the activities; b) the companies of a network may become the economic activity reflex of this network, highlighting what Porter (1999) defends as a value chain model; c) the choose of companies occurs by affinity, what may constitute a specially original network in relation of the competitor companies, ensuring an elevated exclusivity degree (RIBAULT; MARTINET; LEBIDOIS, 1995).

Strategic alliances are a grouping method among companies, with the objective to favor the members' activities, even though there no needs to exist financial ties between them. Thus, alliances range from technical (production environment) to commercial (distribution networks) plans (RIBAULT; MARTINET; LEBIDOIS, 1995).

According to Olave and Neto (2001), these alliances represents a structure adapted to the small and medium companies' reality, who see in this a competitive far forward the large organizations. For the authors, although the networks, alliances and new organizational models composition have been seen as a new strategic way by the managers, against the turbulence and complexity of the organizational environment, there are not a concept uniformity to define them. What is accepted is its operationalization, made by the collaboration and, and it has several theoretical explanations.

According to Rodriguez, Dahlman and Salmi (2008), the use of knowledge in business networks is defined as a fulfilled advance in the knowledge border and, also, as the first time that technology is used or adapted to new contexts, being necessary the conversion of the discovery into a practical, concrete and marketable application. Otherwise, it is needed to adopt the current technology by specific organs, which aims to provide information, technological training, and dispel productivity in industrial sectors.

3. METHODOLOGICAL ASPECTS

The research method used is classified in the qualitative approach, with exploratory objective, on the procedures this research used the case study, in order to adapt the measuring instrument to the reality intended to know (GIL, 2008; TRIVIÑOS, 1992; LAKATOS; MARCONI, 2008).

The qualitative research is an investigation field with its own characteristics, covering disciplines, fields and themes (DENZIN; NORMAN, et al., 2005). For Yin (2005, p. 32) "a case study is an empiric investigation that aims to examine a contemporary phenomenon, inside its real life context, especially when the limits between the phenomenon and context are not clearly defined".

Therefore, the research adopted a case study that analyzed the knowledge use in the innovation management in the APROCCIMA network. Considering the Roese's recommendation (1998), the adopted stages in the case study were as follow: a) introductory stage of research with investigation on the cooperation networks; b) intermediate stage of research with the knowledge, network relationships and particularities of APROCCIMA network; c) intermediate-advanced stage with the network members acknowledgement.

For the data collect, there were made semi structured interviews by using a script that guided the discussion during the development of this study. According to Trivinõs (2012), the "semi structured interview, in general, the one that starts from some basic questions, supported by theories and hypothesis of interest to research, and, then, offering a wide range of interrogatives, result of new hypothesis that arise as long as the interviewed give the answers". The interviews were made in June 2013, with 25 producers' members of APROCCIMA network.

Before every interview, it was requested authorization, presenting the Information Letter and Informed Consent Form.

4. RESULTS AND DISCUSSION

The interviews were conducted through a semi-structured questionnaire with questions that sought to identify how the APROCCIMA network uses, acquires and disseminates the knowledge, as well as its competitive advantage factors.

The interview results can characterize the APROCCIMA network, which has a total area of sixteen thousand hectares and a herd of about four and a half thousand heads. Average production is two and a half thousand hundred heads with annual slaughter age ranging between fifteen and sixteen months.

APROCCIMA is the only entity enabled to receive a good agricultural practices from the Brazilian Ministry of Agriculture, Livestock and Food Supply (Ministério da Agricultura Pecuária e Abastecimento – MAPA) through the Brazilian Agricultural Research Corporation (Empresa Brasileira de Pesquisa Agropecuária – EMBRAPA). Local, regional and state level audits were made by the competent bodies, leaving only the final external audit to grant

recognition. Since its creation, the APROCCIMA network is governed by ethics in relationships, transmission and preservation of cultural tradition, constant innovation, personal commitment of the members, value of the involved people and strengthening of the partnering through union, which are guiding the association decisions.

The new members' entry process is characterized by a peculiarity, the associates choice is made by affinity, giving the association a certain originality in relation to other competitors, assuring to APROCCIMA a high exclusivity level.

The new members' entry process to the network is made by a strict valuation system, including a detailed analysis of the producer's competence and appropriateness, as well the geographic location. This procedure is necessary, once the inappropriate choice of the members may cause loss to the group, as the loss of credit or the corrosion of the network's image with suppliers or costumers.

The emergence of the network took place in the uncertainties faced by the beef cattle in the "Campos de Cima da Serra" region. The beef cattle, which represented for many years the economic forefront of the region, has been going through by a transition process, from native pasture and extensive livestock, to a mechanized farming business with annual crops and orchards. Data from IBGE (2013) have shown that cattle in Campos de Cima da Serra region shrunk 20.16% from 1975 to 2011, while the Brazilian livestock, in the same time, has grown 51.82%, as shown in Figure 1. Another important factor in this context has been the opening of new producing regions like the central-western Brazil, with large territorial extensions and favorable weather for the extensive production system.

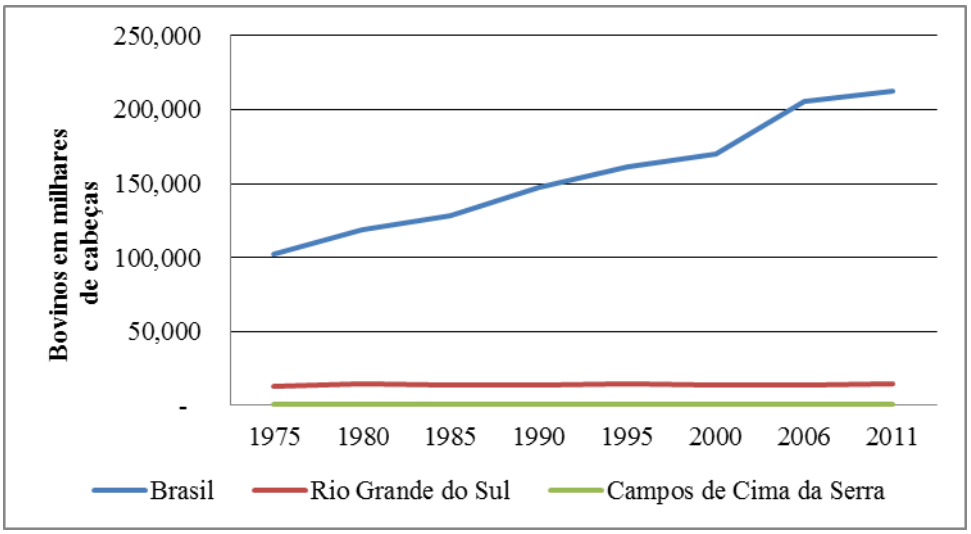

Figure 1: Cattle evolution
Source: IBGE (2011)

The main achievement of the network was the integration between the members, perceived by the experience exchange and by the way of market performance. The together action in inputs acquisition and marketing the main network's commodity, the live cattle, were the firsts gains made. Buy and sell together have brought positive effects for the network's producers and better negotiation conditions.

On input acquisition, the network could bargain for better prices, buy directly from industries, eliminating intermediaries this way. On sales, the network producers could make better deals, directly with refrigerators, whereas none of the producers, individually, had the volume and periodicity required by the refrigerators throughout the year.
In order to confirm the good results described by the producers in the interviews, reedit was analyzed the average selling price in the network, in the period between March 2006 and June 2013, in relation to the trading prices declared by the *Correio do Povo* newspaper, reference for trading in the region, in the same period. The data were analyzed on a quarterly basis over seven years and have shown the network can practice higher prices than those declared by the newspaper, raging 6.90% to 26.09%, as shown in Figure 2. Over the analyzed period, the average selling price in the network was 14.65% over than those declared by the newspaper.

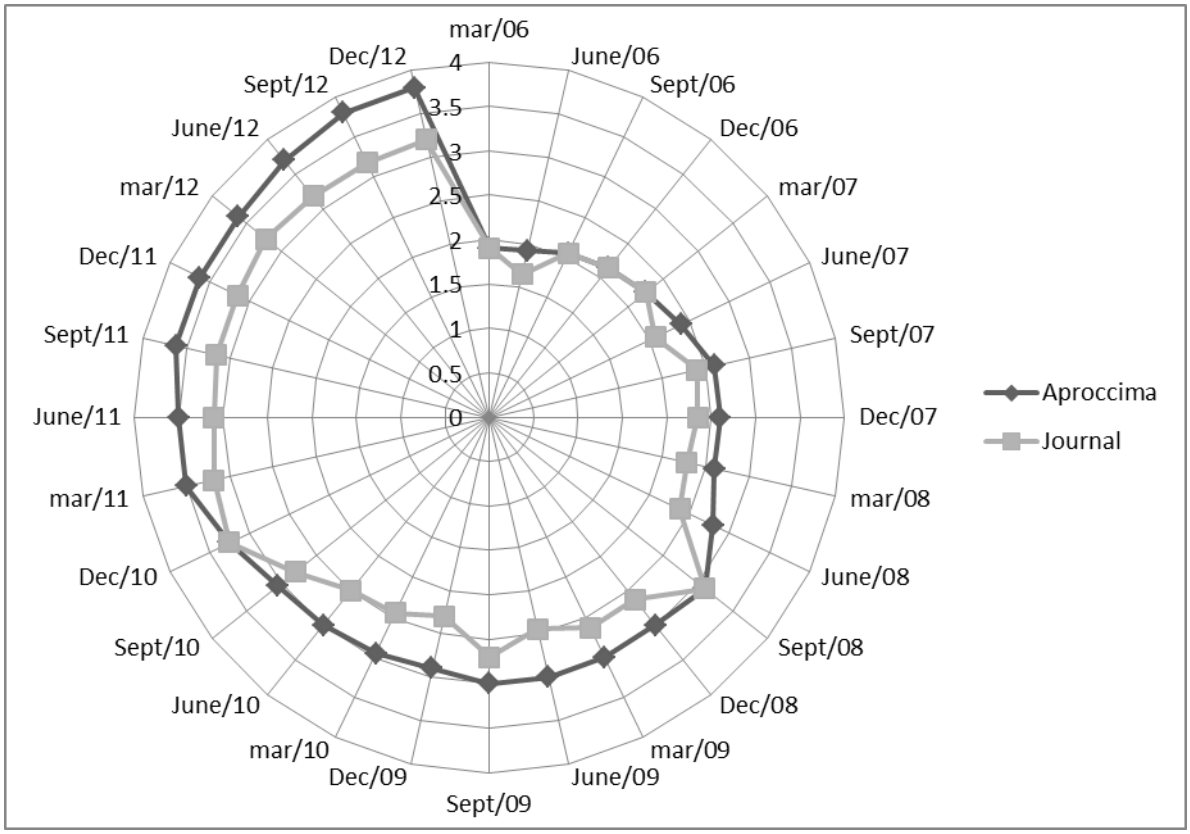

Figure 2: Comparing prices offered by APROCCIMA network and published by the "Correio do Povo" newspaper
Source: Authors

Since its creation, the APROCCIMA network was concerned with the increase of costs, risks and uncertainties related to its economic activities. Through the coordination and cooperation, some producers have found a way to compete in local and regional levels. A key point in this process is the way of chose the new network members, guided by affinity and ethics. This method gives to the network a high exclusivity level and favors its development.

Besides the optimization in resource use by an articulated and symmetric form, the network considers relevant the use of knowledge, realized in the training of producers, made by veterinary doctors, agronomists, zoo-technicians and rural managers. The producers themselves have made almost every technical support among them.

The acquisition of knowledge is made, basically, in two ways, external and internal. The external way takes place by partnerships between the network and educational and research institutions, such as EMBRAPA, EMATER, SEBRAE, SENAR, FARSUL, and regional universities, while the internal way occurs through the experience exchange between the producers, organized systematically always on the last Friday of each month.

The idea presented by Kim (1993) about the organizational knowledge is not only resultant of organizational learning but also from established dynamics among the individuals in organizations, and by Nonaka and Takeuchi (1995) where the knowledge must be built by itself, among individuals and organizations, makes clear in how network members appropriate the knowledge, both technical-scientific knowledge, through partnerships between universities and research institutes, and tacit operational knowledge, by the internal dynamics established by the experience exchange among the network partners.

As result of this process, the network have developed a form of collective propriety for the information use, as Choo (2003) defends the organizational knowledge is a collective propriety, where the organization members create common meanings and discover new knowledge.

Since the network conception, in 2006, the producers aimed for the creation of an enabling environment to identify, create and disseminate knowledge. To this end, there is a strict factor in the decision-making about the entrance of new

members in the network. The new members' choice is made by affinity and ethics principles, assuring to the network a high exclusivity level. Wrong choices can undermine the network's success.

Once established the knowledge use conditions, the network aims to implement the existing and/or acquired technology in its productive context. The implements range from pasture improvements, including more productive and nutritious cultivars, to animal genetic improvements, through artificial insemination process.

The new technologies suitability has brought significant gains to the network, as shown in Figure 2, where the prices practiced by the network are higher than those practiced by the market have. The network producers relate the good performance, by the joint action, to the dealt volume, to the refrigerators partnerships, as well the genetic improvement coupled to the best handling practices, which has brought slaughtering precocity, meat tenderness, pasture improvement, and food supplementation, improving the meat flavor. This way, it is perceived the knowledge use can be understood, as defended by Rodriguez, Dahlaman and Salmi (2008), not only by the improvements in the knowledge borders, but also on the first time when the technology is used or adapted to new contexts, proving, according to Ruas, Antonell and Boff (2005), that competency is not located in the resource scope but in mobilization of them.

To APROCCIMA network, the main requirements for innovation and use of knowledge are presented in the uncertainties generated by the existence of technical and economic problems whose solutions are unknown, in the new technological opportunities, as well the importance of tacit knowledge as a learning method in the innovation process.

The innovation the network is seen as a changing process, where the operations are improved by replacing the then existing processes, generating a competitive advantage by the use of knowledge. The network aims to improve its production technology by taking advantage of useful knowledge available in the network, partners, and in the world as a whole.

The use of knowledge is perceived by the constant efforts searched by the producers, with the objective to improve the production processes, genetic improvements of the herds, production and handling technique. The network knowledge is not only the result of individual learnings, but also from the established dynamics among the network producers. In APROCCIMA network, the knowledge rises from the integration between the group members, learnings, and practical action. Through this process, of information use, covers up the materialization of knowledge as a collective propriety of the network, creating a common meaning in the search of better results, where the new knowledge direct the course of new action.

5. FINAL CONSIDERATIONS

Since its creation, the APROCCIMA network was concerned with the increase of costs, risks and uncertainties related to its economic activities. Through the coordination and cooperation, some producers have found a way to compete in local and regional levels. A key point in this process is the way of chose the new network members, guided by affinity and ethics. This method gives to the network a high exclusivity level and favors its development.

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