

The Interaction Between Cooperatives and Startups. A Qualitative Comparative Analysis in the Context of Open Innovation

Plinio Cunha¹, Jorge Verschoore^{1*}, Jefferson Monticelli¹

Abstract: Large corporations have aimed to establish partnerships with startups to turn them into drivers of corporate innovation. Lately, collaboration initiatives with startups have multiplied, but this interaction has received little attention from organizational studies. This article aims to fill in this gap by identifying the determining elements of the interaction between cooperatives and startups in the context of open innovation. A Qualitative Comparative Analysis (QCA) was conducted with representatives of credit cooperatives and Brazilian startups. The results led to five constructs of interaction for innovation between credit cooperatives and startups – objective, decision-making, relationship, knowledge flows, and experience. The conditions required for open innovation in this context, resulting from the QCA analysis, were pointed out, and a leading framework of collaboration between credit cooperatives and startups was proposed based on the constructs identified. These results might assist cooperatives and startups involved in open innovation initiatives.

Keywords: collaboration; open innovation; cooperatives; startups; business interaction; qualitative comparative analysis (QCA)

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Introduction

Innovation is a topic that has gained relevance in business agendas worldwide, whether motivated by weak growth, commoditization, digitization of business, or increased competition. Collaborative models such as those of open innovation are particularly attractive (Bogers *et al.*, 2021). In this context, firms have collaborated with open models of innovation to solve critical problems in different areas (Chesbrough, 2020; Dahlander & Wallin, 2020). Startups typically have promising ideas, organizational agility, willingness to take risks, and aspirations for rapid growth. However, they live in uncertain environments and do not have the resources, scale, and power (Gerhardt *et al.*, 2021). Therefore, they form partnerships with corporations to obtain capital, technical and market knowledge (Weiblen & Chesbrough, 2015). Kohler (2016) indicated that firms, within the concept of open innovation, increasingly aim at startups as a source of external innovation. Firms have experimented with different ways to manage their acceleration initiatives, and the differences between firms and startups make this collaboration a challenge.

A wide variety of activities have been carried out, such as company-university collaborations, construction of open-source software, crowdsourcing, and connection between firms and startups (Bogers *et al.*, 2019; Aranha & Carvalho, 2022). West *et al.* (2014) show that the adoption of the open innovation model has increased in developed countries. In the context of investor-controlled firms, especially large corporations, studies have assessed different forms of collaboration with startups (Hora *et al.*, 2018; Kohler, 2016; Weiblen & Chesbrough, 2015). However, West and Bogers (2017) argue that few studies consider the use of open innovation in other types of organizations, such as government agencies and non-profit organizations, and

this is a context to be explored. Moreover, the relationships between startups and credit cooperatives have been little addressed in academic studies (Basterretxea *et al.*, 2019). On the other hand, Bogers *et al.* (2021) advocate that emerging economies are a fertile empirical context for open innovation studies to find theoretical connections and unique structures.

This article aims to identify the elements of the interaction between cooperatives and startups in the context of open innovation guided by this research question: How do credit cooperatives and startups interact to generate innovation? The Comparative Qualitative Analysis (QCA) was adopted. Evidence was collected from interviews with 12 representatives of credit cooperatives and 8 representatives of Brazilian startups.

The article contributes to studies on dyads of innovation partners, capturing the perspectives of cooperatives and startups following the assumptions of Chesbrough *et al.* (2006). In addition, the study identifies constructs of antecedents, mechanisms, and results of these partnerships, following the gap pointed out by Bogers *et al.* (2019). The article also contributes to the study of open innovation in specific contexts, such as the services sector and credit cooperatives (Basterretxea *et al.*, 2019; Hora *et al.*, 2018; West & Bogers, 2017).

Theoretical Background

Open innovation

Progressively, innovation has been related to the development of new services, business models, and management practices, expanding the view of connecting innovation with recent technologies and products (Birkinshaw *et al.*, 2011). For Christensen (1997), from the point of view of economic development, market creation, support, and

(1) Business and Management School, Unisinos University, Porto Alegre, RS, Brazil

*Corresponding author: jorgevf@unisinos.br

efficiency are types of innovation. Firms are compelled to improve their dynamic training, implementing practices for monitoring the environment and using this information in the routines of generation, choice, and implementation of different strategic projects (Bernal & Villegas-Aria, 2022). Consequently, firms have sought knowledge from external sources for their innovation activities (Chesbrough, 2003). Therefore, any action of innovation in corporations, eventually, will address open innovation (Birkinshaw *et al.*, 2011; Bogers *et al.*, 2018).

When firms access the knowledge of partners, they need to be open to transmitting some of their knowledge in return (Lichtenthaler, 2016). In this sense, open innovation can be conceptualized as “a distributed innovation process, based on purposively managed knowledge-flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with each organization’s business model” (Chesbrough & Bogers, 2014, 17).

In open innovation, firms seek ways to profit from using other firms (licensing-based business models, collaborations, *joint ventures*, etc.). Moreover, in the open innovation model, a firm markets its own ideas and from other firms, evaluating how external technologies can complement its business and analyzing how internal technologies can reach new markets through different routes (Bogers *et al.*, 2018; Chesbrough, 2003; West & Bogers, 2017). Knowledge flows in open innovation can occur from outside to inside (input) and from inside to outside (output). Incoming knowledge flows occur when innovation activities absorb knowledge obtained externally, involving the opening of the firm’s innovation processes to several types of inputs and external contributions (Chesbrough, 2003). The benefits of open innovation are not free of the risk that others will misappropriate information, knowledge, and assets (Gould, 2012). A recent study showed that knowledge flow from the outside is also the most widely used in Brazilian firms (Sprakel & Machado, 2021). This prevailing interest in external exploration can be a problematic factor when implementing the open innovation model (Lichtenthaler, 2016).

Output knowledge exchanges stem from a firm intentionally, thus allowing other organizations to use, combine, or develop knowledge or ideas for their own innovation activities, their businesses, or business models (Chesbrough, 2003). Also, there is a third configuration of knowledge flows, which is the combined or coupled form, where any movement from outside to inside and inside to outside is practiced between partners in the innovation process (Chesbrough & Bogers, 2014; Gassmann & Enkel, 2004). Moreover, a proper organizational structure must facilitate, coordinate and support the processes of assimilation and marketing of external knowledge. As open innovation does not occur involuntarily (Bogers *et al.*, 2021), the phenomenon of startups and open innovation are closely related (Spender *et al.*, 2017).

Relationships between corporations and startups

With the increasing number of startups and the entrepreneurial capacity of this type of firm, corporations seek fast and agile relationship formats to interact with this community. The gap between the corporate work model and the startup poses challenges to bringing together the two sides (Weiblen & Chesbrough, 2015). Kohler (2016) stresses that organizations that follow an open innovation strategy increasingly seek startups as a source of external innovation, despite their differences. Conversely, Hora *et al.* (2018) indicate that it is usually the startups that take the initiative, presenting their ideas to organizations to be tested and developed. Also, due to inter-related factors involving the macroeconomic and social context, organizational and individual elements, many firms face problems when implementing open innovation and connection with startups (Bogers *et al.*, 2021)

Corporations and startups are different organizations, but both can benefit from collaboration (Kohler, 2016). As for relationship formats, corporations work with alternative models of engagement with startups, failing to supply venture capital to influence decisions and make profits. A model proposed by Weiblen and Chesbrough (2015) comprises the corporate incubators that drive promising ideas in the corporate environment with funding, location, experience, and contacts, but do not fit into the main business or current business model, creating startups to sell intellectual properties or the startup itself in the future. Recently, acceleration programs and platform programs are two models used to engage corporations and startups. In these formats, the focus is on providing interesting products or technologies to the sponsoring organization and is related to the core business, allowing multiple startups to develop their ideas and helping the corporation to respond to the opportunities available faster. As they use standardized work approaches, these models present lower operating costs (Kohler, 2016).

Managing intellectual property is a critical point when the corporation and startup work together to promote technology, as startups fear that their ideas will be stolen, in some cases a reciprocal confidentiality agreement will be mandatory (Weiblen & Chesbrough, 2015). Particularly in technological contexts, startups fear that in the future the corporation will no longer need their capabilities. From the perspective of the corporation, a contract with a right of acquisition at a predetermined price is a good technique to mitigate problems when the first licensing agreement expires (Usman & Vanhaverbeke, 2017).

Startups fear the slow decision-making process. Therefore, corporate engagement would be simplified with an acceleration program (Weiblen & Chesbrough, 2015). At this point, to generate concrete business opportunities, a link between innovation groups and internal business units must be created while playing a role in receiving and disseminating knowledge (Bogers *et al.*, 2021). Accelerators positively affect the development of startups, increasing the speed and probability of achieving key results, and the new form of interorganizational learning seems to stimulate this achievement (Cohen *et al.*, 2019; Hallen *et al.*, 2020). Despite the costs related to the absorption of knowledge, open innovation is expected to enable access to resources, skills and knowledge (Bogers *et al.*, 2021).

Method

This research analyzes, in a dyadic context, the different open innovation relationships between credit cooperatives and startups. An empirical and comparative approach was used to evaluate different cases and their complexities, as well as to produce a certain level of generalization through a Qualitative Comparative Analysis (QCA) (Ragin, 1987). The QCA method has the potential for systematic comparison and is particularly useful in qualitative research with a set of intermediate data, around 15 to 50 cases (Rihoux & Ragin, 2009).

The object of study of the empirical analysis is the Brazilian credit cooperatives. In addition, the target audience also included startups running in Brazil, without any distinction as to the products and/or services they provide, as long as they had some level of relationship with credit cooperatives. In the QCA method, case selection is a process that must be conducted by the research question and preliminary hypotheses, since “the relevant population of cases cannot simply be constituted by purely mechanical procedures like, for example, random sampling” (Rihoux & Ragin, 2009, p. 23). Thus, an intentional sampling was used based on a list of credit cooperatives and startups. Therefore, we opted for the csQCA technique, with values [0] indicating absence/false and values [1] pointing to the presence/true of the condition or result.

Primary data were collected from semi-structured interviews with open questions, based on the studies of Kohler (2016) and Hora *et al.* (2018), with the concern of highlighting five constructs: objectives,

decision-making, relationship formats, knowledge flow, and experience. The 10-question script was previously validated in an interview with experts on the subject in order to check its effectiveness to obtain all the desired binary answers. Twenty interviews were conducted (identified as E1 to E20): 12 interviews with representatives of cooperatives with specific performance in innovation and members of the C-level, and 8 interviews with representatives of startups through their CEOs and founders. Given the context of the Covid-19 pandemic, all interviews were conducted via video conferencing services with representatives of cooperatives and startups from various locations in Brazil. Additionally, secondary data were collected of the firms interviewed and other institutions related to the research. The interviews were dichotomized based on the five dimensions of analysis, one per construct.

The analysis followed the steps proposed by Rihoux and Ragin (2009): 1) building a dichotomous data table; 2) building the truth table; 3) resolving contradictory configurations; 4) Boolean minimization; 5) bringing the *logical remainders* (unobserved cases), and 6) interpretation. For the dichotomous data table, the first step was to dichotomize the answers of the interviews to indicate if they belonged to a set of the constructs previously listed. The method indicates that it is necessary to identify the result (*outcome*) of each case (Ragin, 1987). In this line, the result was called “Innovation” (Innov) and the value was [1] when the innovation created in partnership with the startup is implemented and the customer, whether external or internal, is consuming the innovation. When these attributes are not present, the result was [0] (Table 1).

Table 1: Conditions of interest

Condition	Description	Theoretical Background
Objectives (Objec)	Harmony between the objectives, purpose, or values of the cooperative and the startup [1] coherence between objectives/values [0] no tuning of objectives/values	Bialoskorski Neto (2012) Cook (2018) Hora <i>et al.</i> (2018) Kohler (2016) Usman and Vanhaverbeke (2017) Weiblen and Chesbrough (2015)
Decision (Deci)	Decision-making speed is compatible with the startups model [1] decisions within parameters cited in the literature [0] decision time above recommended	Bialoskorski Neto (2012) Cohen <i>et al.</i> (2019) Cook (2018) Cracogna <i>et al.</i> (2013) Hansmann (1999, 1996) Kohler (2016) Schneider (2012)
Relationship (Rela)	Connection through a structured relationship program [1] connections via a structured program (owned or in partnership) [0] connections made outside the program or no active connection with startups	Bogers <i>et al.</i> (2021) Cohen <i>et al.</i> (2019) Hallen <i>et al.</i> (2020) Hora <i>et al.</i> (2018) Kohler (2016) Weiblen and Chesbrough (2015)
Knowledge (Know)	Organized processes to absorb knowledge and monitor the environment [1] people/processes responsible for the absorption [0] no organized structure	Chesbrough (2003) Cohen <i>et al.</i> (2019) Dahlander and Gann (2010) Dahlander <i>et al.</i> (2021) Kline and Rosenberg (1986) Laursen and Salter (2014) Sawhney <i>et al.</i> (2006)

Table 1: continuation

Condition	Description	Theoretical Background
Experience (Exp)	People with experience in the cooperative/startup [1] people involved have experience [0] no special experience is required	Kohler (2016) Shane and Cable (2002) Usman and Vanhaverbeke (2017)
Innovation (Innov) – Result –	Innovation created with the startup is implemented and used [1] external or internal customers are using innovation [0] innovation not deployed, or customers do not use it	

Source: Created by the authors.

The next step involved the construction of the *truth table*, which organizes the empirical information collected in the research and identifies the connections between the logical combinations and the results. Sixteen positive cases [1] represented 80% of the interviews, and the remaining 20% (four cases) had negative results [0]. A reasonable diversity was seen in the cases evaluated, and it was not necessary to add new cases or disregard any of the interviews.

Antagonistic settings were checked in which conditions [0] were leading to a result [1]. No contradictory configurations were identified. It was evaluated whether conditions could be combined (whether they display the same values in all cases) (Ragin, 1987). In this sense, the procedures indicated in Rihoux and Ragin (2009) were performed, covering the analyses with and without the inclusion of unobserved cases. The coverage of the minimum expressions (when they cover the observed cases) was also evaluated. The three measures recommended in the literature were performed: solution coverage, gross coverage, and single coverage (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012).

Initially, a more analytical step was conducted with the QCA techniques involving the analyses with the support of the *software* Tosmana. Then, these results were explored considering the related literature, content, and citations of the interviews, perceptions of the interviewees, secondary data, and other characteristics outside the constructs that may influence the results.

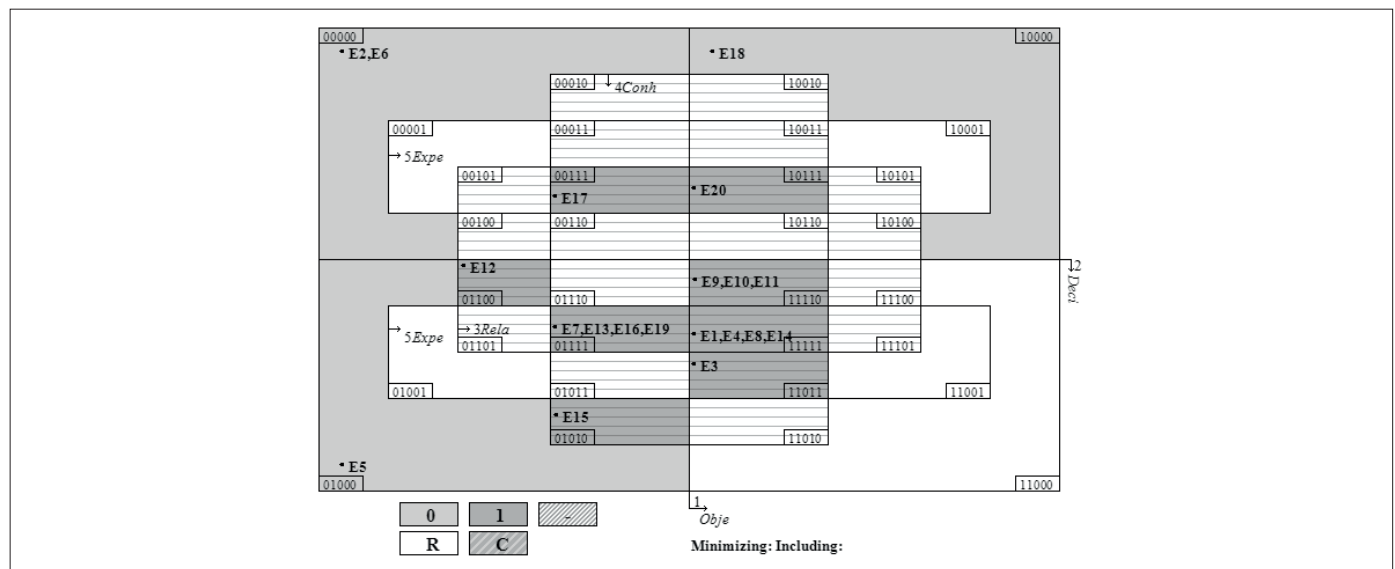
Qualitative comparative analysis

The QCA analysis followed the steps proposed by Rihoux and Ragin (2009), in which the construction of the truth table, the Boolean minimization, and the interpretation of the results are highlighted. At the end of the first phase, which was more analytical and performed with the support of the *software* CSE, two minimum Boolean equations were obtained. The first represents the cases with a positive result $RELA + KNOW \rightarrow INNOV$, indicating that, if at least one of the relationship or knowledge conditions is present, the innovation will be generated. The second, $rela * know \rightarrow innov$, points out that a case will not generate innovation if both relationship and knowledge conditions are absent.

The data in the truth table were also represented in a Venn diagram, which is an intuitive way of visualizing the number of logically possible combinations, where each area of the diagram corresponds to a logical combination, and a Boolean expression can be described (Schneider & Wagemann, 2012). Figure 1 shows the Venn diagram for the analysis of positive cases Innov [1]. The software highlights the solution, which is represented by the dashed areas of the figure. The dark gray spaces indicate the empirically observed cases, and the white areas with dashes indicate the 16 combinations that were considered as simplifying assumptions in the analysis of the cases with a positive result.

The Venn diagram for the analysis of negative cases Innov [0] is

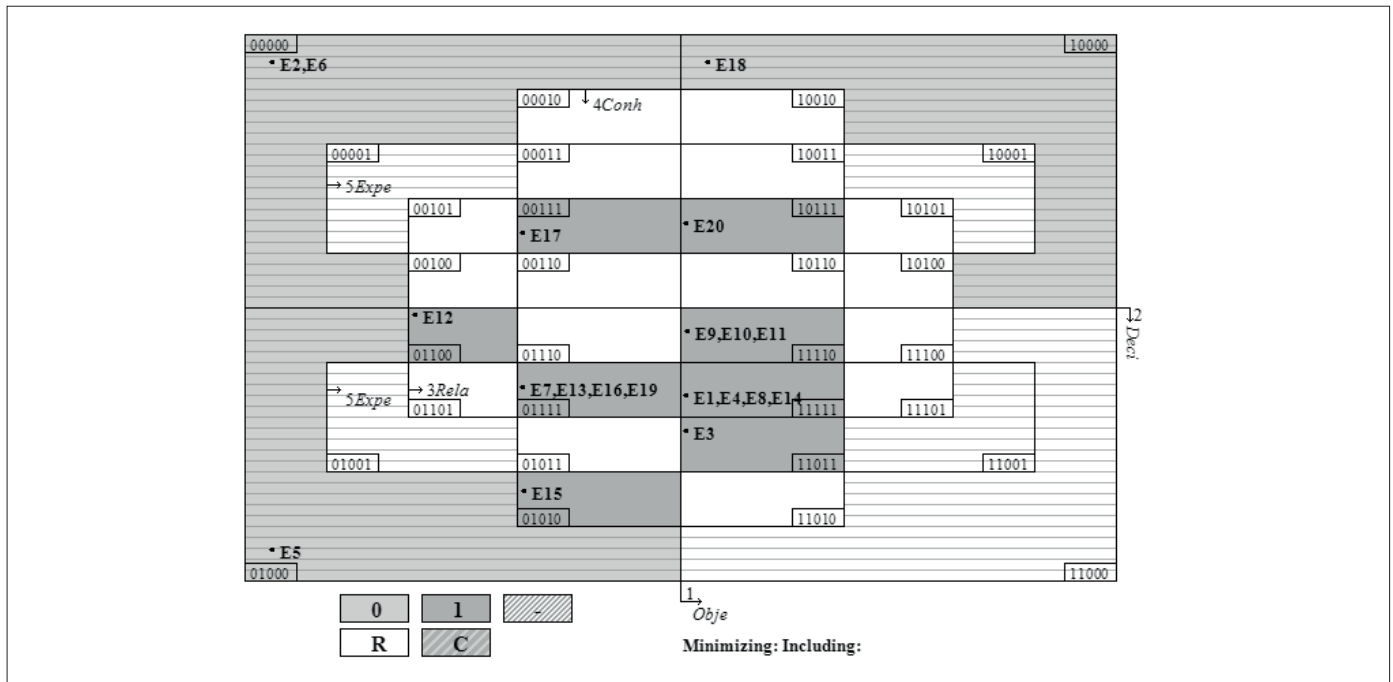
Figure 1: Venn Diagram for Innov [1] with logical remainders (adapted by the authors from the *software* Tosmana 1.61.)



shown in Figure 2 and the dashed areas indicate the solution. The dark gray spaces indicate the observed cases; the white areas with

dashes indicate the five simplifying assumptions of the cases with a negative result.

Figure 2: Venn Diagram for Innov [0] with logical remainders (adapted by the authors from the *software* Tosmana 1.61.)



At this stage of the analysis, the coverage of the minimum expressions was evaluated (the number of observed cases met by the equations

and by each of their terms), thus examining the need and sufficiency of each condition in relation to the outcome (Rihoux & Ragin, 2009).

Table 2: Coverage Analysis

Results	Analysis	Observed cases	Percentage coverage
Positive Innov	Total of positive cases	16	-
	RELA + KNOW (positive case equation)	16	100%
	Result Condition RELA	14	87.5%
	Condition KNOW	15	93.8%
	Only condition RELA	1	6.3%
	Only condition KNOW	2	12.5%
Negative Innov	Total of negative cases	4	-
	RELA * KNOW (negative case equation)	4	100%
	Result Condition Rela	4	100%
	Condition Know	4	100%
	Only condition RELA	0	0%
	Only condition Know	0	0%

Source: Elaborated by the authors.

It is shown that the RELA + KNOW → INNOV equation covers all 16 empirical cases with a positive result. Individually, the condition “positive relationship” meets 87.5% of the cases while the condition “positive knowledge” covers 93.8% of the cases. It can be concluded that both Rela[1] and Know[1] are not necessary for the positive result, since none of them is present in 100% of the cases. The so-called “need” occurs when a condition necessarily needs to be present to generate the result (Rihoux

& Ragin, 2009). The conditions Rela[1] and Know[1] cover 6.2% and 12.5% of empirical cases, respectively, indicating that both are sufficient to produce the positive result Innov[1]. In other words, the occurrence of only one of the conditions is sufficient to generate a positive result. In summary, the conditions Rela[1] and Know[1] are sufficient, because each one can generate the result alone, but individually they are not necessary, since only one of them needs to exist to generate the result.

When evaluating the expression for negative results, the equation $\text{rela}^* \text{know} \rightarrow \text{innov}$, the absence of the relationship condition $\text{Rela}[0]$ is necessary but not sufficient for the result. Likewise, the absence of the knowledge condition $\text{Know}[0]$ is necessary but also not sufficient for the result. In isolation, the negative result of each variable covers 0% of the cases, requiring that both absences occur simultaneously.

Discussion

According to the study of Kohler (2016), for the success of the connection, both the objectives of corporations and the expectations of the startups need to be met while defining clear strategic targets by organizations and the means to meet the needs of the startups. In the interviews with the cooperatives, it was recurrently mentioned that the innovation objectives in the connection with startups were to obtain greater speed in deliveries, improve the efficiency of the cooperative, seek new ways to solve business problems, and improve the customer experience. Interviewee E1 pointed out as targets the “*product digitization, digitization of our work more focused on efficiency, and the issue of operation automation*”. Interviewee E8 indicated that their cooperative seeks “more innovative solutions in relationship and service in general.” These purposes coincide with previous research that mentions that the startups seek to expand sales opportunities, obtain reputation gains, and greater publicity (Hora *et al.*, 2018; Kohler, 2016; Weiblen & Chesbrough, 2015).

The objectives and processes need to be aligned, and it is a make-or-break rule that similar values and attitudes are shared by organizations and startups (Hora *et al.*, 2018; Usman & Vanhaverbeke, 2017). In this regard, the evidence from the empirical field shows that, when there is alignment, it is more linked to the purpose and values than effectively to the objectives. As interviewee E14 highlights: “*in partner startups, an alignment of purpose and values is sought*”. In addition, interviewee E13 states that “*the startups have more short-term goals, a revenue that comes very quickly*”, while the cooperative aims for a long-term relationship with the customer.

Based on this evidence, it is noteworthy that one of the findings of the research is that common values are needed and sought in this type of partnership: “*yes, we aim at [alignment] of the important values*” (interviewee E13). At the same time, tuning was not a very valued antecedent: “*it is not so relevant [alignment of objectives]; the main focus is on the very solution that the startup has to offer*” (interviewee E16). In this context, the objectives of firms and startups will hardly be aligned (Hora *et al.*, 2018; Usman & Vanhaverbeke, 2017).

One finding to be highlighted is the need to complement the list of antecedents by adding the “local development generation” among the objectives for corporations to connect with startups in search of innovation. This new objective enhances the list of previous reasons for this connection, such as: expanding the product portfolio, reaching new market segments, increasing the speed of its processes by improving efficiency, and promoting the innovation capacity of the firm and its employees (Hora *et al.*, 2018; Kohler, 2016; Weiblen & Chesbrough, 2015).

Bialoskorski Neto (2012) indicates that in cooperatives, strategic decisions tend to be costly and slow, given that their corporate governance involves decisions in councils and general meetings. Hansmann (1999) suggests that collective decision-making can generate inefficient decisions for the community from the perspective of resource optimization. Therefore, the slow decision-making process of corporations is one of the fears of startups (Weiblen & Chesbrough, 2015). The findings contradict the literature when it is stated that the deliberation time was adequate and similar to that of non-cooperative firms. In most cases, the deliberation occurred between three and six months, that is, within the parameters pointed out for the acceleration programs (Cohen, 2013; Cohen *et al.*, 2019; Kohler, 2016).

This perception of the cooperatives was supported by the startups' interviewees, as E19 states: “*we found a lot of agility and flexibility, they were open, and they made a point of circumventing and mitigating the obstacles*”. This indicates that changes in processes were necessary to give speed to decision-making and consequent hiring of the startups. This perception is in line with Kohler (2016), who indicated that processes need to be changed in order to overcome existing organizational and bureaucratic obstacles, thus protecting startups from corporate complexity.

In summary, regarding the decision-making process, the main finding of this study is that the speed of decisions of cooperatives is similar to that practiced by non-cooperative firms, and not as slow as the theoretical assumptions point out. This was evidenced by interviewee E3 indicating that the cooperative “*manages to have great agility to make the approvals and make the decisions at an appropriate time*”. This speed was achieved with the streamlining of processes, necessary to obtain speed in non-cooperative firms. It also contributes to this agility the fact that the cooperatives surveyed are regional structures, making it easy to be contacted and get closer.

The QCA analysis identified that, if the firm has its own or partnered structured connection program, it will generate innovation in the relationship with startups. This is in line with Weiblen and Chesbrough (2015), as the relationship is facilitated with a current acceleration program, being a simpler model to involve the startups, having a light governance process, allowing several startups to deliver their ideas, and corporations to scale faster. Moreover, the commitment of these programs is to fill in the gaps between corporations and startups (Kohler, 2016). However, this does not mean that all firm's connections with startups will generate innovation, but that some relationships will have positive results for innovation.

When structuring the programs, it is necessary to consider the costs to find and validate new partners, as well as to build social relationships (Dahlander & Wallin, 2020). In this context, an initial partnership would reduce costs and generate knowledge before they invest in their program. Having the curatorship of an intermediary or having its own program is a feature that can evolve (Kohler, 2016).

The empirical evidence shows that this support by a specialized firm was positive, being indicated as an element that facilitated building a

connection with the cooperative. For example, interviewee E17 stated that *“it was very smart on the part of the cooperative to have an expert saying: look, it makes things more flexible here, or there will be a problem”*, also mentioning that *“the cooperative heard the specialist to do the work”*. According to this report, this does not always occur, because they have already experienced situations in which the firm hired a consultant firm but ignored the specialists’ recommendations.

This type of service provides mutual benefits, given that the startup conquers an important customer, can test its solution in the market and scales its operations. In turn, the corporation finds a solution to its weaknesses and learns about different solutions to the challenges by interacting with several startups (Kohler, 2016). In line with this, interviewee E4 pointed out that the cooperative is a *“large customer with potential and a high ticket and guarantee of payment”*. In another excerpt, he mentioned that the cooperative *“opened a new market for the startup, which saw the possibility of entering into partnerships with other credit cooperatives.”* Interviewee E13 indicated that the exchange with different startups *“broadens the view of the options that we have to follow”*.

The results show the importance of structured acceleration programs as a means of making connections between cooperatives and startups, corroborating the idea that the relationship is facilitated, more efficient, and more cost-effective with a connection program (Cohen *et al.*, 2019; Kohler, 2016; Weiblen & Chesbrough, 2015).

In order to address the knowledge generated in the engagement with startups, the results indicate that firms used the processes that support their connection programs by employing joint actions with the areas of innovation, business teams, and startups. In this context, it is essential to link innovation groups and internal business units, which play a vital role in the absorption and dissemination of knowledge (Bogers *et al.*, 2021).

Managers must have a comprehensive view of all dimensions in which their firms can innovate (Sawhney *et al.*, 2006). Effective acceleration programs require the engagement of executives as the relationship with the startups may be affected by internal conflicts within the corporation (Birkinshaw *et al.*, 2011; Kohler, 2016). In some cooperatives, executive engagement is seen in initiatives with startups: *“Because we did some projects that worked, people have already seen innovation favorably, that said, there was a very great acceptance, not only by the managers, but by the entire organization”* (Interviewee E3).

Conversely, certain cooperatives still face difficulties to involve product managers in open innovation initiatives. Cohen *et al.* (2019), for example, indicate that executive time and attention are the most widely available resource for corporations to support the evolution of startups. A recent study with Brazilian firms pointed out that the flow of knowledge from outside to inside has been the most used (Sprakel & Machado, 2021). In this sense, the empirical evidence obtained from the interviews and complementary materials reinforces this point and indicates that only the input knowledge flows have been used by cooperatives.

In this context, one of the findings is that a firm will generate innovation in the relationship with startups if it has organized processes for knowledge management. This finding expands on that proposed by Laursen and Salter (2014), who indicated that the sharing of knowledge between agents is essential for the creation of value, as can be observed in the interviewee’s statement E5: *“increased our market, because we started to evaluate functionalities that serve credit cooperatives”*. In firms, in addition to the knowledge absorbed about technological solutions and new business models, learning also provides process improvement and promotes a culture of innovation (Cohen *et al.*, 2019; Hora *et al.*, 2018). This is visible in the statement of interviewee E14 (*“we learned a lot from the agile methodology and the way they work”*) and E7 (*“[...] they bring a lot of knowledge and open doors to other different ways of doing that, or other startup options that can be connected”*).

Also, when the corporation and the startup work together to promote technology, a critical issue is the management of intellectual property, given that the startups fear that their ideas will be stolen (Weiblen & Chesbrough, 2015). Therefore, appropriate mechanisms must be in place to prevent leaks and misappropriations of knowledge. Only in this way can value creation be maximized without compromising value capture opportunities (Laursen & Salter, 2014). Interviewee E4 pointed out that *“there was a discussion of exclusivity here; what is interesting is that the cultural issue comes again, the fear of competing for technology and not for somebody’s differential”*. Similarly, interviewee E10 stated: *“we try not to stay with too many fintechs, because we know they want our expertise”*. This evidence shows that in the empirical field studied, it was the cooperatives that were concerned with sharing their knowledge, possibly due to a more conservative performance profile.

Usman and Vanhaverbeke (2017) argue that it is essential that the startup has managers with previous experience in a corporation, which gives credibility to the managers of the partner firm. In the same sense, the experience expands the negotiation skills, improving the handling of operational issues (Shane & Cable, 2002). All the startups that participated in the research had positive results of innovation. However, not all had managers with previous corporate experience, which contradicts the theoretical assumptions.

Among the cooperatives surveyed in this study, half had professionals with previous corporate experience, some of whom already worked at the firm, and others were hired, as employees or as third parties, to structure the innovation area. At this point, it is possible to identify differences in results, as all cooperatives with experienced professionals were able to obtain positive results for innovation. In the other group, where those responsible had no experience, few managed to obtain positive results for innovation.

Regarding cooperatives, it was indicated that a tactic to accelerate the acquisition of experience was the hiring of consultancies to structure innovation strategies and programs. In addition to the technical contribution and market experience, the consultancies had a supporting

role for the cooperative to connect to the open innovation ecosystem, sometimes tutoring acceleration programs, as reported by interviewee E1: “We hired a consultancy that helped us build an innovation strategy for the cooperative, and within this strategy, we have three main pillars: growth and relevance [current business focus], culture [creating an innovation mindset] and new businesses.” Another interviewee reinforces this position by defending the understanding of the startup mode: “I believe that the one who is in charge of this process [connection with startups] is an advantage of having a minimum base of how a startup works.” (Interviewee E19)

In addition to the experience of the professionals involved, it was considered important that the startups already have their solutions implemented with other customers, especially if they are credit cooperatives or financial institutions. Therefore, another finding of this study is that, in situations where relationships are conducted as “being a customer of startup” modality, the startup must implement cases of its product or solution. This finding complements that indicated by Usman and Vanhaverbeke (2017), who argue that it is essential that the startup has managers with previous experience in a large firm. In the cases studied, the firm intends to hire services and thus seek more

mature startups, so counting only professionals with experience will not be sufficient for the success of the connections, being essential that the startup also has operational experience.

The minimum Boolean formulas $RELA + KNOW \rightarrow INNOV$ and $rela * know \rightarrow innov$, resulting from the QCA analysis, were explored with emphasis on theoretical assumptions, and in the cases of the empirical field, to understand the impact of these conditions on the generation of innovation. The other conditions (Objectives, Decision, and Experience), outside the minimum formulas, were also evaluated to interpret their effects and the relative importance of these conditions in generating innovation results (Rihoux & Ragin, 2009).

The analyses show that the five conditions studied have a certain degree of impact to generate innovation through partnerships between credit cooperatives and startups. They also reaffirm the minimum Boolean formulas, obtained in the analytical stage of the QCA. For innovation to be generated, it is essential to have a structured relationship model or effective processes to manage the knowledge flows. Table 3 presents a summary of the contributions related to the constructs evaluated in this study. It contains the main findings linked to the constructs and the empirical evidence that supports them.

Table 3: Summary of contributions

Construct/Definition	Key Findings	Empirical Evidence
Relationship Work models used in the interaction between firms, their particularities, and characteristics.	Stability in the selection process used in connection programs with startups. When the firm has its own or partnered structured connection program, it will generate innovation in the relationship with startups. “Being a customer of a startup” has been the main format used by firms starting their connection programs or having a more conservative culture regarding their investments.	Empirical evidence indicates that the base process involves enrollment, filter, connection, pilot, and evaluation. Boolean equation $RELA + KNOW \rightarrow INNOV$ “it was decided not to invest in startups, using only a more traditional and commercial model, much because of a cultural issue that involves uncertainty about the return on this investment.” (E4)
Decision-making Collective deliberation with “one man one vote”, the impacts on speed, cost, and issues inherent to the heterogeneity of members.	Connections with startups: speed of cooperative decisions is similar to non-cooperative firms.	“It manages to have great agility to make the approvals and make the decisions at an appropriate time.” (E3)
Flows of Knowledge Activities and processes inherent to the sharing of information, breadth of subjects, where and how to seek them.	The firm will generate innovation in the relationship with startups, if it has organized processes for knowledge management.	Boolean equation $RELA + KNOW \rightarrow INNOV$
Experience Influence on the relationship generated by social ties and previous experiences of firms and managers of startups and cooperatives.	In relationships called “customer of the startup”, firms look for more mature startups. Thus, the startup must implement cases of its product or solution.	“As we are looking for more mature startups, this previous experience of customers, of running cases, is very important to us.” (E13)

Source: Created by the authors.

Concluding remarks

In recent years, the topic “startups” has been extensively published in organization studies. Spender *et al.* (2017) point out that the issue of startups is related to the concept of open innovation proposed by Chesbrough (2003). In contrast to the closed innovation that occurs only in the areas of R&D, the understanding that firms should use external sources of knowledge to drive innovation has prevailed.

This study aimed to evaluate, in a dyadic context, the interactions between credit cooperatives and startups, simultaneously collecting the perspectives of corporations and startups. The antecedents, mechanisms, and results of partnerships between credit cooperatives and startups were also explored, following a study opportunity pointed out by Bogers *et al.* (2019). The research was developed in the context of financial services and involved a different type of organization,

given that, by their nature, cooperatives are not commercial firms, two approaches that West and Bogers (2017) indicated the need for further studies.

The results contribute to the understanding of the relationship between credit cooperatives and startups in a dyad context by identifying the characteristics of this connection and the factors that influence the success of the relationships studied. The findings point out that common values between the firm and the startup are desirable and aimed at and that the objectives will hardly be aligned. Regarding the decision-making process, the results obtained contradict what was indicated by Bialoskorski Neto (2012) that decisions in cooperatives tend to be costly and slow. What was empirically verified is that, in this specific situation of relationship with startups, being cooperative did not affect speed. Connection decisions were made within the deadlines indicated in the literature, that is, between three and six months (Cohen, 2013; Cohen *et al.*, 2019; Kohler, 2016).

Although theoretical assumptions indicate that corporations use various relationship models to connect with startups, empirical evidence shows that in the cases studied, only the startup customer model has been used. In the relationship construct, the main finding comes from the minimal Boolean equation, which indicates that when the firm has a structured connection program, either their own or partnered program, it may generate innovation in the relationship with startups.

In line with the model “customer of the startup,” input knowledge flows predominate. The flows from outside to inside are the most explored in the international scientific literature. A recent study with Brazilian firms indicated that this is the most widely used model (Sprakel & Machado, 2021). The main finding indicates that the firm will generate innovation in the relationship with startups, provided that it has organized processes for knowledge management.

The empirical field confirmed the importance of experienced professionals, from both the cooperative and the startup. However, startups must have prior experience with their solutions in other partnerships. Therefore, the use of consultancies specialized in innovation and connections with the ecosystem of startups has been an alternative. This specialized support effectively had positive impacts on the design and execution of connection programs, accelerating the maturation of internal professionals and reflecting on the improvement of internal innovation capabilities.

From a managerial perspective, this research contributes to credit cooperatives and startups recognizing the aspects necessary to make better collaborations, given the antecedents, mechanisms, and results of open innovation presented for this type of connection.

As for research limitations, it is worth mentioning that the QCA does not clarify the correlation between variables, so it was not possible to determine the increase or decrease of a dependent variable in relation to a change in the independent variable. However, the QCA explains the logical relationships between the conditions while

identifying their sufficiency and necessity. Another limitation is related to the data collection procedures. The interview script addresses the five pre-defined constructs, with the understanding that such a choice, while limiting the subjects dealt with and directing the interviews, tends to prevent the emergence of other constructs in the empirical field. Thus, there may be other constructs that affect the result of innovation between cooperatives and startups. Also, interviews may obtain only a partial view of reality when the issues involve concepts such as success, influence, impact, importance, and satisfaction.

For future research, we suggest evaluating the economic and financial performance of innovations generated by the relationship between cooperatives and startups, which may involve the rate of new product launches, product performance, cost reduction, and revenue or sales growth. Therefore, these studies can identify value capture, addressing profitability, effectiveness, efficiency, and impacts after the innovation process, which is an approach that West and Bogers (2017) point out as lacking in research. Another venue for future research would be to explore cases of failures in the connection process between firms and startups or open innovation. Finally, an alternative would be to compare the results obtained by cooperatives with those obtained by non-cooperative firms.

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