

Coop Innovation Framework: An artifact for innovation in Brazilian cooperatives

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Resumo

The cooperatives are not aimed at the capital return but the member's fulfilment. This research combines Cooperativism with Innovation Management (IM). The innovation may be a way to create added value for what is produced, as already widely discussed, but in the field of cooperatives, this is still a relevant discussion. This article began with a method designed for commercial companies (Artifact 1), but given the distinct nature of cooperatives, such an instrument proved to be insufficient. A Brazilian cooperative made a Design Science Research to solve this issue, which turned Artifact 1 into a framework built on the principles of the cooperative system (Artifact 2). Therefore, the objective of this article is to propose a specific method of IM for cooperatives. The Coop Innovation Framework suggestion attained this result. The conclusion is that the new artifact proved to be suitable for the development of Innovation Management in cooperatives.

Coop Innovation Framework: An artifact for innovation in Brazilian cooperatives

ABSTRACT

The cooperatives are not aimed at the capital return but the member's fulfilment. This research combines Cooperativism with Innovation Management (IM). The innovation may be a way to create added value for what is produced, as already widely discussed, but in the field of cooperatives, this is still a relevant discussion. This article began with a method designed for commercial companies (Artifact 1), but given the distinct nature of cooperatives, such an instrument proved to be insufficient. A Brazilian cooperative made a Design Science Research to solve this issue, which turned Artifact 1 into a framework built on the principles of the cooperative system (Artifact 2). Therefore, the objective of this article is to propose a specific method of IM for cooperatives. The Coop Innovation Framework suggestion attained this result. The conclusion is that the new artifact proved to be suitable for the development of Innovation Management in cooperatives.

Keywords: Innovation Management; Cooperativism; Innovation in cooperatives.

1. INTRODUCTION

For Tidd (2018) the field of Innovation Management (IM) has been changing. There are concepts necessary for discussion in this regard. Garrigos, Igartua and Peiro (2018) argue that it is important to consider the role of IM techniques that impact the generation of incremental and radical innovation. Salter and Alexy (2014) highlight that innovation occurs via management, method and a system that enables innovation to happen in the organization. The authors indicate the social and economic benefits that innovation generates and highlight the importance of understanding the firm's context in order to achieve better results. Authors such as Nonaka *et al* (2013) address the importance of the innovation-friendly organizational environment. In the present article, one of the models that served as a starting point was the *Pentathlon Framework*, presented by Goffin and Mitchell (2010), such a theoretical framework is discussed, updated and adapted to the object of study which is the cooperatives.

Cooperatives are peculiar organizations and their goal is the members' satisfaction instead of profit. Such organizations face the dilemma of encouraging innovation without losing its fundamental principles (NOVKOVIC, 2016). Thus, this article is an effort to develop a model that meets the need for cooperatives to remain competitive following the guidelines of cooperative thinking. The aim of the article is to propose a cooperative-specific IM framework. The specific objectives are: a) to develop an initial model of IM in cooperatives; b) apply and analyze the developed model and; c) propose an IM instrument built on the cooperativism principles. This article research method was the Design Science Research and thereby proposed a new artifact called here IM model in cooperatives. This article is justified in its theoretical scope because the theme of IM in cooperatives is still not sufficiently studied. From a practical and economic point of view, 95% of Brazilian cities are served by cooperatives; 22 million Brazilians are served by health cooperatives and Brazilian cooperatives exported US\$ 2 billion in 2017, according to the Rio Grande do Sul State Cooperative Organization - OCERGS (2018).

Delta Cooperative, which is this research focus, carries out its activities through a Brazilian government permission to distribute electricity to its members, having the region monopoly. It distributes energy in 19 cities, including three municipal headquarters, totaling 26170 members; 144 employees; 6 service posts; 20 collection points; about 4,000 km of power distribution lines and it has an approximate revenues of US\$ 15 million and generates more than US\$ 2 million of leftovers at the end of the 2018 period.

There are five structured sections, including this introduction in order to achieve the objectives proposed in this article. Section two discusses the theoretical framework regarding IM and Cooperativism. Section three deals with the issue of methodological procedures. In section four, the results are presented and discussed from a theoretical perspective and the new artifact for IM in cooperatives is presented. Finally, section five presents the final considerations.

2. IM AND COOPERATIVISM

This section presents the concepts and theories related to IM and the Cooperativism.

2.1 Innovation Management

The field of IM has been going through changes; Tidd (2018) argues that there are ephemeral concepts, so it is necessary to identify the fundamental aspects of this discussion.

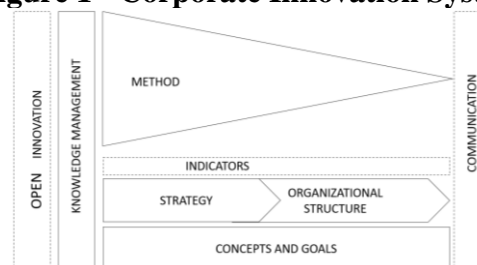
This area of study is fundamental for the survival and development of organizations, considering contexts of fierce competitiveness (D'Aveni, 1994). Garrigos et al (2018) argue that it is important to consider how IM techniques affect the generation of incremental and radical innovation. Seen in these terms, understanding this terminology can contribute to the achievement of effective results. Salter and Alexy (2014) state the IM study is based on an understanding of the sources, nature, results of innovation and the economic, technological and social context in which it occurs. This denotes the importance of the context in which companies are inserted. Although IM may be idiosyncratic, reflecting differences in the markets, technologies, resources and capabilities of an individual organization, it is affected by the broader context in which it occurs. Dobni (2008) considers as context a multidimensional environment, which includes the intention to be innovative, the infrastructure that supports innovation, the value orientation and the environment to implement innovation.

Serra et al (2007), collaborate with the previous statements by describing that the search for innovation is not always easy, because it depends on a favorable environment, creative people without fear of making mistakes, research resources and a very close interaction with the market and its actors. An important factor is resource management under scarce scenarios, as considered by Deakins and Bensemann (2018). Another factor is generating significant knowledge that can drive creativity and innovation (Nonaka, et al 2013). Knowledge is essential for creativity and innovation and there are variables present in the processes of IM that must be defined and monitored to achieve the goals set. One reason knowledge management systems often fail to stimulate innovation is that they have focused more on providing data or information than providing access to knowledge (Leonard & Barton, 2014). This fact becomes relevant, as it may represent the critical point of the process, creating barriers to the creation of knowledge in the organization. To foster such practices, the Nonaka, et al (2013) argue that organizations operate as fractals, where the culture, norms, behaviors, and processes that are encouraged at the organizational level are replicated at the group and even individual levels.

To this end, the use of technology has proven useful for replicating and fostering such knowledge. The ways technologies are used affect organizations' ability to innovate, learn and create new knowledge. Technological change offers an opportunity to redefine who does what, and how things should be done around them (Dodgson, Gann & Phillips, 2014; Garcia, 2019).

Finally, the theme of GI is broad and can be worked from different perspectives, being a form of debate the model presented by Garcia (2010) and developed by Forgiarini *et al* (2018), which has eight pillars as shown in Figure 1. The System Corporate Innovation aims to suggest an IM method, the Pentathlon Framework, inspired by Goffin and Mitchell (2010) with the

Figure 1 - Corporate Innovation System



Source: Adapted and translated by Garcia (2010) and Forgiarini *et al* (2018).

Concepts/Objectives considers that the theme of IM is interdisciplinary (Ganbardella et al 2014). The authors address five topics that affect innovation: disruption, portfolio balancing,

innovation processes, intangible management and growth of creative approaches. For Freeman (2003) the main element for innovation is intellectual capital. Schumpeter (1976) proposes the existence of a continuous process of value creation through innovation and the subsequent destruction of it by other innovations introduced by competition Concepts/Objectives to direct the understanding of innovation in four ways: product, process, organizational and marketing (Schumpeter, 1976; Organisation for Economic Co-Operation and Development [OECD], 2005; Tidd et al, 2008; Dosi, 1982)

In the Strategy, it can be started with the contributions of Gambardella et al (2014) dealing with technology markets, which can be sources for trading idle intangible assets and a means of obtaining new technologies. To discuss the technological positioning, it is important to contextualize it with the strategy theme. Mintzberg et al (1998) postulate that strategy is something different from planning, it is essential that IM, besides discussing its planning practices, has its place in the definition of business strategies. For this, the authors present the five P's of strategy: a plan; a pattern; a position; a perspective or a ploy.

The Organisation for Economic Co-Operation and Development (OECD) (2005) points out that innovative companies can be analyzed according to two main competencies: strategic and organizational. According to Porter's view (Porter, 1991) the strategy is based on the theory of competitive advantages. For Resource-Based View (Grant, 1991), the strategy refers to a company's resources and capabilities as something central in shaping its future perspective. Returning to the technology theme, for Nelson and Winter (1977) a technological paradigm defines the needs that are important to fulfill, as well as the scientific principles used in the tasks and the technological material that will be applied. For Garcia (2019) technology is the foundation for a successful strategy. Goffin and Mitchell (2010) consider technological prospection as one of the main components of innovation strategy. Thus, the Strategy to direct the discussion to new and differentiated innovation opportunities.

In the Organizational Structure, Franke (2014) deals with the increasing consideration of user experiences in innovation processes, this changes the paradigm regarding organizational structure, because to consider the user experiences it is required a customer-centric management method. Leonard and Barton (2014) highlight the importance of creativity in the innovation process because creativity is something that is in people, so it is critical to developing it. In this line, the organizational structure is relevant in order to promote the necessary clarity about how the people involved in the innovation process are organized and how the companies' management practices intend to be innovative. This idea approaches the classic concept of matrix organizations (Peters & Waterman, 1982). For Morgan (2007), the company organization form is a crucial issue, where rigid and very formal models are being discussed. The classic organizational representation through an organization chart generates a series of detrimental side effects, among them, it is possible to inhibit the employee's participation and, in turn, a reduction of organizational creativity. Matrix, organic or project-based models are starting to gain strength, as they are more adapted to the realities of contemporary companies.

In this discussion, Mintzberg (2009) presents five basic models: simple structure; mechanized bureaucracy; professional bureaucracy; divided form and adhocracy. Goffin and Mitchell (2010) highlight organizational structure as one of the most relevant factors to consider in an IM model. They that organizational design must enable creativity, learning and interaction between people. The key issue is to find the balance between organic and mechanical options, depending on the needs and peculiarities of each organization. Finally, the innovation search will be facilitated by a fluid organizational structure directed towards this goal.

The Method discusses the importance of science and technology for IM, and the difference between technology and scientific research (McKelvey, 2014). However, the method and IM itself go beyond the logic of innovating through science and technology. Gibson and Skarzynski (2008) discuss the importance of formal methods for evaluating ideas and opportunities, suggesting that this can be done in a structured way. The Pentathlon Framework (Goffin & Mitchell, 2010) is a five-part model: idea generation; prioritization and selection;

Implementation; innovation strategy; people and organization. Such model directs the discussion from an argument that the methodological structure will facilitate innovation. Also, Hansen and Birkinshaw (2007) present the Innovation Value Chain, which is divided into three stages: idea generation; conversion and diffusion.

In the same vein, the Stage-gate process (Cooper et al 2002) presents the steps that follow in the company, from idea generation to product marketing. The four stages are: exploratory concepts; experimentation; product development and marketing. The proposed method can be understood as a process of sorting ideas until the consolidation/commercialization of some of them. However, Stage-gates can be adapted and used for other types of innovation, not only for new products. Another method that stands out is the Product Development Funnel (Wheelwright & Clark, 1992, Smith & Reinertsen, 1991, Verganti & Dell'Era, 2014) highlight the importance that design has been having in the innovation process, which is playing a relevant role in mature markets. The concepts presented suggest that the method is crucial for innovation to occur, being this one characterized by logical steps that allow the transformation of an idea into an innovation.

In the Indicators, Davila et al (2007) highlight that the creation of performance and reward indicators encourage innovation. According to Oliveira (2010), there are two different approaches related to the ways of measuring the results of this area. The first is the quantitative view, where the R&D area must be regarded as an element of the organization that also needs to have its performance-optimized and measured. The other is a combination of quantitative and qualitative view methods, where the concern is to collect data related to the R&D structure in order to manage it, aiming at the organization's innovation. Measurement of learning and post-project improvements is also valid (Wheelwright & Clark, 1992). Innovation is a complex and systemic challenge that involves a multi-dimensional effort and requires new training, tools, IT systems, indicators, values and management processes (Gibson & Skarzynsky, 2008).

In the Knowledge Management (KM), Nonaka and Takeuchi (1997) studied knowledge-creating companies and present the 'ba' concept, that is, experiential interaction is what generates knowledge. Nonaka et al (2013) points out that fractal organizations, which are those that can effectively perform 'ba', play an important role and these organizations study can generate learning. Nonaka and Takeuchi (1997) characterize two types of knowledge in organizations: explicit and tacit knowledge. Starting from the definitions above and broadening the debate, Hansen et al (1999) state that there are two strategies for acting in KM: coding and personalization strategy. Also in the same approach, Tidd et al (2008) defend as one of the pillars for IM the existence of spaces intended to stimulate creativity. Thus, KM facilitates innovation based on the intellectual development of the people who make up the organization.

In the Communication, marketing is seen as an input for innovation (Prabhu, 2014). In this sense, the process must be aligned with learning and experimenting ideas (Peters & Waterman, 1982). Organizations should seek the development of an extensive communication system. It is important that leaders make clear their desire to innovate and seek innovation through people's involvement (Tidd et al, 2008). Communication can vary between two opposing points, the mechanistic and the organic (Burns & Stalker, 1961), the first being formal and restricted and the second somewhat fluid, informal and light. The communication enables fluidity to the other dimensions of the Corporate Innovation System, as there is the projects feasibility, people engagement and commitment generation to innovation.

The Open Innovation highlights the importance of connections with other market players (Kastelle & Steen, 2014). This may be called innovation networks or even have other terminologies, but the main point is that by connecting ideas there is a growing potential for turning inventions into innovations. Brown and Mason (2014) deal with the gap between public policies for innovation and the demands of firms. Wang et al (2017) address the importance of weak bonds for innovation. These bonds are those with the company, or people, that provide the previously mentioned connections. Malerba and Adams (2014) discuss sectoral innovation systems, which may be a way to initiate an open innovation process. Thus, it is relevant for innovation to go beyond company boundaries (Davila et al 2007). The external relationship can

generate benefits for organizations (Dyer, 2000) and gains should be considered as well as the open innovation concepts (Chesbrough, 2003, 2007).

Such gains may be related to cost reduction, increased product diversification, faster problem solving and greater interaction with the consumer public. The importance of knowledge sharing networks is corroborated by Gibson and Skarzynsky (2008) and Dyer and Singh (2000) who advocate the organization opening to strategic alliances with other organizations. Finally, open innovation facilitates innovation by directing the organization to what is happening beyond the company's boundaries, making it seek to follow cutting-edge research, new technologies and look for different market positioning.

This literature review builds a framework for the theoretical categories necessary to analyze Innovation Management in a merchant company.

Frame 1: Theoretical Framework for Analysis Corporate Innovation Management

Theoretical Categories	Authors
Concepts and Goals	Ganbardella et al (2014); Freeman (2003); Schumpeter (1976); OECD (2005); Tidd, Bessant and Pavitt (2008); Dosi (1982); Salter and Alexy (2014).
Organizational Structure	Franke (2014), Leonard and Barton (2014), Peters and Waterman, 1982, Morgan (2007), Mintzberg (2009) Goffin and Mitchell (2010).
Strategy	Gambardella et al (2014); Mintzberg et al (1998); OECD (2005); Porter (1991); Grant (1991); Nelson and Winter (1977); Goffin and Mitchell (2010); Garcia (2019).
Indicators	Davila, et al (2007); Oliveira (2010), Wheelwright and Clark, 1992, Gibson et al (2008).
Communication	Prabhu (2014); Peters and Waterman (1982) Tidd, et al (2008); Burns and Stalker (1961).
Method	Goffin and Mitchell (2010); Mckelvey (2014); Gibson and Skarzynski (2008); Hansen and Birkinshaw (2007); Cooper et al (2002) Wheelwright and Clark (1992); Reinertsen (1991); Verganti and Dell'Era (2014).
Knowledge Management	Nonaka and Takeuchi (1997); Nonaka et al (2013); Hansen et al (1999); Tidd et al(2008).
Open innovation	Kastelle and Steen (2014); Davila, et al (2007); Dyer (2000); Chesbrough (2003, 2007).

Source: Adapted and translated by Garcia (2010) and Forgiarini *et al* (2018)

The construction of the model presented here has its initial inspiration in the Pentathlon Framework (Goffin & Mitchell, 2010), which was reformulated in Garcia (2010) and In Forgiarini et al (2018).

The first evaluation in a cooperative was made with this framework initially designed for market companies to allow the application itself to indicate whether the model is adherent or not in cooperatives. To understand the peculiarities of a cooperative and; understand which elements of cooperative identity can influence the management of innovation in cooperatives, which next section presents the theoretical framework on cooperativism.

2.2 COOPERATIVISM

Cooperativism is a way of thinking that it has in culture of cooperation the basis on which all economic activities are built upon. The paradigm behind the cooperative consists in the primacy of the individual in the economy and cooperation for human development (Schneider, 2019). Values such as self-help, self-responsibility, democracy, equality, equity and solidarity are developed among those who believe in this system and incorporate it into their cooperatives (Namorado, 2000; Mladenatz, 2003; Pinho, 2004; Bialoskorski, 2012, Kropotkin, 2009).

In contrast with Homo Economicus, Homo Cooperativus is one who believes in ethical values of honesty, receptive attitude, social responsibility and respect for others (Münkner & Mateus, 2011). He is who fosters cooperativism in the way he sees and builds social life.

The experience known as the Rochdale Weavers is considered the world's first modern cooperative and emerged amid the Industrial Revolution consequences (Holyoake, 2014). This cooperative aimed to build a normative organization, also on moral issues, and this is key to cooperativism as a worldview. The cooperative doctrine would be what we should stick to when there is an intention to get what is needed and to provide the practical rules or principles for the achievement of the goals (Balbi De Gonzalo & Cracogna, 1985).

The International Co-operative Alliance (ICA) approaches that cooperativism has as its values “self-help, personal responsibility, democracy, equality, equity and solidarity. Following the tradition of its founders, cooperative members believe in the ethical values of honor, transparency, social responsibility and care about others (International Co-operative Alliance [ICA], 2015, p. 2). Despite global transformations of general nature, the foundations of cooperative remain unchanged. The values defended by cooperativism do not change, but these principles application is periodically reevaluated to keep up with economic and social transformations. The principles reflect cooperativism today in its theoretical composition agreed by the Centennial Congress and General Assembly in Manchester - England (ICA, 2015). Thus, the cooperativism principles are: Voluntary and free adherence; Democratic management by members; Economic participation of members; Autonomy and independence; Education, training and information; Cooperation between cooperatives and; Commitment to the community.

The Education, Training and Information principle is perhaps what most differentiates the cooperative from a commercial company, because it deals with the factor that educates, forms and informs about the organization type that the individual is part of. The three dimensions include education for cooperation, understanding cooperativism as a philosophy and the cooperative democratic aspects. It also includes cooperative 'training', understanding the organization and cooperative systems. 'Information' is a means to build trust, a sense of belonging and seek to strengthen cooperativism within the cooperative's internal and external community (Drimer & Drimer, 1981; Schneider, 2019; Wilson & Shaw, 2016). Yet, cooperatives can better develop cooperativism if they work with each other, that is, by practicing intercooperation, which becomes the sixth principle of cooperativism.

Cooperation among Cooperatives is based on the idea that “cooperatives serve their members more effectively and strengthen the cooperative movement by working together through local, regional, national and international structures” (Cheney, Davis, & Reser, 2016), p. 1). Self-help is one of the cooperative movement pillars, it is a crucial part of the economy's cooperative business sector extension, both nationally and globally. Cooperation between cooperatives will sometimes require sacrifices to achieve common goals (Cheney, Davis, & Reser, 2016, p. 1). This can be complicated when, for example, mutual and collective interests have less weight than actions that benefit a single cooperative. Intercooperation must also be guided by the desire to contribute to the community and region development in which the cooperatives are located and thus contribute more effectively to the seventh principle: Commitment to the community.

Commitment to the community integrates two cooperative values elements contained in the ICA Declaration on Cooperative Identity: 'self-help and self-responsibility' and 'the ethical values of honesty, openness, social responsibility and commitment to others'. These two identity and values elements of cooperativism are reflected in this principle. This combination derives from the fact that cooperatives emerge and are rooted in the communities in which they operate. In other words, the cooperative success must also be evaluated in its ability to contribute to the communities' sustainable development (Cracogna, 2016).

This literature review allowed us to build a framework of the theoretical categories necessary to analyze Innovation Management in a mercantile company. After a analysis, it was understood that, above all, these characteristics influence the innovation in a cooperative:

Frame 2: Theoretical Framework of the Cooperative Identity in Relation to Innovation

Theoretical Categories	Authors
Results for members	Bialoskorski Neto (2012) ICA (2015); Schneider (2019); Namorado (2000); Mladenatz (2003); Pinho (2004); Münkner E Mateus (2011); Forgiarini (2019).
Culture for cooperation	Namorado (2000); Mladenatz (2003); Pinho, (2004); Münkner and Mateus (2011); Bialoskorski Neto (2012); ICA (2015); Forgiarini (2019).
Education, Training, and Information	Martin (2005) ICA (2015) Drimer and Drimer (1981); Schneider (2019); Wilson and Shaw (2016); Forgiarini (2019).
Cooperation among Cooperatives	Cheney, et al (2016); Bialoskorski Neto (2012); ICA (2015); Schneider (2019); Forgiarini (2019).

Source: Adapted and translated by Forgiarini *et al* (2018) and Forgiarini (2019).

This is the cooperativism theoretical understanding as a way of thinking that has in culture of cooperation the basis on which all economic activities are built. The cooperative, in this sense, is the economic materialization of this cooperative system. It is managed and boosted as an economic organization, but with distinct bases from a commercial company. In the current section, the theoretical framework of IM and Cooperativism was discussed. Such construction provided the basis for the proposed new framework. The next section presents the methodological procedures that led to such proposition.

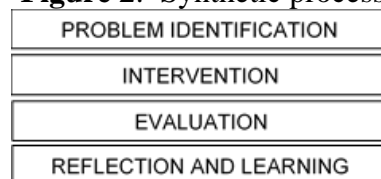
3 METHODOLOGICAL PROCEDURES

The research used the *Design Science Research* (DSR). It is under the prism of the abductive method, more common when using *Design Science* (DS). Definition of DS is a science that seeks to develop and design solutions to improve existing systems, solve problems or even create new artifacts that contribute to a better human performance (Le Moigne, 1994). To understand DS, some basic conceptual alignments are required. The first is related to the 'artifact', which comes to be something constructed by man, an interface between the internal and external environment in each system (Simon, 1996). The purpose of DS is to generate systems that do not yet exist and solutions with a view to better results than previously obtained (Dresch et al, 2015). Resuming, the way to perform research within the epistemological basis of SD is DSR.

The DSR attentive to relevance, interacting with people who in turn have roles, competencies and characteristics related to the problem. Employees that have strategies, structures, cultures and processes. For this, a refinement of the artifact is required, which must be evaluated. This can be done analytically, experimentally, in field studies or in simulations (Dresch et al, 2015). In this research, the experimental evaluation was used. To reinforce the relevance of the DSR, the central role of the artifact in the research methodology is highlighted.

Gill and Hevner (2011) present a process of artifact development. The flow starts on an instance called 'design space', where requirements and possible solutions to the problem must be analyzed. In the second layer, called 'artifact under construction', one must analyze the viability of the artifact, its usefulness, its representations and, following up, the new artifact must be effectively constructed. In the third layer, called 'use', you must start instantiating the artifact. For this research Artifact 1 is figure 1, presented in section two. This artifact is experienced and evolves into an Artifact 2 that is ultimately discussed and analyzed in Figure 5. The Synthetic Process of Cole et al (2005) is presented in Figure 2:

Figure 2: Synthetic process



Source: Cole et al (2005, p.17)

Figure 2 shows that the first block is the identification of the problem, where two central aspects should be considered: understanding of the problem and interest of those involved in its solution. The second block is the intervention, where the artifact must be applied in the problem situation. The third block is the evaluation, where the intervention and the artifact are evaluated. The last block is reflection and learning, where the whole process is discussed in order to identify the generation of knowledge (Dresch et al, 2015).

Following the guidelines of the Synthetic Process of Cole et al (2005) four stages were operationalized: Identification of the problem; Intervention; Evaluation; Reflection and learning. In the identification stage of the problem, there was the appropriation of the idiosyncrasies of cooperativism and the problem is analyzed. The Intervention stage occurred according to the suggestions of the authors of Artifact 1 (Garcia, 2010; Forgiarini et al, 2018). The evaluation stage consisted of the analysis of the results of the intervention. The objective of this stage was

to verify the effectiveness of the implemented actions, so the diagnosis was reapplied, which compared to the first allowed such analysis.

The fourth stage, Reflection and Learning, was constructed from the final analysis of the experience with the cooperative and the final product of this stage was the proposition of Coop Innovation Framework (Artifact 2). The results are presented in the next section.

The choice of the case studied was guided by criteria that aimed at impartiality and met the objective of the research. The criteria were: 1) To be a cooperative formally constituted according to Law 5.764/1971; 2) To be a cooperative where physical access to members and directors was viable and comprehensive in territory. The cooperative is located in a region close to the metropolitan state and operates in 19 municipalities of the State; 3) To be a cooperative demanding by change, according to Bressant & Tidd (2009); This criterion had a higher symbolic weight than the others because the favorable posture of change is the key to the creation of an environment of innovation. This criterion also meets the first two steps of the DSR methodology, according to March & Storey (2008). The existence of a problem and the absence of a resolution. In this case, the demand for change and innovation and the absence of an organizational orientation in this sense. 4) To be a cooperative classified in one of the 4 most representative branches of cooperativism (number of members and/or employees), according to data from the OCERGS-SESCOOP/RS System, which are: Credit, Health, Infrastructure and Transportation. In this case, the CERTAJA Cooperative met the criteria established above being in the Infrastructure branch and, according to data from the Organization of Cooperatives of the State of Rio Grande do Sul / National Service for Learning Cooperatives (OCERGS-SESCOOP/RS) (2018) has 467,062,000 members, being the third largest branch in the State in number of members. 5) Acceptance of the cooperative for the research proposal, the plan and schedule presented by the researchers, a criterion complementary to the second. The group of respondents of the research included 27 agents (collaborators and cooperative members) of the cooperative, being at least one agent from each sector, according to the frame below:

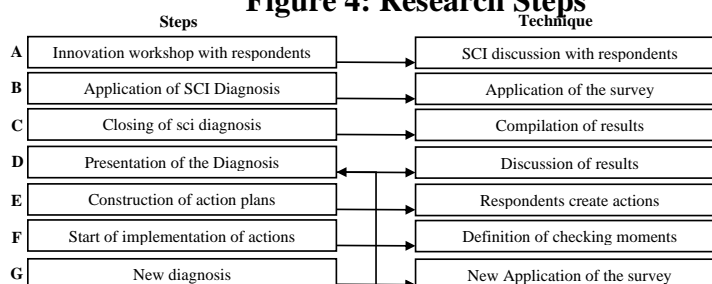
Figure 3: Respondents

Political Structure	Board of Directors	Fiscal Council	Administrative Structure
President	Nine board members	Three board members	Administrative Manager
Vice president	Three alternate councilors	Three alternate councilors	Commercial Energy Manager
Secretary			Financial Manager
			Energy Distribution Manager
			Communication Center
			Sector of People management
			Quality sector

Source: Prepared by the authors.

After the selection of the case, the research had this script:

Figure 4: Research Steps



Source: Adapted and translated by Garcia (2010) and Forgiarini *et al* (2018).

To build the diagnostics of innovation management, Theoretical Framework for Analysis Corporate Innovation Management was used e the responses followed the likert scale:1 (red); 2 and 3 (yellow) and 4 (green). It should be noted that, following the DSR methodology, the first application was with the merchant company model. In the results it will be discussed if it was adherent or not and if the peculiarities of the cooperative make this model need to be reconstructed based on the characteristics of the cooperative.

4 RESULTS AND DISCUSSIONS

This section is structured according to figure 2, so the subsections are identification; intervention; assessment and reflection and learning.

4.1 Problem Identification

Schumpeter (1976) clarifies how innovation generates value to the product/service, and how the entrepreneur can capture this value through the concept of extraordinary profits. The author explains that the entrepreneur by making new combinations generates priceless value, because the new product/service solves problems that were not so well solved before. With this, the entrepreneur and/or the organization end up being rewarded (Schumpeter, 1976). Innovation can also lead to drastic production costs reduction, which will also lead to higher profits, but management must be included, even to innovate (Tidd, 2018).

Garrigos, Igartua and Peiro (2018) argue that IM techniques impact the generation of incremental and radical innovation. Salter and Alexy (2014) highlight that innovation is affected by the broader context in which it occurs. Dobni (2008) complements this idea by pointing out that in an organizational environment, innovation is often expressed through behaviors or activities that are ultimately linked to a tangible action or outcome. Innovation is known to generate and add value to what has been produced, to work. Cooperativism, as a theoretical basis for the creation of cooperative companies, exists in order to generate cooperative member's fulfilment. That is, to generate value to this member's work so that the cooperative can have sufficient resources to support its social dimension.

Cooperatives are peculiar organizations which when effectively based on cooperativism, their goal is the members' fulfilment and not the profit. Even the term 'profit' is not used but rather as 'leftovers'. Leftovers is the proper word, as it is all that was not necessary for this operation. If you analyze the reason for the existence of the commercial company, there will never be any surplus, because profit is the reason for the company's existence.

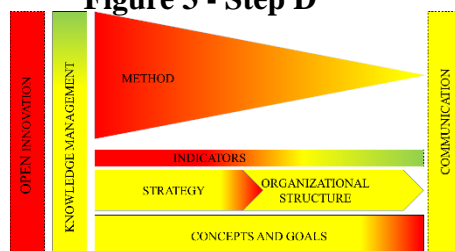
In other words, the identified problematization to carry out this research lies in the rationalization of a method that allows generating and adding value to the cooperative member's work through the IM, starting from the cooperativism. Therefore, IM models, which start from the conventional way of seeing the world, are not suited to such a peculiar organization. Thus, this research seeks to suggest a model that can catalyze innovation in Cooperatives and for this purpose proposed an initial IM model in cooperatives (Artifact 1), which makes an intervention and in function of this one proposes the Coop Innovation Framework (Artifact 2).

4.2 Intervention

The first step of the intervention consisted of an 'innovation workshop with managers and cooperative members', where a discussion about innovation took place. In the second step occurred the 'application of the diagnosis', made through individual and group questionnaires. In the third moment occurred the 'closing of the diagnosis', where the results were compiled. The fourth step was the current situation presentation of the compiled results, which were presented and discussed with the cooperative.

The fourth stage's result is presented below, where for didactic purposes the color resource is used for the figure's blocks. In this representation, the green color symbolizes the fulfillment of the pillar requirements, the yellow color would be an intermediate service level and the red color would characterize the non-fulfillment of the requirements. The results of the individual research were close to the results of the group, so we chose to present in Figure 3 only the group survey data.

Figure 3 - Step D

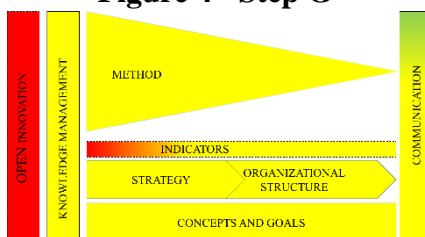


Source: Prepared by the authors.

In the fifth intervention's moment, occurred the 'construction of the action plan', where the improvement points were identified, and an improvement plan of the respective aspects was elaborated. At this stage 14 projects were prepared, two of them for each of the pillars of the Corporate Innovation System. The projects were: 1) Dissemination of innovation concepts to all employees; 2) Inclusion of the innovation theme in the strategy map and systematization of the innovation committee; 3) Research on organizational culture that encourages innovation; 4) Technical visits to cooperatives and innovative commercial companies; 5) Technical visits to same branch companies as the cooperative, but which stand out technologically; 6) Dissemination of innovation news with employees and cooperatives; 7) Structuring an idea management system; 8) Creation of an internal program to capture ideas from employees and members; 9) Search for events in the area of innovation in the region; 10) Structuring a knowledge management system for innovation; 11) Structuring a method for managing technical ideas, specific to the engineering area; 12) Creation of metrics for innovation measurement; 13) Search for class entities that encourage innovation and that can be accessed by the cooperative; 14) Inclusion of the theme of innovation in the agenda of the cooperative board discussions through the direct involvement of counselors in the technical projects debates. In the sixth phase there was the 'implementation of action plans', where 13 projects were successfully implemented and one of them failed (project 10 -Structuring a knowledge management system for innovation).

The last step of the intervention was a new application of individual and group questionnaires. The following is Figure 4 with the results.

Figure 4 - Step G



Source: Prepared by the authors.

In the Concept/objective the five groups positioned the cooperative at an intermediate level; In the Strategy the five groups positioned the cooperative at an intermediate level; In the Organizational Structure the five groups ranked the cooperative at an intermediate level; In the Method the five groups classified the cooperative at an intermediate level; In the Indicator two groups understood that the cooperative did not meet the requirements and three groups rated it at an intermediate level; In the Knowledge Management, the five groups classified the cooperative as intermediate; In the Communication four groups classified the cooperative as intermediate and one group classified it as satisfactory; In the Open innovation the five groups rated the cooperative as critical. Figure 4 shows the achieved results at Delta Cooperative after project implementation, thus concluding the intervention. The next section presents the assessment of these results.

4.3 Assessment

In the current section, the intervention assessment is first developed and then the artifact is analyzed. Concepts/Goals is yellow. It can be said that the cooperative understands that innovation is interdisciplinary and considers it important to balance project portfolios for innovation, as suggested by Dodgson, et al (2014), but the cooperative does not have systematically practices yet. The organization is aware that the basis for innovation lies in intellectual capital, as suggested by Freeman (2003), but has no initiatives to operationalize it. The cooperative has an idea of what innovation is for its, namely: organizational processes and changes, following the concepts of Schumpeter (1976) and OECD (2005), but this is still little discussed and disseminated.

The Strategy was yellow, which means that it knows the existence of markets for obtaining new technologies, as Gambardella et al (2014) suggest, but still does not use them. The cooperative understands that strategy is different from planning and has a management practice focused on it, as considered by the authors Mintzberg et al (1998), but the innovation issue is still not so much addressed in strategic discussions. It is aware that resources need to be managed for innovation, as the Resource Based Vision predicts (Grant, 1991), but has not taken action yet.

The Organizational Structure was yellow. That is, the cooperative is aware of the importance of considering the users' experience, as pointed out by Franke (2014), but has no method to accomplish this. On the other hand, the cooperative is clear about the role of people in the creativity process, and consequently innovation, something very close to what is highlighted by Leonard and Barton (2014). Regarding the people organization for innovation, having an example in the matrix organizations highlighted by Peters and Waterman (1982), the cooperative does not have something structured. Organizational culture showed timid signs of being participatory and open to dialogue, insufficient in the view of Morgan (2007).

In the Method was yellow. As Mckelvey (2014) points out, science and technology are bases for IM, and the intervention enabled the cooperative to build initiatives on these issues. Gibson and Skarzynski (2008), Goffin and Mitchell (2010), Hansen and Birkinshaw (2007), Cooper, Edgett and Kleinschmidt (2002), Wheelwright and Clark (1992), Smith and Reinertsen (1991) bring models, frameworks, concepts and theories that highlight the importance of structured methods for innovation to happen.

In the Indicators was incipience of the innovation measurement process. Indicators are important to the innovation process, without them it is difficult to understand where you are, where you are going and what your goal is. This is the general argument line of authors Davila, et al (2007) and Oliveira (2010) about this theme. The construction of the metrics must take into account the cooperative's function, which is not to generate profit but to fulfil the cooperative member (Schneider, 2019; Flaviano et al 2014; OCB 2016; Knutson 1966; Cook 1995).

In Knowledge Management, there was also a high intermediate level incidence, that is, yellow. This demonstrates some initiatives, but still with unsound practices. There is some evidence of the existence of "ba" (Nonaka & Takeuchi, 1997), but still far from what Nonaka et al (2013) call fractal organizations. There are some initiatives for codifying explicit knowledge, described by Hansen, Nohria and Tierney (1999) as one way of managing this specific type of knowledge. Aligned with Tidd et al (2008) in the cooperative are being developed some spaces intended to stimulate creativity, but still at a very early stage. The principle of education, training and information (ACI, 2015) is something that can be used for this pillar development.

Communication was mostly yellow, despite the occurrence of green, which indicates an intermediate development level. It was identified that the cooperative understands the importance of marketing (internal and external) as input for innovation, something highlighted by Prabhu (2014) and Tidd et al (2008). However, there is still no process of aligning learning with the experimentation of ideas, as suggested by Peters and Waterman (1982). There is evidence that communication in the cooperative is at an intermediate level to the advanced between the mechanist and the organic, Burns and Stalker terms (1961).

The last factor assessed was Open innovation where there was a red level predominance, indicating the inexistence or irrelevance of this process in the cooperative. This aspect highlights the importance of connecting with external players as a way to catalyze the firm's innovation. In general this is the authors arguments: Brown and Mason (2014); Kastle and Steen (2014); Wang, Sung and Chen (2017); Malerba and Adams (2014); Chesbrough (2003) and Chesbrough (2007), being Open Innovation diagnosed as practically non-existent in the cooperative. According to Pinho (2004) and ICA (2015), intercooperation and commitment to the community may indicate paths for the development of open innovation in the cooperative.

The assessment indicated that in some pillars the case was relatively appropriate and in others not. However, although Artifact 1 assisted the cooperative studied, it has no consonance with the cooperativism principles. Thus in the next section a new artifact is proposed.

4.4 Reflection and Learning

It can be concluded that the project implementation brought benefits to the cooperative studied. However, from the Artifact 1 perspective the assessment showed that it was not enough designed for a deeper approach in the cooperativism field. This situation arose because: i) The theoretical basis of the strategy aspect is focused on generating profits, something natural for commercial companies, but this culture contradicts the conceptual basis of cooperativism; ii) The organizational structure was theoretically insufficient to generate innovation. Whereas in the cooperativism field, the culture of cooperation encouragement can be an element that generates new knowledge; iii) The indicators aspect was more linked to the method than effectively, which means this topic is properly solved through the practice of metrics included in traditional IM methods; iv) The knowledge management is how the organization produces and keeps assets for profit generation in the organization. This topic is more appropriated in the cooperative context, through the Education, Training and Information principle focusing on the cooperative and the collaborator where knowledge is generated for cooperative's search for results.

The application of the research made it clear that the entire cooperative framework is fundamental to make a correct analysis of innovation management in a cooperative. With that we have a new framework:

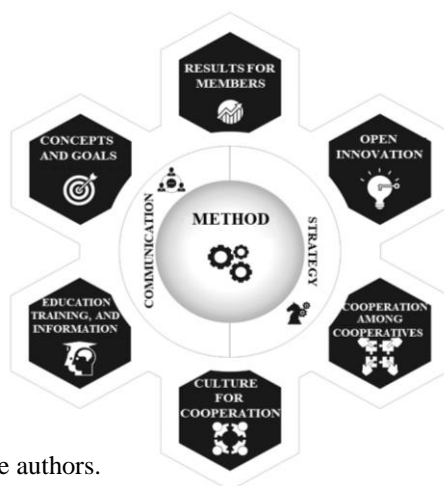
Frame 5: Theoretical Framework for Analysis Management of Innovation in Cooperatives

Innovation Management Dimension		Cooperativism Dimension	
Theoretical Categories	Authors	Theoretical Categories	Authors
Concepts and Goals	Ganbardella et al (2014); Freeman (2003); OECD (2005); Schumpeter (1976); Tidd et (2008); Dosi (1982); Salter and Alexy (2014).	Cooperation among Cooperatives	Cheney, Davis and Reser (2016); Bialoskorski Neto (2012); ICA (2015); Schneider (2019); Forgiarini (2019).
Open innovation	Kastelle and Steen (2014); Davila, Epstein and Shelton (2007); Dyer (2000); Chesbrough (2003); Chesbrough (2007).	Education, Training and Information	Martin (2005) ICA (2015) Drimer and Drimer (1981); Schneider (2019); Wilson & Shaw (2016) Forgiarini (2019).
Strategy	Gambardella, Giuri and Torrasi (2014); Porter (1991); Mintzberg, Ahlstrand and Lampel (1998); OECD (2005); Grant (1991); Nelson and Winter (1977); Goffin E Mitchell (2010); Garcia (2019).	Culture for cooperation	Namorado (2000); Mladenatz (2003); Pinho, (2004); Münkner and Mateus (2011); Bialoskorski Neto (2012); ICA (2015); Forgiarini (2019).
Communication	Prabhu (2014); Peters and Waterman (1982) Tidd, et al (2008); Burns and Stalker (1961).		
Method	Goffin and Mitchell (2010); Mckelvey (2014); Gibson and Skarzynski (2008); Hansen and Birkinshaw (2007); Cooper, Edgett and Kleinschmidt (2002) Wheelwright and Clark (1992); Reinertsen (1991); Verganti and Dell Era (2014).	Results for members	Bialoskorski Neto (2012) ICA (2015); Schneider, (2019); Namorado (2000); Mladenatz (2003); Pinho (2004); Münkner and Mateus (2011); Forgiarini (2019).

Source: Prepared by the authors.

Given these explanations, Figure 5 presents the new artefact the Coop Innovation Framework, which is detailed below

Figure 5 - Coop Innovation Framework



Source: Prepared by the authors.

The Coop Innovation Framework was the result of SCI's reflection from the cooperativism logic. The first difference is that it is no longer treated in pillars, but in topics of a synergistic system. Thus, the basis of this new model is the culture for cooperation. This topic recovers a key cooperativism element and uses it for the beginning of all IM construction. Innovation happens in diversity, because when different players network and value each other, in a cooperation spirit, they create a favorable environment for innovation (Johnson, 2010; Garcia, 2019; Forgiarini, 2019). Cooperation is one of the cooperativism bases, that is, the goal of innovation in this case is due to its value added to the work that will be collectively built (Schneider, 2019). Finally, understanding cooperation is a key motivation element to innovate in a cooperative environment.

Starting from the logic that cooperation is the basis for innovation, it is soon expected that intercooperation is the next step in this journey. In this logic, intercooperation allows similar organizations to share and enhance learning and innovation gains, as well as share costs and process insecurity. The cooperatives competition should not be between cooperatives but with commercial companies (Cheney et al 2016). That is why the alliance with other cooperatives is relevant, since rationality is not only based on individual economic returns, but on gains for the system. In other words, cooperatives have other rationalities to maintain themselves in an exchanging, learning and innovating environment. There is the search for return to the cooperative member, but this is also in line with the development of the cooperative field as a whole and not only with the individual economic return (Forgiarini, 2019).

The Education, Training and Information topic makes its relevance clear, as it is necessary that cooperative development agents are educated of the differences between cooperativism and the current system in force. In fact, the cooperative's source of competitive advantage is that it is a cooperative (Forgiarini, 2019; Schneider, 2019; Wilson & Shaw, 2016). Education is not only guided by the instrumentalist nature, which is included in the formation dimension, but also by its enlightening nature that, by explaining the differences between the cooperative and the commercial company, it ends up evidencing the competitive advantage source of this peculiar organization and also encourages these sister organizations to work better with each other (Forgiarini, 2019; Schneider, 2019; Wilson & Shaw, 2016). The informational nature of this topic ensures an environment of trust, by providing the most different cooperative's information from its acts to its balance sheets, it ends up showing transparency a fundamental element for trust (Namorado, 2005; Schneider, 2019; Draperi, 2016).

These three topics are fundamental to IM in cooperatives within the Coop Innovation Framework logic. This basis, together with the topic that highlights the ultimate goal of this framework completely changes the SCI logic, which was intended only for commercial companies. It is now important to understand how this basis can be managed to ensure innovation and thus add a value in the cooperative results.

The aspect Concepts/Objectives deals with the understanding that the cooperative has about innovation because according to OECD (2005) innovating is generating novelty for organizations, which can be: product innovation, process innovation, organizational innovation and marketing innovation. Tidd et al (2008) also addresses, besides products and processes, the concepts of position innovation and paradigm innovation. Therefore, the cooperative needs to be clear to all players involved what is innovation for it, if it is all these factors, or just some of them, and what is their goal with innovation. Experience in the cooperative studied showed that the lack of a clear concept meant that the cooperative did not have a goal on the subject, which generated significant mismatches. Open Innovation, Communication, Strategy and Method continues as it was.

Answers must follow the likert scale 1 (red); 2 (yellow); 3 (green) and 4 (blue). The cooperative differs from the commercial companies, because the second focuses on its efforts to bring returns on capital and the cooperative focuses its efforts on fulfilling the cooperative member, on increasing return to work, and this transforms the whole logic of rationality behind innovation. Even if the project does not generate greater financial resources for the cooperative,

but if it generates fulfilment to the cooperative member, the project must be maintained. In the Cooperative, capital is a means and not an end. Innovate not only to generate capital, innovate to generate a pleasant and happy environment for the members and players involved (Mladenatz, 2003; Kurimoto, 2016; Draperi, 2016; Bancel, 2016; Novkocic, 2016; Wilson & Shaw, 2016; Cheney, Davis & Reser, 2016; Cracogna, 2016). These are the elements that make up the Coop Innovation Framework. The final considerations are presented in the next section.

5 FINAL CONSIDERATIONS

The aim of the present study was to propose a specific IM framework for cooperatives. As specific objectives, it was thought to: develop the IM in cooperatives, apply and analyze a model and propose a specific IM framework for cooperatives.

Thus, a first diagnosis was made in Delta cooperative, projects were elaborated and executed, and a new diagnosis was made after the intervention. What happened was that Artifact 1, despite having good results in the application, proved fragile for cooperatives, so Artifact 2 was proposed. Thus, the study concluded that: a) The results for the object of study (Delta Cooperative) were relatively positive, as there was a substantial improvement in its position regarding innovation; b) Although Artifact 1 is applicable to cooperatives, it does not fully meet expectations from the cooperativism perspective; c) The study indicates that the new artifact proposition is appropriate: Coop Innovation Framework (Artifact 2).

The present study has some weaknesses, the main one being the fact that Artifact 2 was not tried during the present research. Here is a suggestion for future studies. The DSR method has as its central foundation the experimentation and artifacts sharpening, which occurred in the current research. Finally, the study contributes to the IM and Cooperativism field by connecting these two elements. From the theoretical point of view there is still on the horizon a necessary effort to deepen the concepts underlying the Coop Innovation Framework. From the business point of view, the new artifact can be considered for future experiments.

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