

Social innovation, social bricolage, and brokerage after a disaster in Córrego d’Antas

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We studied how a Brazilian community responded to a disaster using social innovations (SI) developed based on social bricolage and brokerage with stakeholders. The paper seeks to explain these processes and their interrelation. The methodological approach was primarily inductive, using semi-structured and open-ended interviews, document analysis, and the residential experience of the senior author before, during, and after the disaster. Our results suggest that the disaster upset the social balance of the community in several ways and triggered waves of subsequent SI related to social bricolage and brokerage that faded somewhat over time. Originality and value of the paper derive both from the unique and neglected context of post-disaster recuperation in a developing country and from the application of advances in the conceptualization of brokerage and its relation to social bricolage and SI.

Keywords: social innovation; social bricolage; brokerage; stakeholders.

Inovação e bricolagem sociais com intermediação após um desastre em Córrego d’Antas

Estudamos como uma comunidade brasileira respondeu a um desastre com várias inovações sociais (IS) propiciadas por bricolagem social e intermediação com *stakeholders*. O artigo busca explicar tais processos e sua inter-relação. A abordagem metodológica foi majoritariamente indutiva, utilizando entrevistas abertas e semiestruturadas e análise documental, além da experiência do autor principal, que residiu na localidade antes, durante e após o desastre. Nossos resultados sugerem que este abalou o equilíbrio social da comunidade de diversas maneiras e desencadeou ondas subsequentes de IS ligadas a bricolagem social e intermediação, as quais se amenizaram parcialmente ao longo do tempo. A originalidade e o valor do artigo derivam do contexto único e negligenciado de recuperação pós-desastre em um país emergente e da aplicação de avanços na conceitualização da intermediação e de sua relação com a bricolagem social e a IS.

Palavras-chave: inovação social; bricolagem social; intermediação; *stakeholders*.

Innovación y bricolaje sociales con intermediación después de un desastre en Córrego d’Antas


Estudamos cómo una comunidad brasileña respondió a un desastre con varias innovaciones sociales (IS) propiciadas por el bricolaje social y la intermediación con *stakeholders*. El artículo busca explicar tales procesos y su interrelación. El enfoque metodológico fue principalmente inductivo, utilizando entrevistas abiertas y semiestruturadas y análisis documental, además de la experiencia del autor principal que residió en la localidad antes, durante y después del desastre. Nuestros resultados sugieren que dicho acontecimiento afectó el equilibrio social de la comunidad de diversas maneras y desencadenó oleadas subsiguientes de IS relacionadas con el bricolaje social y la intermediación que se atenuaron parcialmente con el tiempo. La originalidad y el valor del artículo derivan del contexto único y de abandono de recuperación posdesastre en un país emergente y de la aplicación de avances en la conceptualización de la intermediación y de su relación con el bricolaje social y la IS.

Palabras clave: innovación social; bricolaje social; intermediación; *stakeholders*.

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1. INTRODUCTION

Social innovations (SI) are collective initiatives that address social needs, improve human relationships or improve people's quality of life (Ettorre, Bellantuono, Scozzi & Pontrandolfo, 2014). Although they have existed since the beginning of humanity, the formal study of SI is relatively recent and tends to emerge from the fields of urban studies, community development and social entrepreneurship (Garcia & Haddock, 2016; Moulaert, 2010; Moulaert, MacCallum, Mehmood & Hamdouch, 2013; Phillips, Lee, James, Ghobadian & O'Regan, 2015; Rodriguez, 2009).

Like all types of innovation, social innovations involve a lot of trial and error, and most fail or generate modest results (Hargadon, 2003). Thus, it would not be expected that a time of crisis or disaster would be conducive to SI. However, many SIs arise in times of disaster (Kendra & Wachtendorf, 2007), when both the state and market forces are in check (Hayward, Morris, Ramos & Díaz, 2019) and during crises (Bessant, Rush & Trifilova, 2012). It is practically and conceptually important, therefore, to know more about the dynamics of the occurrence of SI in adverse conditions.

This paper reports the emergence and evolution of SIs after a natural disaster in the Brazilian community of Córrego d'Antas in the city of Nova Friburgo, Rio de Janeiro state. As far as we know, it is the first formal field study about SI after a natural disaster. It was possible because of the casual presence of the senior author in that community before, during, and after the 2011 disaster. Because it is an original study, it is an inductive research that adopts contributions from grounded theory without positivistic ambitions or priori hypotheses (Glaser & Strauss, 1967).

Despite the inductive nature of the research, we note that our field observations are aligned with former studies about different aspects of social bricolage (Di Domenico, Haugh & Tracey, 2010) and brokerage (Obstfeld, Borgatti & Davis, 2014). These are two constructs that have not yet been considered together or associated with SI. This juxtaposition permits us to expand and deepen our understanding of SI as a phenomenon associated with a specific context. Therefore, our research question was: *What are the dynamics of SI, social bricolage, and brokerage that occur in the response of a community to a natural disaster across time?*

Our principal contribution is related to the observation that the incidence of social bricolage and different types of brokerage covaries, is associated with different types of SI, and obeys a temporal logic during the response to a natural disaster. This contribution is part of the flow of publications on social initiatives and entrepreneurship against crises we initiated in our previous work (Nelson & Lima, 2020).

2. THEORETICAL FRAMEWORK

2.1 Social innovation

SI has been increasingly researched in a variety of contexts including community development and urban studies (Garcia & Haddock, 2016; Moulaert, 2010). Although the definition of a SI is still debated, most literature includes the idea of a new contribution to social improvement involving either a better response to a social need or some means of improving social relations (Phills, 2008). Because of the paucity of research on post-disaster SIs, we prefer to keep the threshold of novelty for

a SI low. The definition adopted here integrates the main points of many relevant definitions: “*any new object or process able to address a social need which changes the socio-economic structure and/or improve the people’s quality of life*” (Ettorre et al., 2014, p. 139). Hence, SIs need to be different from former local practice but they need not be revolutionary (Moulaert et al., 2013).

We choose this inclusive definition because of our focus on a local setting in the third world where even simple initiatives can face challenges and effect important enhancements to the quality of life. An inclusive definition also seems attractive because of growing recognition of the importance of simple initiatives created by individuals in the process of meeting emergent challenges – see recent work on “everyday entrepreneurship” (Welter et al., 2017).

Beyond the inclusive definition of SI, there are commonalities across much of the SI literature that are relevant to understand the data from our research field. Many of these can be summarized under three themes: satisfaction of needs, reconfiguration of social relations, and empowerment or mobilization (Mehmood & Parra, 2013; Moulaert et al., 2005). Each theme has been the subject of detailed exegesis and debate but the essence of each can be expressed simply. SIs address a range of human necessities that go beyond mere survival. Identity, community, personal development, expression and growth are sought for them as legitimate requirements for human dignity but also as means for the sustainability and health of social initiatives. Similarly, it is argued that successful SIs involve positive change in patterns of interaction be they interpersonal, intergroup, institutional, or among those levels.

These changes often involve linkages across “different spatial scales” meaning that actors in a locality become connected to agencies or entities which are oriented to regional, national or global concerns (Moulaert & Mehmood, 2011; Van Dyck & Van den Broeck, 2013). Finally, SIs are expected to generate empowerment and/or mobilization. The process of developing and implementing the innovation or the nature of the innovation itself will often provoke a redistribution of power, empower excluded groups, and/or facilitate collective action. Frequently SI initiatives with modest goals contribute to larger scale change involving greater social equity (Moulaert & Mehmood, 2011). For this reason, some observe that SIs tend to involve “micro level” initiatives that generate “macro level change.” One might expect that these criteria are a rather tall order for people attempting to survive after food, shelter, and water have disappeared suddenly, but this may not entirely be the case. On the contrary, we observed that the traumatic and disorienting effects of the Córrego d'Antas (hereafter CA) disaster led to new socially innovative initiatives. Frequently, they were facilitated by brokerage carried out by the leaders of the initiatives (local emergent and formal leaders) in order to develop interpersonal, intergroup, and interinstitutional or multilevel collaboration while connecting varied local and external stakeholders as we discuss later.

In this paper we classify as a SI any element that meets our more inclusive definition. However, we are very aware that the individual innovations we observed were but a part of a larger transformation process of SI that involved interrelated themes of need satisfaction, reconfiguration of relations, and empowerment.

2.2 A process view of disasters and SI

As mentioned, the relative youth of SI research, combined with the lack of empirical studies on post-disaster SI, requires inductive and exploratory approach. However, there is a long tradition of research on related topics, which is diverse, but pertinent, offering initial reflections and promising directions.

We realize, above all, that such a tradition uses a process, or at least temporal, approach to crises, disasters and the like. The literature considers clear phases of disaster response (Contreras, 2016; Haas, Kates & Bowden, 1977). The literature on organizational resilience also identifies a temporal sequence of phases that accompanies the response to environmental shocks of various types (see, for example, Williams & Shepherd, 2016). Entrepreneurship publications also have strong process components (Moroz & Hindle, 2012), as well as literature on institutionalization, institutional change and desinstitutionalization (Dacin, Goodstein & Scott, 2002; Lawrence et al., 2001).

The literature also notes that different relational and organizational mechanisms are associated with different types of innovation. After Burns and Stalker (1961), the notion that innovations are favored by certain organizational types has become axiomatic. More recent dynamic perspectives, such as structuralism (Giddens, 1984) and practice theories (Bourdieu, 1977), observe recursive interactions between structure, agents and innovations (Barley & Tolbert, 1997). In addition, the literature on social entrepreneurship identifies interactions between entrepreneurship styles and types of innovation (Zahra, Gedajlovic, Neubaum & Shulman, 2009). In addition, the sensemaking literature (Weick, 1993, 1995), which supports many analyses of response to crises, also adopts a temporal perspective. We can therefore expect that, in responding to a disaster, patterns of interaction and institutionalization will covary with the generation of SI over time.

2.3 Bricolage, brokerage, and social innovation: Possible connections

The general ideas in the previous section were useful because they support our initial interpretations of the response of the community to the 2011 disaster. However, as our research matured, we observed that many of our field observations and the SI literature made more sense when supported by the concepts of social bricolage and brokerage. These are two concepts yet separated from the study of SI. For example, after a natural disaster, SI frequently faces the crisis by offering heroic solutions. This was the case after several disasters in Japan, including typhoons, earthquakes, and tsunamis (Lai, 2019). One of the characteristics of SIs in response to crises of this type, as can be seen in Lai's (2019) references to voluntary activism combined with roles of different actors, is to occur with the collaboration of diverse stakeholders and also to promote such collaboration. Considered in this light, SIs are similar to the notion of open SIs (Chesbrough & DiMinin, 2014) and converges with social bricolage, which includes the participation of stakeholders as one of its central elements (Di Domenico et al., 2010).

The report of Bessant et al. (2012) about different SIs that emerge in crises stresses the scarcity of resources and crises as stimulating SIs. They also stimulate bricolage, that is, "making something from nothing" (Baker & Nelson, 2005). It is a behavior that overcomes limitations which is common in

socially oriented activities as Janssen, Fayolle and Wuillaume (2018) observe, referring to the relevant role of bricolage in social entrepreneurship. Studies of bricolage identify several strategies to overcome scarcity by exploiting resources at hand (Baker & Nelson, 2005; Di Domenico et al., 2010; Janssen et al., 2018). Precisely the six elements that make up social bricolage make it useful and common in social activities which are made difficult by institutional and resource limitations: social value creation, rejection of limitations, make do with what is at hand, improvisation, stakeholder participation, and persuasion (Di Domenico et al., 2010).

The response to a disaster is influenced by numerous frequently disconnected stakeholders acting in (and/or influencing the) community context (Chamlee-Wright & Storr, 2010; Quarantelli & Dynes, 1985). Stakeholders are any groups or persons that can influence the realization of the purpose of a focal organization or who are affected by this realization (Freeman, 1984). The focal organization considered in this article is the neighborhood association of CA, a small social organization of limited resources, even without a crisis. We included as part of the organization, the actions of emergent leaders that carried out the roles of formal directors managing the responses of the community to the disaster. During the first 17 days after the disaster, the organization became disarticulated due to the psychological and material effects of the disaster on the directors, who abandoned their roles. The emergent leaders also took on the role of brokers. This role slowly went back to being institutional although the performance was primarily by these leaders. They were received, by the former directors, as *de facto* directors of the association during the crisis and, in May of 2011, they were elected as new formal directors. Connecting in a coordinated fashion the local and external stakeholders to the community (e.g. emergent leaders, formal directors, residents, local business owners, authorities, municipal and state politicians, utilities, public agencies, and reconstruction contractors) and imply them is a typical brokerage role carried out by community organizations. These organizations seek the welfare of the community, including by the brokerage of relations between, on the one hand, local actors, and on the other hand, between these and other stakeholders, especially the state (Chaskin, 2003). These specifications, although they advance data analysis, are necessary to identify the focal organization and the stakeholders to consider in this article, also as the parts whose relations are seen as facilitated by the brokerage in the reality studied. They also identify the emerging leaders as the principal organizers of the social bricolage and SI initiatives.

Habitually SIs are not only targets of collaboration and other influences from multiple stakeholders, but also are challenged by conflicting interests, indifference, resistance, or opposition from stakeholders, especially from noncollaborators. This view is confirmed by the description of the open SI process (Chesbrough & DiMinin, 2014) of which we may infer the importance of understanding brokerage for stakeholder collaboration. The study of SI supported by brokerage and stakeholders facing urgency, scarcity and state and private initiative incapacity is relevant for theory and practice. Such observations led us to reexamine our field data in the light of the constructs of social bricolage, especially the participation of stakeholders as well as brokerage. We will now offer a short explanation of the two constructs.

2.4 Social bricolage elements and the context of a disaster

Social bricolage is an emergent perspective that reflects a broad tendency identified by Simon (1955) to admit and explore the limitations of human rationality. Bricolage is a concept from anthropology (Lévi-Strauss, 1962) which has influenced the institutionalism and sensemaking perspectives, among others. Bricolage is associated with a mental framework that is quite different from modern thought which is dominated by disembodied abstractions used by people to solve problems (Lévi-Strauss, 1962). Bricolage involves the recombination of items and concrete stimuli from the immediate environment without the use of formal abstractions.

A disaster is an event limited in space and time imposing severe danger, physical damage, and disruption of the routine functioning of society or a part thereof (Fritz, 1961). Disasters are similar to accidents and crises in the generation of disruptions, but vary in their causes, origin, predictability, and responses (Shrivastava, Mitroff, Miller & Miglani, 1988). Given the ambiguity and duress that typifies disaster and also other contexts of SI, it is not surprising that our field research identified elements of social bricolage in CA. Space here will not permit a detailed explanation of convergence and divergence of our field study with the literature. However, for our purposes, we identified relevant contributions from the concept of social bricolage (Di Domenico et al., 2010), especially the participation of stakeholders, to interpret field data. As we mentioned above, this element attributes characteristics of open innovation to SI (Chesbrough & DiMinin, 2014). And it is consistent with the five other elements to configure the process of social bricolage. Di Domenico et al. (2010) induced six elements of social bricolage by studying several British social enterprises (which sought to create social value within the context of scarce resources, frequent voluntary labor, and diverse stakeholders), supporting their research in Lévi-Strauss (1962) and Baker e Nelson (2005). The six components which receive attention in our field study are explained in Box 1. Di Domenico et al. (2010) borrow the first two elements from Baker e Nelson (2005). They define the concept of “making do” as using resources at hand for new purposes, which is common in most work on bricolage. However, they do not stress the idea that “making do” involves searching for solutions that are viable but not optimal as described in the literature on entrepreneurial bricolage (Baker & Nelson, 2005), sensemaking (Weick, 1995), and institutionalism (Rao, Monin & Durand, 2005). But we believe that this idea is not inconsistent with their approach. Their idea of “refusal to accept limitations” is very close to the concept popularized by Baker and Nelson (2005), apparently with a greater emphasis on the refusal to be constrained by a wide variety of challenges, be they logistical, institutional, or political. Improvisation – the fusion of design and execution (Baker, Miner & Eesley, 2003) – is not necessary for making do or refusing to accept limitations, but is often used when both processes happen.

BOX 1 **DETAILS ABOUT SOCIAL BRICOLAGE**

Social bricolage components	Explanation
Making do for a social end (with limited resources available)	<ul style="list-style-type: none"> • Combination of resources. • Creating something from nothing. • Using discarded, disused or unwanted resources for new purposes. • Using hidden or untapped local resources that others fail to recognize, value or use adequately.
Refusal to accept limitations (imposed by environmental constraints in pursuit of a social goal)	<ul style="list-style-type: none"> • Trying out solutions as tactical responses to pervading institutional structures/ rules. • Subverting the limitations particularly in their ability to create social value.
Improvisation	<ul style="list-style-type: none"> • Joining design and execution in creative solutions through “best fit” approaches within the constraints of the limited resources available. • Using trial and error to solve problems.
Social value creation	<ul style="list-style-type: none"> • Creating offers, goods, services and/or activities socially benefiting people and/or communities. • Generating employment, skills development, training and development, social capital, and community cohesion.
Stakeholder involvement	<ul style="list-style-type: none"> • Active involvement of stakeholders in decision making, board membership, strategy determination and implementation, governance and/or consultation/counseling processes.
Persuasion (of other significant actors to leverage acquisition of new resources and/or support)	<ul style="list-style-type: none"> • Convincing others to support objective/mission fulfillment for social value creation. • Obtaining stakeholder collaboration. • Intentionally influencing key actors in a desired direction.

Source: Based on Di Domenico et al. (2010).

The other three elements – social value creation, stakeholder involvement, and persuasion – are quite distinct from the way the construct is conceptualized elsewhere and closer to the SI literature. There is nothing inherent in Lévi-Strauss’s (1962) original formulations, nor in subsequent work that requires that bricolage generate social value. Neither does the concept inherently include stakeholder involvement or persuasion. As such, these elements seem more related to the “social” component in social bricolage than the “bricolage” component. In any case, the formulations are seen to be consistent with central elements of the SI literature identified above.

Besides creating social value and delivering services to communities, social initiatives increases social capital and community cohesion through stakeholder involvement even in governance structures and procedures (Di Domenico et al., 2010). In this way, such initiatives (e.g. community efforts against the effects of the disaster) assure accountability and social embeddedness (Pearce, 2003). They also assure a broad collaboration to face challenges with multi-agent SIs (Windrum, Schartinger, Rubalcaba, Gallouj & Toivonen, 2016) in the community it serves. Complementarily,

persuasion (using argumentative conversations, implication of network contacts, pressure, diplomacy, advocacy, and/or legal means, among others) influences stakeholders' thinking and agendas. This produces convergence of interests, more legitimacy and more useful resources – favoring stakeholder involvement for SI (Di Domenico et al., 2010; Ruebottom, 2013).

2.5 Brokerage and stakeholders in interrelations between spatial scales

Another construct which proved useful, according to our data, is brokerage. Like bricolage, brokerage is a broad concept which has been used across the behavioral sciences. However, space will not permit more than a brief description about this concept. Again it is a central concept to describe the reality we studied. We also found that it is closely related to the theme of stakeholder participation and reformulation of social relations which is foundational in much SI research. Supported by a long tradition of social network research in sociology and anthropology, SI researchers are attentive to the configuration of social capital in SI situations, normally focusing on contact and function ties, useful for different purposes in communities and institutions (Coleman, 1988; Granovetter, 1983; Tello-Rozas, 2016).

Brokerage is a sub-theme highlighted in the research on social networks, but it seems not to have been explored in the research on SI, perhaps due to the assumption that it exists basically to generate benefits, above all, for the intermediary, who acts between the otherwise unconnected parties. This has led to a rather restrictive definition of brokerage as bridging people in a network's structural hole (e.g. Burt, 2005). Burt's definition of brokerage insists on connections between two actors which would not occur but for the contact with a third party, the broker. More recent work has challenged this conceptualization in favor of a more inclusive perspective that is closer to the original anthropological and sociological roots on the concept. Obstfeld et al. (2014) argue that a number of important mediating behaviors can occur when the intermediary is not the only connection between two actors and when transaction is not the only object of the relation. They thus advance a more inclusive definition of brokerage as "behavior by which an actor influences, manages or facilitates interactions between others" (p. 141). This definition is seen to be more closely aligned with research interests around SI in processes and interactions, facilitating social ends and including the administration of SI and its aspects related to the participation of stakeholders.

We favor this definition here, particularly because it accommodates more types of brokerage including representation (Lavalle & Bülow, 2015), advocacy (a common mission of neighborhood associations – e.g. Chaskin, 2003; Scheller & Yerena, 2018) as well as catalyst and middleman brokerage (Stovel, Golub & Milgrom, 2011). All of these were shown to be important in CA. Representation involves acting in the name of a person or entity when dealing with third parties (Lavalle & Bülow, 2015). Advocacy involves actively defending opinions and/or interests of one of the parties to make them prevail over others. For this reason, it involves a component of persuasion, indicating a mixture of concepts of brokerage and social bricolage. Catalyst brokerage puts previous unconnected others into contact or even into collaboration; and middleman brokerage facilitates relations and exchanges rather than generating new relationships (Stovel et al., 2011).

2.6 Brokerage promoting SI

Brokerage can be carried out when entertaining or initiating relationships with different parties and, based on their own connections, others are promoted, in addition to exchanges of information and/or dynamics involving the parties. Network bricolage initiatives may be more feasible using brokerage, especially when entrepreneurs are looking for resources to overcome limitations and explore new opportunities (Baker et al., 2003). However, entrepreneurs are usually from the same group and the same activity sector – from the same network. When an entrepreneur participates in heterogeneous events relating to different people, he can become a link between them (Stam, 2010). Such a position can contribute resources and capacities, such as the collaboration of stakeholders to explore social opportunities and create social value.

The SI and its administration can be improved by the benefits of participating in different networks. If entrepreneurs can carry out more SI initiatives by taking advantage of their different types of relationships, it seems attractive to improve their venture by exploring these relationships as a source of new ideas, inspirations and opportunities for SIs. Precisely, the literature shows the intermediary as a privileged actor in terms of different capitals (social, cultural and informational, among others) for nurturing relationships that capture these capitals from different parts and contexts (Burt, 1992; Soda et al., 2018). There is a tendency, therefore, for such relationships to bring more powerful resources as entrepreneurs are structurally interwoven in a wide network and operating in different locations (Smith & Stevens, 2010). Different types of stakeholders in collaboration can also increase the potential of SI (Chesbrough & DiMinin, 2014). By combining information, knowledge and skills from different people and organizations from various sectors, there are more opportunities to pursue social purposes, especially those related to SI (Phillips et al., 2015). In addition, we have to recognize that the creation of SI by multiple agents is usually driven by social organizations representing the interests of citizens (Windrum et al., 2016), as seen in CA. Thinking about stakeholders, all actors with some influence and/or interests are considered, which indicates a large network of people and relationships influencing the IS.

Typical open innovation initiatives, such as the participation of various stakeholders in the SI, appear to be promising particularly in a context of crisis in which creative and rapid articulations are needed in the face of resource poverty and numerous vital needs. The combination of different knowledge and skills from different contexts, networks and actors is important to understand social needs, seeking to propose SI solutions. The scope and effectiveness of SI seem to depend not only on the results of social initiatives, but also on the result of social collaboration (Fromhold-Eisebith, 2004). Thus, the perspective of open SI is highlighted, in particular regarding the potential contributions of collaborators outside the system in which the innovation is generated (Chesbrough & DiMinin, 2014). Brokerage proves to be central, therefore, as an enabler or facilitator of innovation connecting partners for innovation.

3. METHODS

This type of study under extraordinary conditions is difficult because extraordinary events are difficult to predict and accompany. We took advantage of the fact that the first author was present in the community during most of the studied occurrences. He is originally from the region and, at the time of the disaster, he had already accumulated ten years of work in his family's small local business. While this reduced his objectivity for field research, it offered an unorthodox but useful perspective. We believe that the resulting deep and wide access to data in such rare events more than outweighs any limitations. Other possible methodological disadvantages of this condition of insider were compensated by the second author, a foreigner, with greater analytical distance. The authors' partnership helped to make better use of their respective insider and outsider conditions (Adler & Adler, 1987) and to mitigate the contrasting challenges of marginality and immersion in research (Dwyer & Buckle, 2009).

We carried out 18 semi-structured and open-ended interviews with officials and residents during 90 minutes on average. Transcriptions totaled 290 pages, including data from the president and secretary in office at the time of the tragedy and five members of the reconstruction commission who were elected as directors afterwards, in May 2011. A dissertation on residents' participation in recovery (Correa, 2015) reinforced data validation. Box 2 describes the data sources used.

BOX 2 DATA SOURCES

Type	Quantity	Details
Interviews with important actors	18	Interviewees were identified in a snowball process. Criteria included influence on the phenomena under investigation or important actors in the community and/or association history and being well informed about the phenomena through personal experience. Each informant received a short description of the research and its objectives including publications and a guarantee to indemnify informants. All interviewees signed an authorization to accept participation and divulge their names in subsequent publications. Contents were analyzed in detail with the Atlas-ti software.
Association's website and Facebook page – texts and photos	1 of each	These public data were used to detail, validate, triangulate and organize the data collected from the other sources in the timeline, serving also to vividly illustrate facts as needed. These sources were particularly useful to identify challenges faced by the community/association, as well as announced SIs and successes. Contents were read, without deep analysis, and the most relevant were registered for inclusion in results development.
Reconstruction commission's e-mails	Many, exchanged during five years	Access to all the association's e-mails was granted to the authors specifically for research, but the senior author had already received copies of many of them in the context of his previous collaboration. This source was useful to understand the "back stage" activities, the development of initiatives, disputes and challenges the community faced over time. Contents mined using keywords were attentively read for consideration.

Continue

Type	Quantity	Details
Meeting minutes	140 before and 32 after the disaster	Essentially, minutes studied are those after the disaster. Those before it were roughly considered to complement interviews in synthetically characterizing the association's activities, experience and institutional conditions as a basis for post-disaster recuperation efforts. Although very synthetic, post-disaster minutes were analyzed with Atlas-ti identifying critical subjects and decisions made to validate and complement interviews.
Bylaws	3 versions (approved in 1984, 2006, and 2017)	Bylaws and minutes describe the (legal) formalities and the bureaucratic norms governing the association and its activities. Bylaws indicate how it can legally operate, with which governance structure, and official objectives. The three versions reflect an organizational evolution permitting more entrepreneurial initiatives. The bylaws were studied as a record of the institutional context for the association's activities.
Informal participant observations	Several visits to the community	Periodic visits posed and validated new theoretical concepts and observations with major informants confirmed facts in doubt and followed up on new analytical possibilities.

Source: Elaborated by the authors.

Consistent with our process focus described in the theoretical framework, data analysis was organized in temporal waves. Each wave began with a determining event for SI generation, respectively the disaster itself, the first post-disaster community meeting, and the election of emerging leaders. Our analysis employed coding supported by the Atlas-ti software, a useful tool to decorticate, classify and retrace data segments (Friese, 2014). Initially, the transcribed interviews and the documents were analyzed with a preliminary code list composed of concepts about social bricolage (Box 1) and characterizations of SI, according to the current definition of this concept (Ettorre et al., 2014). Adding open codes (Strauss & Corbin, 1998), which emerged inductively, we detailed knowledge about aspects of brokerage mentioned in the theoretical foundation (representation, advocacy, etc.). The following data and analysis sections use bold text in to highlight content linked to the codes.

3.1 The case

In 1984, the neighborhood of CA founded a neighborhood association to defend the interests of the community (advocacy) and realize social, cultural, and recreative activities. A bylaw reformulation in 2006 included **representative activities** which were always carried out in fact. The association operated with varying degrees of **public participation** and intensity in its activities across the years until the predawn hours of January 12, 2011. Heavy tropical rains caused severe mudslides and flooding destroying thousands of properties and killing or injuring thousands in the hilling region of the state of Rio de Janeiro. The neighborhood was one of the most affected in the region (Retrieved from <https://corregodantas.wordpress.com/fotos/sobre/>).

Public services ceased outright as did street availability and the most basic economic exchanges. The first reactions to the disaster in CA were desperate initiatives that gradually evolved into innovative behaviors, most of which could be called SIs according to our inclusive definition. Few or none of these activities were foreseen in the association's bylaws. The association orchestrated, with emerging leaders, the community's response to the crisis after the first chaotic days. It is a voluntary, non-profit organization. It promotes the empowerment of citizens and the **intermediation** of the community and its members with other stakeholders, local and external. According to its bylaws, all residents or property owners in the neighborhood are members, which totaled about 4,000 people, even though only about 20 **regularly attended the association's meetings** before the disaster. Elections took place every three years for 11 positions, including presidency, vice-presidency and first and second secretariats. With few exceptions, funding was modest, coming from rare donations and community parties.

In the months after the disaster, the association's formal structure and routines were gradually re-established and provided an official forum for the community to face ongoing trials. The SIs continued from various sources loosely coordinated by the association. Many who were involved in the initial post-disaster activities became active in the organization's initiatives, galvanizing a second wave of SI, predominantly involving creative ways to provoke government agencies to comply with their legal obligations. The expertise, motivation and reputation that emerged in the second wave, in turn, produced a third wave of SI with which the association undertook broader and more ambitious initiatives aimed at the lasting well-being of the community. In this regard, the dynamics of recovery are more clearly connected to the central themes of the SI – reconfiguration of social relations, empowerment and mobilization, according to the literature. The data for the three waves are analyzed in the following sections, whose contents are summarized in Boxes 3, below, and A1 to A4, in the appendix.

3.2 First wave of SIs¹

The immediate reactions to the disaster tended toward one of two extremes. One was paralysis and shock. Many people froze up in the face of the enormity of the disaster. A smaller number engaged in frenetic **improvisation** moved by the urgent needs and dangers. Affected directly by losses, the formal leadership of the association was practically inactive during the first days after the disaster. Instead, people who were less reflective, conventional, and orderly stepped forward. Restless, active youths, a fireman, and other residents with no formal standing in the social order were more prone to come forward. These people acted vigorously and by some standards, recklessly or foolishly, to save lives and properties and to ease suffering.

Making do and **improvisation** occurred in almost all initial responses to the disaster. An infirmary, emergency meals, a bridge and stretchers were examples of **making do** and **improvisation** created partly by simultaneous design and execution (Box A1 - appendix). **Refusal to accept limitations** was equally present in the first wave, involving some violation of norms and regulations. By definition,

¹ From the morning of the disaster to the first community meeting in 01/29/2011.

social value was created by all of these initiatives. **Stakeholder participation** did not initially involve external stakeholders (Box A5). It concentrated on residents helping other residents. The most active aid providers emerged as new local leaders, also playing a role of **intermediaries** to bring the other stakeholders into collaboration. Many people were disoriented so that direct and forceful orders needed to be made; and the urgency of events did not allow elaborated dialogue. For this reason, **brokerage** was moderate and slightly articulated, applied to getting **local actors into collaboration**. Urgent actions were taken by small groups without **mediation**, support, or authorization by third parties or authorities from outside the community. After three days, there was already an intense **presence of rescuers, technicians, authorities and other external stakeholders**. They came from unaffected areas of the city and, mainly, from the state capital, with teams that even had military police temporarily acting as first aid workers and ordinary civil servants **improvised** in the suboptimal body collection and identification service. This made it difficult for families to find and bury their dead, even when they were found. **Making do with what is at hand** was the norm for **participating local and external stakeholders**.

3.3 Second wave of SIs²

A second period of SIs in the recuperation (Box A2) began in 17 days. The immediate dangers had subsided, injured people had been removed and treated. Missing residents had either been located, buried or assumed as dead. Food and supplies were being delivered again albeit precariously. Still basic services had not been reestablished; and frustration with government inaction was seething. The leaders of the association had convened a meeting of some of the more active local actors of the **improvised relief efforts** and the initiatives that depended most on **making do with what was at hand** to decide about more actions. Somehow, community members understood that this was to be an open meeting and over 150 irate people showed up. The unforeseen, apparently negative and intractable, was converted into a benefit of community mobilization, with a significant adjustment of the type of meeting by **institutional bricolage** and **improvisation**. Much of the meeting was taken up with emotional complaints of government neglect and misconduct. Gradually, tempers cooled. “We made a list of demands. We wanted to make a small reconstruction commission and it ended up with 30 members”! (Sandro – firefighter and president of the association after May 2011.)

The commission proved to be an important **governance SI**. Association officials and anyone else interested met weekly to discuss issues and act regularly through the commission to solve problems. As a **central forum for local and external stakeholders participation and involvement** (Box A5), the commission plunged the association formal and informal leaders into frequent activities of **representation and advocacy**, as Sandro explains: “The work was intense and we were in the media a lot. Public managers, third sector people and others participated in the meetings [**stakeholder participation**]. It generated a lot of movement and good results.”

² From the first community meeting, in 01/29/2011 to 04/30/2011.

Concomitantly to the attractive and non-threatening activities of this stakeholders' forum, more aggressive actions were undertaken. The association **made do with few resources** creating a website which publicized damage and recuperation efforts. In it, texts and photos were posted regarding complaints of neglect, lack of performance and bad conduct by external stakeholders, such as people, builders and authorities who should advance the reconstruction. On their own initiative, residents also made two unauthorized protests against government negligence, closing the Friburgo-Teresópolis highway. There were other **elements of social bricolage** in the second wave. Unauthorized protests constituted a **refusal of limitations**. Initiatives, such as community work parties doing what was the duty of the state, clearly went beyond the traditional limits of behavior and also constituted a provocation against the government. The demonstrations involved a degree of **improvisation**, but less than the initial frenetic rescues. Similarly there was less **making do** in the second wave although some activities employed tools and methods that were suboptimal by normal standards.

The **participation of more varied stakeholders** (many external, this time) was central to all the initiatives of the second wave. While the emergency initiatives of the first wave had the **spontaneous participation of affected parties and benefactors**, volunteering was smaller and more diverse in the second phase. Thus, **stakeholder participation** became broader, more selective and problematic. There was a clear **decline in stakeholder attention and involvement** as the sense of urgency passed. **Persuasion** became more central as the need for action was no longer as obvious and urgent and there was more time for debate and deliberation. The **engagement of external stakeholders** (such as civil servants and authorities) also made **persuasion** more central. As in the first wave, the **creation of social value** was clear in all initiatives.

From the narrative above, we can see that the elements of **social bricolage** declined in the new phase, but it is not clear what took its place. **Stakeholder engagement** declined, although a more **superficial participation by a variety of actors** remained. A broader spectrum of stakeholders emerged. Those responsible for public and private services began to **attend committee meetings**. **The press became much more present**. Provoked by the website, **several parties became involved** at least informing themselves and sending messages, going beyond just moral support and donations from less informed people. Leaders also went to government offices to **present demands from the community** and **lawyers, activists and outside volunteers became engaged**.

BOX 3 SI, BROKERAGE AND INSTITUTIONAL CONTEXT ACROSS TIME

Period	Types of SI	Brokerage	Institutional situation
Pre-disaster Before Jan 12 th 2011	Incremental copies of existing forms and practices.	Limited representation and advocacy for community using documents and some contacts pressing local government via official channels and hearings.	Institutional conformity. Residents create and operate the association according to legislation and standard bureaucratic practices. Assumption “We can’t do very much”.
First wave of SI (Immediate aftermath) Jan 12 th to Jan 29 th 2011	Improvised field solutions such as bridges, stretchers, and rescue equipment made of debris or immediately available materials. Improvised use of public and private space, Untrained volunteer labor focused on urgent needs.	The association secures official recognition and undertakes periodic lobbying principally for public improvements already foreseen in municipal budgets. Little or no brokerage occurs due to isolation of the community and immediacy of life and death risks. Neighbors and strangers spontaneously collaborate without previous intermediation (e.g. for introduction or demands) to help each other or others.	Frenetic improvisation and independent action determined mainly by imminent danger, risk perception, and self-preservation. Association officials are frozen in personal concerns, but residents engage in risky initiatives to save and sustain life. - No concern for institutional norms or practices / Use of resources at hand / Impulsive and risky action/ Minimal deliberation or sensemaking / Intense physical activity and psychological stress. Assumption “Together we can do many things”.

continue

Period	Types of SI	Brokerage	Institutional situation
Second wave of SI (Advancing social bricolage beyond improvisation)	New institutional arrangements , such as the reconstruction commission, work parties, external stakeholder participation in local meetings, representation of neighbor groups in the association's meetings. Website and e-mail profusion to pressure and mobilize.	Representation, advocacy, some connective. Due to the enormity of and distribution of disruptions, representation by neighbor groups according to streets or localities in the association's meetings. Connections with interested outsiders, and representation to state officials.	When immediate threat to life subsides, actors engaged in the initial lifesaving activities are joined by neighborhood association officials and a large number of community members highly upset with the lack of effective action by state agencies. -New leadership and diverse coalition emerge / Diverse needs voiced by diverse stakeholders / Leadership begins to modulate and channel stakeholder militancy / Selective refusal to enact limitations / Institutional innovations to facilitate interface between state representatives and residents / Use of mass communication and electronic platforms to pressure state / Selective use of physical confrontation and obstruction / Less improvisation. Assumption "We do anything together" .
Third wave of SI (Maturing institutional brokerage)	Diverse legal initiatives for quality of life – e.g. closure of an incinerator, resistance to transform the neighborhood in a park, approval of resources for construction of the cultural center. Broader social focus including medical care and cultural initiatives.	- Increasing expertise in negotiation with public sector. - Increasing political maturity and involvement of formal leadership. - Cultivation of external contacts and resources. - Broader scope of initiatives. - Increasing reliance on professionals. - Waning militancy, confrontation, and involvement by immediate community members.	The assumption becomes "We would do more with the mobilization we had before" . Multiple activities of the community center impose more personnel and coordination needs, besides financial complexity. Operation challenges, bureaucratization, and planning attain a high level in the association's services demanding professionalization of the administration. Succession become a concern for directors.

Source: Elaborated by the authors.

Persuasion also requires examination in the second wave of SI. In this phase, it became more present, but in a more diversified and nuanced way. The complaints on the website had a **persuasive intention**, but in a different way from **interactions with public officials**. The closure of the highway, even without the participation of the association's leaders, involved yet **another type of persuasion**, much like work parties and bridge reconstruction initiatives, which **embarrassed authorities in the media, forcing them to act**.

Such nuances show **social bricolage** as insufficient for a complete understanding of the association's actions and the community's SIs responding to the disaster. In search of more explanations, we find the studies of **brokerage**, which deals more completely with the ways in which **connections between different actors** are built, maintained and developed – here, the stakeholders. Reviewing the second wave of SI, we identified several types of brokerage (Box A4). The next three seem to have the greatest explanatory power.

3.3.1 Representation

In this modality, one or more actors **represent** citizens in their interests with other stakeholders (employees, authorities, entrepreneurs, etc.), which involved two dimensions. In the first, leaders had to calm the residents' spirits, using **persuasion** and **collegial interactions of these local stakeholders** to establish consensus and priorities or even channel collective aggression and discomfort toward specific actions. The second dimension was the modulation and **presentation of community interests to external stakeholders**. This **role of representation** was complex and involved paradoxes, as it brought **various stakeholders into interaction** with different and conflicting cultures and objectives, starting with the residents themselves.

3.3.1.1 Advocacy

Advocacy is simpler than **representation**, even though it involved different intensities and strategies to **persuade** stakeholders to act in line with the interests of the community. Denunciations made public and mobilization with joint efforts were strong **advocacy activities**. Another type, which we observed more widely in the third wave, involved formal legal actions, apparently milder. The types varied in terms of **persuasion, stakeholder participation** and **rejection of limitations**.

3.3.1.2 Catalyst brokerage

This was perhaps the simplest and one of the most productive types of **brokerage**. It involved merely **introducing parties** with common interests or complementary needs. Many stakeholders ended up **forging new collaborations by attending the reconstruction commission meetings**. Even visits to the website **connected parties**, in a way, also by **persuading them** to act. For example, the website, in addition to the news media, provided information to stakeholders, including locals, which encouraged them to volunteer.

3.4 Third wave of SI³

At the beginning of the third wave (Box A3), confrontations and negotiations with the state (using **advocacy** and **persuasion**) for the immediate restoration of services had decreased. Informal leaders who emerged in the first post-disaster moments were elected to formal positions on May 1, 2011. The association's reputation as a force to be reckoned with was established. The association had also **sought specialist assistance** (e.g. voluntary lawyers and consultants) to develop formal structures and procedures.

This wave was marked by initiatives of larger scale, formality and complexity, aspects that mitigated **social bricolage**. Three events stood out. Perhaps in response to the community's revolt, **the state determined** that the entire neighborhood be demolished and turned into a river park. **Voluntary legal assistants** helped ensure suspension of the determination. Second, an important financial donation from the Swiss city of Fribourg was received for the construction of community facilities. After several considerations, it was decided to build a cultural center with the headquarters of the association, continuing the **community pressure** for a municipal day care center. Third, the association **went ahead with the prosecutor's office** in closing a local toxic waste incinerator. **The effort started months before the disaster**, but the closure occurred in 2015, the result of the most enduring and persistent activities in the association's **advocacy, representation and persuasion**. The treatment of waste commonly involves serious illegalities in Brazil, making **opposition with advocacy** rash, configured as a persistent **rejection of limitations**.

In the third wave, many residents received, from the state, an **intimidating order** to expropriate their property with an offer of compensation, considered insufficient and which often did not arrive. Again, the association **brokered legal assistance** for **negotiation, litigation, and disclosure of residents' complaints**.

The third wave shows a massive transition from **bricolage** to **brokerage** and institutional isomorphism. The **involvement of local stakeholders** declined (Box A5). **Improvisation** practically disappeared. The **rejection of limitations** continued in the **opposition against** poorly compensated expropriations, indemnities not received and the park project, but this was done predominantly through institutional-legal channels. Similarly, while **advocacy** and **persuasion** were still active in **building consensus** and **acceptation** of formal measures, legal avenues became more important. **Making do with what you have** and **using informal skills** with **suboptimal solutions** were no longer prominent. Of the **elements of social bricolage**, the **creation of social value** remained the most active. Even so, this more institutionalized phase was quite productive in SI, often more ambitious than those of the previous waves, such as those related to the creation of the cultural center and a local medical post.

³ From the election of the emergent leaders, occurred in 05/01/2011, on.

4. DISCUSSION AND CONCLUSIONS

The CA disaster clearly spurred several SIs over the three time waves considered. There is also ample evidence that these innovations have unfolded in others. Early post-disaster efforts brought people together in ways that provided engagement, sophistication of initiatives and focus on a clear timeline. Equally important, the pattern and characteristics of popular initiatives taken and supported by several spatially dispersed actors coincide with the main SI attributes identified in the literature.

In addition to the encouraging result that SI can emerge from a deadly disaster, what else do we learn? We see three potential contributions. Perhaps the most significant is that a very specific institutional form (perhaps anti-institutional) described much of the adjustment and innovation processes in CA. The idea that bricolage – a prominent alternative to classical administrative rationality – was present in post-disaster SI is important as a possible descriptive and normative theoretical framework for SI researchers. We reviewed four recent case studies on SI in Latin countries (La Trinitat Nova, in Spain; Montemor-o-Novo and Aldoar, in Portugal; and Lima, in Peru) and found no reference to bricolage, effectuation or other alternative views to administrative rationality, although most case histories include some element of social bricolage, such as persuasion, improvisation and stakeholder participation (André, Henriques & Malheiros, 2009; Tello-Rozas, 2016; Rodriguez, 2009).

We also noticed that brokerage followed and reinforced social bricolage in CA. Something also important is that the most common brokerage behaviors in CA were the non-traditional alternatives and deviants from the classic structural concept described by Burt (2005), according to which individual actors (*tertius gaudens*) broker previously disconnected parts to obtain gains. It is also significant that traditional intermediation regarding a structural hole rarely appeared and was more common in the last waves. The literature on SI is usually based on the role of linking and uniting social capital (Coleman, 1988), which loosely corresponds to the classic dichotomy of strong and weak ties (Granovetter, 1983). The case of CA suggests that the category “link” can be expanded to include the four types of brokerage that we present in the theoretical foundation, each with its own implications for the generation of innovation and reformulation of social relations. The discovery of these dimensions of brokerage in the SI process can be useful for the analysis of future cases of SI and the retrospective analysis of past studies.

Contrary to the organization, structuring and empowerment phases of Tello-Rozas (2016), we identified the pre-disaster phases and three SI time waves in CA. The pre-disaster phase, which lasted for many years, presented elements of organization, structuring and limited empowerment, but the first wave of IS was quite different, and apparently unique, due to the urgency, the emotion, the concentrated effort and the spontaneous nature of this short period. It seems safe to say that most disaster responses contain a notable period in which routine structures and roles fail and improvisation and social bricolage dominate. The brokerage phase with institutional maturation clearly contains elements of structuring and empowerment with some organization. However, we believe that much of the dynamism and engagement of people in this phase was forged in the crucial situations of the emergency phase.

We believe that, in this first phase, lies the source of some of the unexpected positive consequences of disasters. In terms of SI, they reconfigure social relationships by breaking up relationship networks and creating new ones, bringing together people, even strangers, to face harm, in addition to generating

empowerment with the community and act autonomously against emergencies. This procedural and dynamic nature of the reactions to the disaster also seems to comprehend great challenges for the SI caused, even presenting opportunities to take advantage of synergies and multiplier effects arising from the solidarity, involvement and empowerment that occurred in the emergency phase. One challenge is to increase popular involvement. Another is the need to profitably channel community collaboration and links with people from other locations. Great results from dynamic processes can apply to SI and communities in post-disaster recovery. Serious environmental events can open opportunities for social progress because they tend to “unfreeze” (Rao, 2008) the social system. Such thawing can be used very well by alternative means, such as social bricolage and catalytic brokerage, rather than with traditional bureaucratic logic.

The disruption caused by the disaster leads us to a third contribution. During the pre-disaster, the association was governed by institutional rules and promoted modest SI, often similar to outside structures and initiatives. The disaster suspended institutional rules and prevented complex considerations, imposing ill-considered actions for people to take care of themselves and others. Brokerage virtually disappeared. At first, some emerging leaders brought residents (local stakeholders) together, including strangers, and collaborated in humanitarian actions. However, most of the actions were carried out directly by close people with little time or inclination to seek third parties or brokerage.

The second wave, marked by improvisation and social bricolage in general, including making do with what is at hand, was rich in types of SI and complexity of solutions and intermediations. For the first time, those responsible for public services and residents frequently met in the neighborhood. Everyone was welcome at meetings and assemblies. The association's website and the notoriety of the disaster, combined with vigorous advocacy initiatives, captured wide media attention and attracted outside experts. Local leaders who were inactive during the initial crisis returned to active duty and supported emerging leaders. This set of forces has advanced all types of brokerage, from advocacy to simply putting third parties in contact. The breadth and frequency of SI was impressive, from residents blocking tractors that could damage houses to illegal road closures, photoregistration of contractual violations and more subtle actions, leaving the most elaborated initiatives to the emerging leaders of the association. Stakeholder participation, persuasion, improvisation, testing institutional boundaries and brokerage are aspects that have helped CA to overcome its challenges, with a broad coalition of semi-autonomous actors involved in many initiatives of trusted emerging leaders, who have gained credibility with courageous pro-social actions at the most critical moments.

The third wave of SI, marked by the maturation of institutional brokerage, presented great innovations, such as the creation of the cultural center and the closure of the toxic incinerator, which almost certainly would not have occurred without more maturity and credibility, expanded in the preceding waves. However, there was also a weakening of some community forces. The creative modes of pressure on institutions, the involvement of residents in collective decision-making and mobilization, and the sacrifice of individual interests in favor of collective needs decreased. Dependence on outside organizations increased.

Broader aspects of SI were also shown. As community leadership became involved with external stakeholders, local involvement and autonomy decreased. Residents' frustrations often threatened to disrupt external relations. This evokes the question of whether major organizational paradoxes

and tensions identified in the literature currently in vogue (Putnam, Fairhurst & Banghart, 2016) are less relevant in the anomalous context of a major disaster and, if so, why. On the other hand, do local CA paradoxes reveal post-disaster tensions in general or just those in the community context? It appears that the autonomy-dependency tension and the tension between finding your own, sometimes controversial, solutions internally, and external pressures for compliance are important in many contexts and may deserve systematic attention in future research. The apparent differences in the “density” of paradoxes over time are provocative: little sense of paradox before disaster, a crude paradox in the immediate post-disaster (e.g. inaction under shock versus saving others), multiple paradoxes and multiple SIs during the social bricolage phase and less balance between paradoxes in the institutional maturity phase. How much does this observation clarify or is clarified by procedural perspectives such as theories of organizational or entrepreneurial life cycle or temporal theories of innovation?

We believe that this question opens several lines for future research that, hopefully, will begin to reveal explanations of the important sequence of events described in our data. The suspension of sensemaking and institutions in the immediate post-disaster could make it easy to separate the 48 to 72 hours from the post-disaster as a separate cognitive and social void, irrelevant to subsequent community efforts. However, we think that this initial phase was decisive for subsequent actions in several ways. We highlight the fact that those who were most active in the first high-risk moments ended up directing the formal residents’ association, as well as the less formal activities of social bricolage, apparently essential to engage the state and mobilize the community. It is also possible that the brutality of destruction and loss of life stimulated residents to put aside conventions and some reserve and, thus, vigorously confront the state and service providers in the media, on the internet, in protests, in joint efforts and in direct dialogue. Such a stance almost certainly created a pole of a paradox extensively faced in the second wave of SI. Emerging leaders had to channel, modulate and harness community anger in ways that captured public attention and the state’s reaction without making their brokerage role unfeasible by representing the community in its claims to the authorities. It also seems acceptable to think that the heroic actions of those who acted in post-disaster emergencies gave credibility to these actors as intermediaries, due to their great altruism.

We begin this article by noting the paradox that, interestingly, crises and disasters usually generate SI despite the scarcity, stress and disruptions they produce. Our study of the January 2011 disaster response in CA suggests that the interaction between social bricolage and brokerage can help explain the paradox and perhaps even provide a model for future actions and public policies. Before the disaster, there were fewer elements of social bricolage in the structure and actions of the residents’ association studied. The association had engaged in representation and advocacy activities, which are variations of brokerage with which local stakeholders, such as residents in need of public service, were put into constructive interaction with external stakeholders, such as the local government and public service providers. Social value was created, but little SI. Shortly after the disaster, chaotic improvisation brought about elements of social bricolage that, in part, brought about several SIs. Concomitantly, this phase witnessed a great expansion of the scope and diversity of stakeholder involvement and the various intermediaries. Starting from the first hour, without brokerage and only with the involvement of residents, time and conditions evolved so that emerging leaders and the association gradually used

all types of brokerage (representation, advocacy, catalyst and middleman) with almost all the possible categories of stakeholders, including the press, the third sector, the government, the judiciary, other communities and national and international actors (see also Box A5, in the appendix). After this period of effervescence, the community settled on a more deliberate and institutionalized pattern of generating SI and social value, but, even so, it continued to be the birthplace of important SI of increasing scale. The observed SIs have changed and improved relations with (and among) stakeholders, starting with the residents themselves and then with external stakeholders. Also, as our definition of SI predicted, they improved the quality of life in the community, including going beyond post-disaster recovery, associated with relevant environmental and socio-cultural initiatives that continued to improve the standards of interaction and the creation of social value.

The relations we observed between concepts do not prove causality, and our contribution has emerged inductively from a single case study. However, we found that, by emphasizing the concomitance of the various aspects of social bricolage and brokerage with SI, the occurrence and trajectory of the community's responses to the effects of the disaster, made through the emerging leaders and the association, became more intelligible. Rejecting limitations, improvising and involving stakeholders and the other relevant actions that we observed, being undertaken with the use of different types of brokerage to involve a progressively broader and more diverse population of stakeholders, seem to be a promising way to increase the occurrence and the maturity of SIs.

The clear overlaps between social entrepreneurship, social bricolage and SI indicate that a lot of work remains to be done to integrate contributions from different fields and sub-disciplines related to these themes. Still, we hope that our study of events in a community has helped to demonstrate the underlying similarities and usefulness of these perspectives to understand how communities can overcome the effects of the increasingly numerous natural disasters that human greed and ineptitude aggravate. We also hope that our research will help to bring to light what is universal and what is idiosyncratic in the processes covered. The exact response of a community to a disaster is unique and results from a mix of personalities, actions and contextual factors. Despite this unique character, our account of the heroic efforts of a small community will contribute in some way towards broadening the dialogue on how diverse people and institutions can face adversity in a creative and human way.

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APPENDIX

BOX A1 FIRST WAVE OF SIS (FROM JANUARY 12TH TO JANUARY 29TH 2011)

SIs observed	Illustrating quotations	Social bricolage components
<p>Rescue teams applying social bricolage</p>	<p>We made splints out of boards and carried the injured on our shoulders to the emergency station at Mario's house, an improvised infirmary. We improvised stretchers and carried the critically injured to the hospital, traversing deep mud. (<i>Rafael de Moraes</i>, manager of an auto parts store.)</p> <p>We had no equipments. We cut several pieces to drape over the guide rope and stabilize a boat. We had no carabiner. Two persons held onto a piece of the rope to pull the boat. We enlisted two strong guys on each side of the river to hold another rope that people could grab onto in case they fell out of the boat. It was totally improvised! (<i>Sandro</i>.)</p>	<p>Bricolage (as defined by Baker and Nelson, 2005)</p> <p>Making do for a social end</p> <p>Refusal to accept limitations</p>
<p>Improvised bridge made of debris</p>	<p>I have some understanding of the construction trades and figured we could make a bridge out of wood and fallen utility cables. We figured that would be a way to ease the suffering of people who were isolated. (<i>Edmo Teixeira</i>, builder.)</p>	<p>Improvisation</p> <p>Social value creation</p>
<p>Snowball effect of SIs Community's SIs inspired complementary talents to join and help</p>	<p>The disaster affected other places too. Why then did all this organization happen only here? Because we took the initiative ourselves and they were contagious. We had some people with a sense of leadership – Edmo is an example. Then more formally trained people joined in. (<i>Sandro</i>.)</p>	<p>Useful for other SI waves: leadership emergence, talent revealing, and status for brokerage</p>

Source: Elaborated by the authors.

BOX A2 SECOND WAVE OF SIS (FROM JANUARY 29TH TO APRIL 30TH 2011)

SIs observed	Illustrating quotations	Social bricolage components
<p>A novel governance dimension in the Jan 29th community meeting</p>	<p>We found some paper for a flipchart and you (the senior author) took notes. We made a list of demands including basic social necessities. It was a very complete list. We wanted to make a small commission to expedite solutions and it ended up with 30 members initially. <i>(Sandro.)</i></p> <p>The commission's work was of great importance because the formal directors weren't able to play their role. <i>(Cláudio Werneck, then secretary of the association and former president.)</i></p>	
<p>Ways of engaging outstanding collaborators</p> <p>Reconstruction commission (RC): a low-risk practice sphere to engage talent, new leaders, and (temporary) help</p>	<p>Thanks to this commission led by Sandro we were able to move forward at that time. After the May election it was called the "Management Group" and Sandro became president of the association. <i>(Cláudio.)</i></p> <p>There was a demonstration by residents who blocked the road using barricades, protesting against the lack of public assistance. The police came, and did the media and then government officials came. It was a big expression on the part of the community. I got curious to find out who mobilized the people. I found out it was Edmo and another guy. I asked both to be on the commission. Only Edmo came. <i>(Sandro.)</i></p>	<p>Increasing social bricolage</p> <p>Stakeholder involvement</p>
<p>RC and meetings as stakeholders' involvement arena</p> <p>Brokerage bypass and coalition to better advance the community's agenda</p>	<p>We were having a meeting of the RC every week and a general assembly every 14 days. The work was intense and we were in the media a lot. Public managers and third sector people and all [politicians, judges, attorneys, head of the municipal water works and so on]. This was a gain for us because it generated a lot of movement. <i>(Sandro.)</i></p> <p>One day we brought the water company's manager to a meeting. This made a big difference to solve water problems. The people we invited brought other people and put us into contact with still others. Later they helped us with information requests and queries to agencies. <i>(Sandro.)</i></p>	<p>Persuasion</p> <p>Social value creation</p> <p>Refusal to accept limitations</p> <p>Less improvisation</p>
<p>Resident's cleaning and rebuilding work parties</p> <p>Positive results galvanized community for more initiatives</p> <p>With media coverage, they shamed the authorities forcing them to act</p>	<p>We had Silvio who has an earthmoving business who let us use his equipment and provided the operator, but it turned out that the city ended up contributing with trucks and labor to the work party. <i>(Sandro.)</i></p> <p>In 2014 we started another project to make a larger bridge ourselves. We collected money and material and such. I was having a beer at a bar and the politician in charge of relief efforts appeared surprising me. (...) This is one of the tricks we learned that is very effective. We try to do what the state is supposed to do and the state feels threatened. Soon after he showed up asking us to give up our project, he announced that the state would build it. <i>(Edmo.)</i></p>	<p>Making do for a social end</p>
<p>Integration of outside volunteers and assistance in implementing their initiatives, mostly defined by themselves</p>	<p>Our initial efforts based on human and collective values [and media coverage] ended up attracting others who wanted to help. Things became more complicated. We began even having people coming to help from other cities. This created work for us because we had to find ways to fit them into the NA's efforts so they could carry out their projects. <i>(Sandro.)</i></p>	<p>Related element: brokerage</p>

Source: Elaborated by the authors.

BOX A3 THIRD WAVE OF SIS (FROM MAY 1ST 2011 TO 2016)

SIs observed	Illustrating quotations	Social bricolage components
<p>Alliances and collaboration with other NGOs and specialists</p>	<p>I said to myself “we need to do something to involve the families; we’re wearing people out just doing work parties all the time. We need to do something fun. I took the idea to a voluntary association. They liked the idea and they went after contributions and helped us have a community party. <i>(Sandro.)</i></p> <p>I got a couple of consultants to help. One was Tião Guerra himself and the other, whose name I can’t recall, was super. He consults to big companies in São Paulo, multinationals and such. The guy is killer. So we had two guys, one to work on the technical side and one to work on human factors. <i>(Sandro.)</i></p>	
<p>Anchoring of parts of a big basalt outcropping It began in 2014 as an effect of the association’s pressure on the state.</p>	<p>Admittedly, the big construction on the outcropping that is happening was a conquest of the community with the work of the association. <i>(Sandro – in an e-mail to the Management Group in 03/18/2014.)</i></p>	<p>Stakeholder involvement</p>
<p>Construction of a cultural center with headquarters using a Swiss donation offering even medical consultations , in alliance with public agencies</p>	<p>An important step we are taking is to build the cultural center. We had decided to build a day care, because we really need one. But we would face the risk of expropriation of the building and the land as the city is legally obliged to offer this service. <i>(Edmo.)</i></p> <p>The idea behind the cultural center is for us to have courses to offer children and teenagers who can’t stay in daycare anymore. We want to give them the opportunity to take other courses so they spend their time doing healthy things. <i>(Sandro.)</i></p> <p>See also: https://www.facebook.com/CasaDeSebastiao.</p>	<p>Persuasion</p> <p>Social value creation</p> <p>Refusal to accept limitations</p> <p>Less improvisation</p>
<p>Partnerships for complimentary assistance in disaster risk management, consultancy for the association, etc.</p>	<p>We wanted some consulting to help us define our goals, mission, administrative models, strategies, etc. so we could later revise our bylaws, for which we already have the volunteer help of a manager and attorneys. <i>(Sandro – in an e-mail to the Management Group in 07/17/2015.)</i></p>	<p>Related element: brokerage improvement</p>
<p>Offer of cultural and leisure activities at the cultural center (dance, crafting...)</p>	<p>We are about ready to inaugurate our headquarters which will also be a cultural center where we will have a number of activities for the benefit of local residents and maybe even for the region... We already have volunteers. <i>(Sandro – in an e-mail to the Management Group in 07/17/2015.)</i></p>	
<p>Offer of medical services with a Cuban doctor made available by the government program <i>Mais Médico</i></p>	<p>We already offer free medical consultations (only for residents of our neighborhood)! Consultations will happen on Wednesdays and Thursdays. <i>(Association’s Facebook page – 03/06/2016 - https://www.facebook.com/associacaomoradorescorregodantas)</i></p>	

Source: Elaborated by the authors.

BOX A4 EVOLUTION OF BROKERAGE IN TIME

Periods of SI against the service need	Brokerage activity	What was characterizing brokerage?
<p>Pre-disaster Rare and tenuous SIs</p>	<p>Before the disaster on Jan 11th Trying to obtain better public services.</p>	<ul style="list-style-type: none"> - Simultaneous or sequential brokerage modalities: * representation[#]. * advocacy^{##}. - Dialog and soft persuasion with sympathy to obtain collaboration of residents, besides public agencies, service companies, and local businessmen. - The association has already developed a reputation among stakeholders as a go between.
<p>First wave Disaster hits - critical days and weeks</p> <p>It immensely increased the service need</p> <p>Intense SIs saving lives and improving basic life conditions</p>	<p>From Jan 11th to Jan 29th Brokerage void caused by disarticulation.</p>	<ul style="list-style-type: none"> - Paralysis in the NA's brokerage role. - Community's connections were cut as it was focused on self-healing. - Former brokers were inactive under the impact of the disaster. - Emergence of new local leaders organizing SI. - SI gave them status and legitimacy to become association directors and new brokers.
<p>Second wave SIs and brokerage aims at reconstruction</p> <p>SIs improving living conditions</p>	<p><i>From Jan 29th to April 2013</i> New impetus focusing on representation and advocacy.</p>	<ul style="list-style-type: none"> - Simultaneous or sequential brokerage modalities: * representation[#] - more intensely than in pre-disaster. * advocacy^{##} - more intensely than in pre-disaster. * catalyst brokerage. * middleman brokerage.
<p>Third wave SIs focusing more general interests, like community's health, leisure and culture, fulfilling public agencies' obligations</p> <p>SIs improving living conditions</p>	<p><i>From April 2013 to 2016</i> Focus on middlemen and diplomatic brokerage.</p>	<ul style="list-style-type: none"> - The association has a positive reputation as a quality interlocutor, using diplomatic brokerage and a sympathetic approach with officials.

[#] Representation: e.g. presenting community's problems to public agencies and asking for solutions.

^{##} Advocacy: e.g. defending community's interests and legal action against a polluting incinerator.

Source: Elaborated by the authors.

BOX A5 **STAKEHOLDERS IN THE DIFFERENT TIME WAVES**

SI periods	Variety of stakeholders and their local activities
<p>Pre-disaster Rare and tenuous SI</p>	<ul style="list-style-type: none"> * Local stakeholders, with little mobilization (residents: ordinary people, small local entrepreneurs, community leaders, specialists ...). * External stakeholders sporadically present in the community (politicians seeking votes, authorities, and invited public servants). * External stakeholders pressured by the association to offer services to the community (bus company, electricity, water, and paving services, politicians and authorities).
<p>First wave (17 days) Disaster impacts - critical days and weeks</p>	<ul style="list-style-type: none"> * First two days: only the locals (residents: ordinary people, small local entrepreneurs, emerging leaders, specialists ...) acted as a matter of urgency, autonomously (with the community isolated by the disaster), in certain cases with facilitated relations through the intermediation of emerging leaders. * From the third day: there is also a growing performance by security agents and firefighters as rescuers and in the collection of bodies – they receive guidance from the most collaborative local actors. * As of the sixth day, approximately: more contextualized performance by the external stakeholders, now more frequently guided and mediated by the emerging leaders, already recognized and sought as such. * As of the tenth day, approximately: in addition to the other stakeholders, heavy equipment operators, engineers and supervisors with large construction companies operate, often in bad conduct combated by residents.
<p>Second wave SI and brokerage for reconstruction</p>	<ul style="list-style-type: none"> * Rapid expansion of the variety and number of collaborating stakeholders. * Emerging leaders are elevated to community spokespersons and hailed as coordinators of community meetings, integrating themselves as informal directors to the association. * The local stakeholders met, planned and have priority demands to guide the action of leaders and the association, as well as brokerage and relationship with stakeholders. * The reconstruction commission was created as a basis for the participation and collaboration of local and external stakeholders. * The mosaic of stakeholders operating in the neighborhood expands with everyone mentioned above, plus external volunteers, external NGOs, legal assistants, groups of religious volunteers, representatives of public bodies – including from the judiciary, to pressure legally for solutions. * Managing the collaboration of the numerous stakeholders (particularly volunteers who arrive at and depart from the community) is virtually impossible and the fluctuating mass of collaborators acts locally in a semi-autonomous manner. * Local stakeholders with great and lively participation in community meetings, each motivated mainly by their own problems and interests, seeking collective support for personal causes – which is conducive to conflict and disarticulation.
<p>Third wave SI focusing on more general interests, such as community health, leisure and culture</p>	<ul style="list-style-type: none"> * Rapid expansion of the variety and number of collaborating stakeholders. * The participation of local stakeholders has significantly decreased (many of them have had their personal problems resolved or already believed they would not be) and so the participation of the external ones (they no longer saw urgency and great need for help in the community). * The association, elected emerging leaders, and long-term collaborators persist in broader causes that demand more patience and perseverance, such as the construction of the cultural center with the headquarters of the association, the construction of contention on top of immense stones of the local landscape, the deactivation of a toxic waste incinerator, and the provision of health services, daycare and school in the neighborhood. * Stakeholder involvement and mobilization to collaborate is eased.

Source: Elaborated by the authors.