Business network commons and their fragilities: Emerging configurations of local organizational fields

Journal of Business Research

Special Issue on "*Quantitative and Qualitative Comparative Analysis in Business*"

From conference papers - GIKA 2017

Submission:

Business Network Commons and their Fragilities: Emerging Configurations of Organizational Fields

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September 2017

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Abstract

This study cross-fertilizes the literatures on commons, organizational fields, and network organizations to identify the configurations of field-level organizational variables that effectively enhance the resilience (i.e., the adaptiveness and robustness) of firms participating in business networking. These three organizational variables are: (1) network-level participatory architecture, (2) network-level organizational integration, and (3) the presence of specific network-level mechanisms for opportunism prevention and resolution. A model is proposed, identifying four combinations of these three variables that are expected to enable firm resilience through the development and protection of network commons under certain boundary conditions. A fuzzy set qualitative comparative analysis (fsQCA) of 202 Italian firms involved in business networking provides an encouraging corroboration of the proposed model. This study opens up new possible research paths on the role of business network commons in organizational fields and firm resilience.

Keywords: Network organization, Firm resilience, Robust action, Organizational field, Business network commons, Business model fit

1. Introduction

Recent decades have witnessed a dramatic increase in the frequency and importance of business networking (Gulati, Puranam, & Tushman, 2012). Although traditional organization and management theories (Rossignoli & Ricciardi, 2015) suggest that business networking's main motivations are transaction cost reduction (Williamson, 1985), power (Pfeffer & Salancik, 2003), competitive advantage (Lavie, 2006) and resource control (Wernerfelt, 1995), it is becoming increasingly clear that, in many cases, these collaborative interorganizational relationships' primary expected outcomes are different (Clegg, Josserand, Mehra, & Pitsis, 2016). Among the emerging needs, firm resilience (Plummer & Armitage, 2007; Kayes, 2015) is regarded as particularly important in today's turbulent business scenario. Resilience can be defined as the capability to leverage crises and difficulties in order to adapt and get stronger. This study argues that many emerging network-based organizational forms are shaped mainly by the networking firms' need to enhance their resilience. In these networks, then, organizational design's key aims include network-level mutual help, innovation, sustainability, evolutionary learning (Ferraro, Etzion, & Gehman, 2015), and/or the future co-creation and seizure of opportunities that cannot be predicted or planned in advance (Scherpereel, 2008). All these factors work together in enhancing the partnering firms' resilience, which can be measured in terms of adaptive business model innovation after a crisis (Ricciardi, Zardini, & Rossignoli, 2016). A consistently viable and promising research stream is emerging that investigates the organizational factors through which business networks become—and remain—fertile environments for breeding multilevel resilience (Ferraro et al., 2015). Our study contributes to this emerging stream and suggests that business networks can significantly improve the participating firms' resilience if the network's specific organizational field effectively protects and develops the business network's commons.

A commons can be defined as a resource available for collective use by a certain community, and requiring its users' educated collaboration to be acknowledged, protected and/or developed (Dietz, Ostrom, & Stern, 2003; Ostrom, 1990; Plummer & Armitage, 2007). The commons concept is well-

established in economics, ecosystem studies, and political science (Hess, 2008) and can offer insight into the emerging network forms of organization. Economics and ecosystem scholars primarily focus on traditional commons—i.e., local natural environments like fisheries or grazing lands—but recent years have witnessed growing interdisciplinary interest in larger, artificial or even intangible commons, such as global climate, urban public spaces, and Wikipedia (Hess, 2008). While traditional commons are mainly vulnerable to free-riding and over-exploitation, the so-called new commons are also often vulnerable to users' lethargy, inertia, and poor coordination. It is also becoming increasingly clear that all the commons are vulnerable to the relevant social actors' ignorance and unawareness. In other words, the so-called tragedy of the commons (Dietz et al., 2003) may occur for different and more complex reasons than those originally envisaged by the pioneering studies on the commons. In this scenario, organizational sciences can play a key role in an interdisciplinary effort to discover how the commons could best be managed for a more prosperous and sustainable future.

In the last three decades, the literature has identified several key challenges that institutional and organizational architectures need to address in order to protect and develop the commons through harnessing the commons' fragilities and potential (Dietz et al., 2003; Ostrom, 1990; Plummer & Armitage, 2007). In particular, the rich research stream on ecosystem resilience provides evidence that a community's effective institutional work in protecting and developing its own commons makes the system significantly more resilient (Cantino, Devalle, Cortese, Ricciardi, & Longo, 2017; Kayes, 2015; Plummer & Armitage, 2007).

Similarly, this study argues that business network commons, along with the efforts to govern them, can provide the networking firms with resources that are particularly valuable to (re)build firm resilience in the face of turbulent business environments. Business network commons can include, for example, a co-owned department for conducting common research and development (R&D) activities; a shared web-based information repository; a network agreement enabling trust and

mutual help among partners; or a protected organizational unit serving as a niche for exploring new business opportunities for the network partners' common good.

Since the construction of system resilience is strongly based on institutional work, this study takes the organizational field as the key level of analysis for investigating how business networking can enhance firm resilience through the development and protection of business network commons. A business network, in fact, by definition enacts and is enacted by a specific organizational field including the relations within the business network's boundaries. The rich literature on organizational fields has so far primarily focused on legitimation and/or power as field dynamics' main outcomes (Wooten & Hoffman, 2008). To the best of the authors' knowledge, this is the first study investigating the link between organizational fields' institutional architecture and firm resilience through the protection and development of business network commons. This investigation is made possible thanks to an original cross-fertilization between literature streams that have so far remained separated, namely, institutional fields (Wooten & Hoffman, 2008), resilience-oriented network organizations (Ferraro et al., 2015), and commons-based systems (Berkes, 2009). Building upon this cross-fertilization, this article argues that the field's institutional architecture plays a pivotal role in enabling business network commons, which in turn are key to enabling resilience at multiple levels, including the individual firm's level. This study's proposed model leverages the results of the literature on the commons to identify three organizational variables that are expected to influence the organizational fields' capability to protect and develop business network commons. These organizational variables are: (1) a strongly participatory architecture of the business network's field, enabling field actors' sustained engagement in shared sense-making, arrangement-making, and problem-solving; (2) an intense organizational integration at the network level; and (3) a significant presence of organizational mechanisms for opportunism prevention and resolution at the network level. These three variables result in eight possible combinations (configurations) of the business network's organizational field. By leveraging the extant findings of the literature, this study argues that four of these eight combinations can lead to high firm resilience, measured

through business model fit following a severe crisis. Two specific possible fragilities of the network commons at stake provide the boundary conditions that predict which of the four field configurations is necessary and sufficient to enhance firm resilience in each specific case; according to this model, the less fragile the network commons at stake, the less complex the field configuration needs to be.

Conducting a fuzzy set qualitative comparative analysis (fsQCA) on 202 firms engaged in business networking confirmed that organizational fields' architectural configurations, as based on the appropriate combinations of the aforementioned three organizational variables and two commons-related boundary conditions, led to business model fit after a severe crisis (a proxy of firm resilience).

Besides contributing to the literature on business networks and interorganizational relations, this study provides a double-sided original contribution to organizational theories by highlighting the explanatory power of the commons approach in field-level analysis as well as the explanatory power of field-level analysis in firm resilience investigation. The article's presented model and results open up interesting research paths on the configurational analysis of field-level success factors, not only in business networks, but also in hybrid community-organizations, public-private, and profit-nonprofit networks.

2. Background and theory development

2.1 Organizational field dynamics and business network commons: An emerging link

Building upon Wooten and Hoffman (2008), this study defines an organizational field as a relational space with distinguishable boundaries and whose actors engage in similar or overlapping activity systems, thus positioning actors to influence and/or be influenced by institutions of common interest through social sense-making processes. Social scientists typically utilize the label "institutions" to indicate those socially constructed structures—such as values, norms, sanctions,

roles, hierarchies, procedures, expectations, or beliefs—providing social behavior with stability and collective meaning (DiMaggio & Powell, 1991; Scott, 1995).

The organizational field plays a pivotal role in the intersection of micro (individual) and macro (regional or global) institutional dynamic levels (Borum, 2004; Corbo, Corrado, & Ferriani, 2015; Wooten & Hoffman, 2008). Therefore, the organizational field concept provides a powerful lens for understanding network organizations, including business networks. In fact, a business network enacts (and is enacted by) a common organizational field where actors interact (also) to create, maintain, undermine, change, and/or comply with the common institutions perceived by the actors as relevant to their activities. Field-level institutional dynamics result in changing (or inertia in) endogenous institutions (such as network agreements) and/or exogenous institutions (such as national standards, e.g., through lobbying activities). Therefore, this study focuses on business networks' organizational fields as the key locales where institutions coevolve with the actors' relationships, capabilities, technologies, and business models. For example, a business network's partners could sign a network agreement stating the network's common purposes, conflict resolution structures, and membership requirements. Network members are then able to build upon this agreement to construct a shared identity and collectively make sense of—and react to—emerging problems, threats, and/or opportunities.

Commons studies, which are mainly rooted in politics and ecosystem disciplines, identify system-level institutions as key factors for achieving social-ecological system resilience (Dietz et al., 2003; Kayes, 2015; Plummer & Armitage, 2007). Adaptive institutional solutions and arrangements can lead the community to sustainable prosperity, while poor institutional work that fails to develop and protect the commons will likely lead the system to decline or even collapse.

This commons-centered approach to complex systems' resilience is consistent with some recent important organization literature developments. Dougherty and Dunne (2011) view network organizations as the best possible answer to growing needs to develop social ecosystems that enable and support complex innovation processes. They propose that (a) local actor-to-actor collaboration

for orchestrating knowledge and (b) developing ambiguity-embracing policies are the key factors for building successful ecologies with continually emerging opportunities and innovations.

Fjeldstad et al. (2012) analyzed the emergent, network-based organizational designs that seem particularly successful in addressing the hard challenges of today's complex, fast-paced business scenarios. They found that successful network organizations tend to be based on three main elements: (a) competent actors with the capabilities and values to self-organize; (b) protocols, processes, and infrastructures enabling multi-actor collaboration; and (c) commons (here understood as "common social and/or technological environments") where actors accumulate and share common resources.

Lusch and Nambisan (2015) developed a similar model explaining successful service innovation. In their article, they claimed that successful interorganizational service systems are based on (a) actor-to-actor structures where actors co-create value; (b) mechanisms supporting the roles and processes underlying value co-creation; and (c) common platforms facilitating access to appropriate resource bundles, therefore serving as innovation venues.

Ferraro et al. (2015) argued that complex, ever-evolving challenges cannot be addressed through traditional organizing and planning. They claimed that network organizations of engaged actors are the most promising organizational forms today, as they are positioned to develop robust action strategies, thus keeping future lines of action open even in case of (and thanks to learning from) local failures. If robust action strategies are successfully implemented, network organizations will trigger virtuous cycles of sustained actor engagement and novelty generation, thus enabling a flux of flexible innovation with distributed outcomes. Ferraro et al. (2015) suggested that robust action requires: (a) multivocal inscriptions, i.e., many and diverse actors, discourses and artifacts providing collective interpretation process dynamism; (b) participatory institutional architecture; and (c) distributed experimentation and learning based on both the successes and failures of a variety of initiatives.

Consistent with the recent theoretical contributions synthesized above, it is reasonable to expect that the institutional architecture of a business network's organizational field could prove very relevant in enabling or hindering participating firms' success (both in terms of robustness in crises and innovativeness) by enabling the development and protection of relevant business network commons. However, mainstream organization and management studies have so far primarily focused on how social mechanisms influence institutional processes within fields, as well as how field dynamics impact value capture (Wooten & Hoffman, 2008), especially through field members' legitimation and/or power (e.g., Zilber, 2002). Instead, the role of organizational fields' institutional architecture in enabling resilient value co-creation through the protection and development of network commons is an under-investigated issue in organization and management studies.

This study focuses on the commons' fragilities as the key aspect to understanding the commons-enabling role of organizational fields. Studies on the tragedy of the commons have long highlighted the fact that classical commons (such as grazing lands and fisheries) are typically vulnerable to opportunistic over-exploitation due to a social dilemma, that is, a conflict of interest between individual short-term payoff and collective long-term payoff. However, more recent studies, often based on Elinor Ostrom's seminal work (Ostrom, 1990), suggest that free-riding is just the tip of the iceberg of the commons' possible fragilities.

In many cases, the commons risk collapse from inaction rather than from opportunistic action; in other words, the commons may also be significantly vulnerable to inertia and/or poor coordination among the common resource's users. For example, Wikipedia provides its users with resources (knowledge contents created for free by the users) that may be substantially more vulnerable to users' lethargy than to over-exploitation. For this reason, much of Wikipedia's effort is directed to making users' active collaboration easy and feasible.

The commons are also vulnerable to users' ignorance; if the users are unaware of the dynamics that jeopardize the commons, it is unlikely that users' behaviors will protect and develop the commons. For this reason, scholars increasingly insist on the process of the social construction of the

commons; for example, the perception of global climate as a fragile commons that requires engagement on the part of the human community has emerged gradually through social movement and multilevel institutional change. For decades, unawareness of climate-related threats has been the basic problem hindering the protection of the commons (Ansari, Wijen, & Gray, 2013). Based on the literature streams synthesized above, this study identifies three organizational variables of the network field's institutional environment that may jointly shape the business network's capability to develop and protect its network commons: (1) participatory architecture, (2) network-level organizational integration, and (3) specific mechanisms for opportunism prevention and resolution. In addition, this study identifies two boundary conditions that help identify which combinations of the above-mentioned organizational variables are necessary and sufficient for enhancing field resilience in a specific case. The next section will be dedicated to the three organizational variables, whilst the following section will develop a theory on how specific combinations of these three variables, depending on commons-related boundary conditions, can contribute to firm resilience.

2.2 Participatory architecture, network-level organizational integration, and mechanisms for opportunism prevention and resolution

Actors' sustained engagement in shared sense-making, arrangement-making, and problem-solving (Ferraro et al., 2015; Wooten & Hoffman, 2008) is indispensable for continuously (re)constructing actors' awareness of the network commons' ever-evolving dynamics. Scientific research has demonstrated that, when it comes to protecting or developing the commons, rigid and centralized institutions lead to disaster (Dietz et al., 2003). The field architecture should therefore, in a pragmatist perspective, empower actors as active experimenters (Ferraro et al., 2015) that hypothesize means-ends relationships in order to solve their problems, later observing their generated outcomes (Whitford, 2002), understanding these outcomes, and adjusting the next course of action through inter-subjective sense-making and deliberation (Mead, 1934). If complementary,

competent and engaged actors are enabled, encouraged, and empowered to do so by effective field institutions, these actors can reciprocally engage in evolutionary learning (Ansell, 2011). In evolutionary learning, problems and crises generate reflection, deliberation and action, which can produce refined understanding of the problem and possible solutions. This view of resilience-oriented learning, which is gaining increasing attention in organization and management studies, lies at the very core of the research stream on adaptive co-management of commons-based ecosystems (Plummer & Armitage, 2007).

In order to enable actors' sustained engagement with shared sense-making, arrangement-making, and problem-solving, the literature on commons-based systems and innovation networks converge in suggesting that participatory institutional architecture with distributed authority, intense personal interaction and collective sensemaking is the best possible solution (Callon, Lascoumes, & Barthe, 2009; Ostrom, 1990; Dietz et al., 2003). An effective participatory institutional architecture is characterized by rules of engagement, boundary-keeping arrangements, and decision-making rights (Gulati et al., 2012) that are acceptable in the long term for a sufficient number of competent, complementary goodwill actors, thus encouraging their active contribution to the commons and providing an irreplaceable capillary antidote to unawareness and lethargy. In addition, a participatory architecture often allows for lateral accountability and mutual monitoring, thus resulting in a strong social discouragement of opportunistic behaviors. Finally, a participatory architecture is also effective in enabling numerous and extremely flexible self-organizing processes that are necessary, and in many cases sufficient, to set actors within the conditions to effectively coordinate their actions for protecting and developing the commons.

In some cases, however, the self-organizing capabilities that stem from the field's participatory architecture may be insufficient for effective interorganizational collaboration. For example, the development and protection of the network commons at stake may require complex activity redesign, centralized data processing, or fast decision-making; in such cases, specific organizational capabilities at the network level may be necessary. In other words, in many cases, a participatory

architecture may need to be complemented with a certain level of organizational integration (Lawrence & Lorsch, 1967) at the network level. Studies on the adaptive co-management of the commons increasingly and consistently highlight the role of "bridging organizations" in enabling partial transformation of communities into complex distributed activity systems, in which specialization, science-based data processing, division of labor, and coordination enable a much wider range of organizational capabilities than those made possible by traditional community relationships (Plummer & Armitage, 2007).

Finally, there are also cases in which the social pressures of a participatory environment are not sufficient to discourage or resolve users' opportunistic behaviors. This mainly occurs when transparence (and then horizontal accountability) is for some reason insufficient, and/or the perceived payoff of opportunism is significantly higher than the benefits of remaining a well-accepted network member. When depletable commons are at stake, opportunism manifests itself through over-exploitation ("get it while you can"), misappropriation, and/or carelessness ("someone else will take care of it") (Ostrom, 1990). These behaviors, or even the suspicion that these behaviors could occur or have occurred, generate tensions within the field. These tensions compound on those stemming from the network actors' differing interests, standpoints and logics, which risks jeopardizing the commons as much as the opportunistic behavior itself..Therefore, commons that are particularly vulnerable to opportunism need institutions that effectively prevent commons-threatening behaviors, including escalations of cheating, destructive conflicts, and fighting (Dietz et al., 2003). Field architectures must create a space where actors meaningfully and constructively engage with counterparts, even when their relationships are adversarial (Mair, Martí, & Ventresca, 2012; Ferraro et al., 2015). Most commons are vulnerable to opportunism, though some commons are not; for example, Wikipedia is quite robust to opportunism thanks to its organizational and technological infrastructure, as well its hosted resources' non-depletable nature (Hess, 2008).

2.3 Boundary conditions (levels of fragility of the commons at stake) and successful field configurations

The three organizational variables presented above (field participatory architecture, network-level organizational integration, and mechanisms for opportunism prevention and resolution) translate into eight possible combinations in which each variable can rank as high or medium-low. For example, one of these eight possible combinations features high participatory architecture, high organizational integration, and the medium-low presence of mechanisms for opportunism prevention and resolution. Which of these eight combinations of organizational conditions can lead to firm resilience through the development and protection of network commons?

As shown in the previous section, all the commons are vulnerable to unawareness and disengagement. However, not all commons are significantly vulnerable to disorganization. For example, a network aiming for informal knowledge exchange and brainstorming does not require specific and integrated organizational structures to coordinate the activities. Similarly, not all the commons are particularly vulnerable to opportunism; in some cases, such as many successful supply chains, resource misappropriation is not easy, and its expected payoff is much less attractive than that from remaining a legitimated member of the network.

Since the extant literature converges in claiming that a participatory architecture is irreplaceable in fighting unawareness and disengagement, this study's model (Table 1) proposes that a participatory architecture is a necessary condition, that is, the four combinations with participatory architecture rankings of medium/low are excluded from the list of successful field configurations. In addition, as shown in the previous section, a highly participatory architecture also provides protection to moderate the levels of commons' vulnerability to both opportunism (through horizontal accountability, mutual monitoring, and social control) and disorganization (through community self-organizing capabilities). Therefore, under the boundary condition that the commons' vulnerability to both opportunism and disorganization is not high, a participatory architecture can be

sufficient to develop and protect the commons, thus enhancing firm resilience (see Configuration D in Table 1).

Similarly, if the commons' vulnerability to opportunism is not high, participatory architecture and organizational integration can be sufficient (see Configuration B in Table 1), while if the commons' vulnerability to disorganization is not high, participatory architecture and mechanisms for opportunism prevention/resolution can be sufficient (see Configuration C in Table 1). In this line of reasoning, if all three organizational variables rank as high, no boundary condition is necessary, and the configuration is always sufficient to protect and develop network commons and then firm resilience (see Configuration A in Table 1).

TABLE 1 here

3. Method

3.1 A comparative, configurational approach

A comparative, configurational approach is the one most suited for testing this study's proposed model (see Table 1). In fact, the model implies that different equifinal configurations of business network's organizational field architecture could lead to high firm resilience, given that these configurations are consistent with the boundary conditions consisting in the absence of specific business network commons' fragilities. In addition, this model implies strong input variable interdependence.

Therefore, this study adopts the fsQCA (Woodside, 2015). In fact, this method is particularly suited to addressing equifinality, causal asymmetry, and possible interdependence of input variables (Cooper & Glaesser, 2015; Greckhamer et al., 2007; Pajunen, 2008; Ragin, 2000; 2008; Woodside, 2010). Set-theoretic methods like the fsQCA differ from traditional variable-based approaches by treating different configurations as different case types and therefore not disaggregating cases into independent aspects. This makes the fsQCA suited not only for theory testing, but also for concept formation, elaboration, refinement, and theory development (Fiss, 2011). This study will then

compare a significant number of commons-based business networks in order to find out which configurations of the field architectures discussed actually lead to high (or medium-low) firm resilience.

3.2 Sampling, questionnaire development, data collection, and calibration

The leading Italian industrial association's database lists all Italian firms that have formally established a business network agreement to pursue a specific business project (Cantele et al., 2016). This database of approximately 16,000 firms (which is continuously increasing due to new contracts) is a good source for this study to identify suitable firms, as the firms included in this list are actually members of a network organization with an organizational field governed by a clearly recognizable meta-institution: the business network contract. The authors focused on business networks whose business projects were accessible and readable. Among these, the authors selected networks created between 2010 and 2013, a period of severe economic crisis in Italy during which severe turbulence affected all business environment sectors. This allowed the authors to identify 900 firms belonging to resilience-oriented business networks that have existed for at least three years, have experienced a severe crisis, and whose organizational fields have a clearly recognizable architecture thanks to the business network contract. These firms received an e-mail invitation to answer the online questionnaire developed for this study. A total of 202 firms (22.4%) belonging to 72 business networks accepted and returned complete and usable questionnaires. The respondents represented a broad and balanced variety of industries, such as services (35%), manufacturing (34%), fashion and clothing (9%), information and telecommunication (8%), and food and beverage (14%). As for firm size, 39% had 10–50 employees, 44% had 50–249, 12% had 250–499, and 5% had more than 500. Among the 202 firms surveyed by the questionnaire, 61% ranked high in the outcome variable (i.e., business model fit).

The questionnaire was developed based on the literature and inductive work through an experience survey (Zikmund et al., 2012) involving 35 interviewees from as many firms engaged in different

business network contracts, along with two senior managers at the leading Italian industrial association and four managers of a major Italian bank (whose expertise in identifying firm resilience factors was particularly useful). These interviewees provided both ideas for developing the items and face validation of the scale. The process led to the final scale version for the three input variables and the output variable (see Table 2). These scales were later validated through exploratory and confirmatory factor analysis by leveraging the survey's results. (see Table 3) The questionnaire items used a 5-point Likert scale, as well as an open question requesting a description of the network's main purpose and resources.

TABLE 2 here.

TABLE 3 here.

FsQCA allows for gradual set membership, thus preserving information though a calibration process. Calibration involves transforming original data into a continuous value interval from 0 to 1 (Ragin & Fiss, 2008; Woodside, 2010). Then, the study uses the average item value of each respondent's variables and converts the 1–5 Likert scale values into "fuzzy value[s]" (Fiss, 2011) ranging from 0 to 1. Specifically, membership is associated with the value 5 (after fuzzification 0.95), non-membership with the value 1 (after fuzzification 0.05), and the value 3 (after fuzzification 0.5) is the maximum ambiguity point. The fuzzification model (each variable's value from 0.05 to 0.95; threshold value=3) results in similar values, thus validating the calibration (Li, 2013).

4. Findings

4.1 FsQCA results

Starting with the Pearson bivariate correlations matrix analysis (Table 4) between the three input variables and the outcome variable (firm resilience as measured by business model fit after a crisis), three significant correlations exist among the input characteristics. Furthermore, the results indicate a significant, positive correlation between two input variables (C1: participatory architecture, and

C2: organizational integration) and the outcome measure. However, none of the input items demonstrated a significant net effect (all values are not higher than 0.33, see Ragin, 2008), which excludes a multicollinearity effect's presence. These results indicate that the input characteristics and the output measure are non-linear and asymmetric, thus confirming the fsQCA's appropriateness.

TABLE 4 here.

FsQCA differentiates parsimonious, complex, and intermediate solutions. This study used a combination of intermediate and parsimonious solutions (Greckhamer, 2011; Ragin, 2008; Ragin & Rihoux, 2009) and set a consistency benchmark of 0.90 for necessary conditions (Ragin, 2008). Case distribution was not random, as the χ^2 value was 58.67 (d.f.=4), and the significance level was less than 0.001 (Ragin, 2014). The analysis identified two solutions (i.e., the equifinal configurations S1 and S2) associated with the examined outcome (business model fit). In particular, Table 5 adopts Ragin and Fiss's (2008) notation system, with each column representing condition configurations linked to the respective outcome. More specifically, full circles indicate a condition's presence, whereas hyphens indicate the condition's absence.

TABLE 5 here.

In Table 5, all of the solutions' consistency values are more than 0.90 (S1=0.92 and S2=0.91), indicating that all configurations share the same outcome (Ragin, 2008; Fiss, 2009).

Solution 1 (S1, unique coverage 0.09) indicates that firms with high business model fit are engaged in organizational fields with architecture characterized by a high degree of actor engagement and interorganizational integration. Solution 2 (S2, unique coverage 0.04) indicates that firms with high business model fit are engaged in organizational fields with architecture characterized by a high degree of actor engagement and conflict management capabilities.

These two solutions can be synthesized as follows: C1* (C2+C3), which means that C1 (participatory architecture) is a necessary but not sufficient condition (Fiss, 2011), to which at least

one of the other two conditions—C2 and C3 (organizational integration and opportunism control & resolution mechanisms)—must be added.

The solution's sufficient combination coverage is 0.87 (Table 4), which means that the attribute configuration captured 87% of the set membership in compensation-level outcomes (Greckhamer, 2011).

This analysis shows that the same solutions (Solutions 1 and 2) emerge as complex, parsimonious and intermediate solutions (Ragin & Sean, 2014). This means that this study's proposed model is highly consistent and that the corresponding configurations are likely to strongly influence the outcome (Greckhamer, 2011). The authors also conducted an fsQCA analysis with outcome negation (~Firm resilience as an outcome, with the same input conditions). Thanks to this analysis, it was possible to verify that no necessary conditions are significant when negating the outcome, and only one solution is sufficient: ~OUT = ~C1*~C2 (Solution coverage, raw coverage, and unique coverage are 0.44, and solution consistency and consistency are 0.81). This further confirms the results.

4.2. Discussion: Fields' commons-enabling architectures

Both solutions (Table 5) include only firms that rank high in participatory architecture, thus confirming the claim that a highly participatory architecture is a necessary condition for enhancing firm resilience through the development and protection of network commons.

In order to assess whether the results also confirm the effectiveness of Configuration B (see table 1), the authors checked whether the successful firms ranking high in actor engagement and interorganizational integration, but ranking medium/low in mechanisms for opportunism control and resolution (21% of those ranking high in resilience measured through business model fit after a crisis), actually relied on business network commons that were not significantly vulnerable to misappropriation, consistent with the boundary condition of Configuration B (Table 1). To accomplish this, the authors compared these respondents' open answers to the network purpose and

resources question included in the questionnaire. In addition, when necessary, the authors conducted follow-up phone interviews and checked the contents of the business network contracts. The results indicate that these firms constitute a very homogenous group for networking purposes, with 91% of these firms as small/medium enterprises belonging to business networks aimed primarily at building a "critical mass" for commercial purposes. The critical mass—i.e., the dimension-based market credibility of the network organization—certainly needs effective interorganizational integration, but this is not a depletable resource; therefore, this network commons type is not significantly vulnerable to misappropriation. These results confirm that Configuration B, within its boundary condition, is effective.

The authors leveraged a similar procedure to check whether the 9% successful firms ranking high in participatory architecture and mechanisms for opportunism control and resolution, but ranking medium/low in organizational integration, actually relied on business network commons that are not significantly vulnerable to interorganizational structured coordination. The results indicate that these firms also constitute a very homogenous group for networking purposes, with 82% of these firms as small/medium enterprises belonging to business networks aimed primarily at new product development, typically by co-funding an outsourced R&D initiative. This approach does not require the partnering firms' coordination or process integration, whilst the risks of opportunistic behavior (misappropriation of the common good) or conflicts about cost and revenue distribution are high. These results confirm that Configuration C (Table 1), within its boundary condition, is effective. Finally, since 70% of successful firms rank high in all three organizational variables, the study's results also strongly confirm the effectiveness of Configuration A (Table 1).

Conversely, the fs/QCA solutions do not include Configuration D (Table 1). This could be due to the nature of the sample, made up of firms that signed a formal business network agreement. According to our interviews, if the business network (expected) commons are not significantly vulnerable to both opportunism and disorganization (as stated in the boundary condition for success in Configuration D), it is unlikely that the partnering firms will sign a business network contract. In

other words, Configuration D's boundary condition for success is not sufficiently represented in this study's sample. Therefore, we can conclude that this specific study's results tell us little about the effectiveness of Configuration D.

5. Limitations and conclusion

This study investigates an issue that has been quite overlooked by organization and management theory so far, that is, the role of business network commons in field-level dynamics and firm resilience. Given its exploratory nature, this study has limitations, which constitute many opportunities for further research.

First, similar configurational analyses in different national contexts and for different network types would enhance the generalizability of this study's outcomes. In particular, studies on informal networks (such as communities of practice) are needed in order to test the effectiveness of Configuration D (see Table 1).

Second, a systematic model to identify and classify the main types of business network commons and their specific fragilities would be extremely useful in creating the conditions for incremental knowledge accumulation in this novel research stream. In particular, such efforts could improve scholarly understanding about boundary conditions for the effective protection and development of business network commons through different organizational configurations at the network field level.

Third, more in-depth studies on the organizational variables influencing business network commons would be needed. The scales of participatory architecture, organizational integration, and mechanisms for opportunism prevention and resolution (Table 2) could be extended and/or improved, and new relevant variables could also be discovered.

The authors hope that this study's proposed conceptual tools will encourage research on new commons-enabling organizational, management, and monitoring solutions for pursuing multilevel resilience in today's complex business scenario.

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FIGURES AND TABLES

Table 1 – Research Model: Configurations of business networks' organizational fields enabling firm success (in terms of resilience, measured through business model fit after a crisis) through the development and protection of business network commons.

Type	Configuration of the business network organizational field	Boundary conditions for success
A	High Participatory Architecture High Network-level Organizational Integration High Presence of Mechanisms for Opportunism Prevention & Resolution	---
B	High Participatory Architecture High Network-level Organizational Integration Low Presence of Mechanisms for Opportunism Prevention & Resolution	The over-depletion or misappropriation of the network commons at stake is not easy for network members and/or it provides less attractive payoff than remaining a legitimated network member
C	High Participatory Architecture Low Network-level Organizational Integration High Presence of Mechanisms for Opportunism Prevention & Resolution	The protection and development of the network commons at stake does not require significant levels of coordinated action between network members
D	High Participatory Architecture Low Network-level Organizational Integration Low Presence of Mechanisms for Opportunism Prevention & Resolution	The over-depletion or misappropriation of the commons at stake is not easy or is much less attractive than remaining a legitimated network member, AND the protection and development of the commons at stake does not require significant levels of coordinated action between network members

Table 2 – Questionnaire items

Variable	Items
Participatory architecture	1. Clear and effective procedures for changing network arrangements are available. 2. Clear and effective procedures for entering/exiting the network are available. 3. In this network, people share common values. 4. The partnering firms are satisfied with this network's decision processes. 5. Communication within this network is effective. 6. People interacting in this network trust each other.
Network-level organizational integration)	1. Our network arrangements clearly establish each partnering firm's expected contribution. 2. In our network, there is a recognized leading person/group that is in charge of providing vision and coordination. 3. Our network's activities are based on a network-level business plan. 4. Our network enables interorganizational sharing of human resources and/or other important resources (e.g., software, facilities).
Presence of mechanisms for opportunism prevention and resolution	1. Our network arrangements establish clear and easily applicable sanctions for partnering firms' unfair behaviors. 2. Our network arrangements provide effective mechanisms for managing and controlling threatening conflicts.
Firm resilience (measured through business model fit after a severe crisis)	1. In the last year, our firm has been highly credible in our reference markets. 2. In the last year, our firm has proposed products/services for which there is a high demand. 3. In the last year, our firm has reached profitable customers thanks to effective channels.

Table 3 – Factor analysis (Hair, Black, Babin, Anderson, & Tatham, 2010)

CMIN/DF	CFI	NFI	RMSEA	Pclose	Sign. (ρ)
2.06	0.94	0.92	0.061	0.009	0.000
Note: CFA fitting model values					
Factor	**AVE**	**CR**	**MSV**		
Participatory Architecture	0.51	0.83	0.50		
Organizational Integration	0.53	0.72	0.49		
Opportunism Resolution	0.52	0.79	0.51		
Notes: CR>0.7; AVE>0.5; AVE>MSV					

Table 4 – Correlation matrix

		Cond.1	Cond.2	Cond.3	Outcome
Condition 1 Actors' engag.	Pearson Correlation	1			
	Sig. (2-tailed)				
Condition 2 Inter-org. integr.	Pearson Correlation	**0.316****	1		
	Sig. (2-tailed)	0.000			
Condition 3 Conflict mgmt.	Pearson Correlation	**0.234****	**0.286****	1	
	Sig. (2-tailed)	0.000	0.000		
Outcome Var.: Firm resilience	Pearson Correlation	**0.194****	**0.204****	**0.119***	1
	Sig. (2-tailed)	0.000	0.002	0.046	

N=202 ** Correlation significant at the 0.01 level (2-tailed). *Correlation significant at the 0.05 level (2-tailed).

Table 5 – FsQCA Solutions

	S1	S2
Condition 1: Actors' engagement	•	•
Condition 2: Inter-org. integration	•	–
Condition 3: Conflict management	–	•
Consistency	*0.92*	*0.91*
Raw coverage	*0.82*	*0.78*
Unique coverage	*0.09*	*0.04*
Solution consistency	*0.91*	
Solution coverage	*0.87*	
Frequency cutoff: 7.000000. Consistency cutoff: 0.916.		