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Brokers or Platforms? A Longitudinal Study of How Hybrid Interorganizational Partnerships for Regional Innovation Deal with VUCA Environments

Abstract: The study investigates the role played by turbulent environments in the evolution of hybrid (i.e., multi-party, cross-sector) partnerships for regional innovation. Although extant research suggests that organizations decide to participate in such partnerships to cope with their turbulent environments, little is known about how actual perceptions of turbulent environments influence the setup and evolution of a partnership. Our qualitative study adopts a longitudinal design to investigate the evolution of a cross-sector regional innovation partnership between ten very different organizations. With the help of the VUCA (volatility, uncertainty, complexity and ambiguity) model proposed by Bennett and Lemoine (2014a), we study the relation between partners' initial perceptions of environmental turbulence and the models adopted for the partnership throughout its lifecycle (emergent, brokering and platform). We show that partners' intentions to solve perceived environmental turbulence through collaboration can have the unexpected consequence of triggering perceived turbulence inside the collaboration itself. Specifically, we show that perceived partnership VUCA at each stage was a result of partners' attempts to cope with the perceived VUCA in the previous stage. The study thus highlights a set of common traps that both public and private organizations engaged in hybrid partnerships might fall into precisely as they try to lower VUCA threats in their environments.

Keywords: cross-sector partnerships, regional innovation systems, environment turbulence; VUCA; business models; collaboration strategies; brokers; platforms.

Introduction

Over the last few decades, we have witnessed an increasing diversity of collaboration arrangements which aim at fostering innovation activities at the regional level (Bryson et al., 2006; Raab and Kenis, 2009). Since the early 1990s, the concept of regional innovation systems has been used to understand innovation as a product of collaboration between public and private actors, usually occurring within a circumscribed regional area to which actors are connected and in relation to which they have specific interests (Asheim and Isaksen, 2002; Cooke et al., 1997; Doloreux, 2003, Doloreux and Parto, 2005). Regardless of the forms they can take (e.g. social partnerships, consortia, public-private partnerships, networks), hybrid partnerships within regional innovation systems are collaborations between multiple organizations, usually from different sectors, conducive to the generation, use, and dissemination of knowledge that goes beyond the boundaries of the partnering organizations (Doloreux and Parto, 2005; Cooke et al., 2000; Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz, 1996).

It is important to notice that inter-organizational collaboration activities are often described as responses to turbulent environments (for discussions see Babiak and Thibault, 2009; Duysters and Man, 2003; Sawhney and Prandelli, 2000). A common argument is that partnering with other organizations and institutions is an organizational-level strategy to face complex, uncertain or rapidly changing environment conditions which single organizations consider they cannot tackle on their own (see Crosby et al., 2006; Edquist, 1997; Selsky and Parker, 2005). For instance, research shows that organizations' need for complementary technological resources in unpredictable and highly competitive markets pushes them to engage in collaborative inter-organizational projects. The necessity to cope with turbulent environments then becomes vehicle to reach benefits that could not be reached by acting alone, such as faster development of innovations, improved market access, economies of scale and scope, cost sharing and risk spreading (Asheim and Isaksen, 2002; Duysters and Man, 2003; Eskelinen et al., 2002; Hartley et al., 2013), on the one hand, but also a tool to

contribute to the common good by setting up large-scale projects that go beyond the interests of single partners, on the other hand (Crosby et al., 2006; Selsky and Parker, 2005).

So far, much of the research has focused on the characteristics that make hybrid innovation collaborations successful (see also Amin and Thrift, 1995; Cooke, 2002; Edquist, 1997; Etkowitz, 2008; Laranja et al., 2008). From such standpoint, differences in innovation performance are linked to the characteristics of the institutional settings in which these develop. Cooke (2002), for instance, has suggested that the success of hybrid partnerships for regional innovation in a turbulent environment is highly dependent on the pre-existence of a substantial number of diverse innovative organizations, pre-existing innovation relationships between them, the ability to develop strong and established governance systems for the partnership, and the existence of external support for the partnership in the form of regional policies and funding. However, studies have also suggested that hybrid collaborations face significant challenges in realizing their potential (Bleda and del Rio, 2013; Googins and Rochlin, 2000). The heterogeneity of partners' interests, the changing conditions in partnership scope and scale, the uncertainty of outcomes and the difficulty to collect and combine resources for their attainment are just some of the factors that explain the paradox by which hybrid partnerships set up to deal with turbulent environments might end up creating more turbulence than they are able to solve (Bryson et al., 2006; Babiak and Thibault, 2009; Iammarino, 2005; Woolthuis et al., 2000). However, understanding the dynamics that hybrid partnerships for regional innovation face within turbulent environments has not been an easy task: While most studies have been concerned with understanding the antecedents or outcomes of such partnerships, relatively little is known about how the dynamics of the partnership (i.e., governance structure of the partnership, relations between partners) relate to the turbulent environment in which the partnership unfolds (Rip, 2002). Additionally, little attention has been given to how partners' perceptions of environmental turbulence may influence the evolution of their collaboration. To build on these gaps, our study investigates how turbulent environments shape the setup and evolution dynamics of hybrid partnerships for regional innovation.

We adopt a process-based perspective on the evolution of hybrid partnerships in general (le Ber and Branzei, 2010; Seitanidi and Lindgreen, 2010) and on the evolution of regional innovation systems, in particular (Iammarino, 2005; Rip, 2002). We suggest that a better understanding of the dynamics through which hybrid partnerships function overtime is pivotal to appreciate how they progress towards their goals, and, as a consequence, how the strategies chosen to cope with turbulence impact their performance (Selsky and Parker, 2005). To do so, we propose that the VUCA model created by Bennet and Lemoine (2014a) to investigate the environments in which single organizations operate can provide a useful lens to analyze also the environmental perceptions of actors engaged in partnerships, and the evolution of these perceptions throughout the partnership's lifecycle Additionally, we argue that the four turbulence factors in the model -i.e., volatility, uncertainty, complexity and ambiguity- can be also used to study the relationship between perceptions of external (i.e., environmental) turbulence and internal (i.e., partnership) turbulence during a partnership's lifecycle. We thus advance the VUCA framework by connecting perceptions of turbulent external environments to perceptions of turbulent conditions inside an innovation partnership.

Our longitudinal study takes the case of a cross-sector partnership between ten different organizations that come together to deal with a regional innovation project which had the main goal to create a regional science park. We follow the project across its lifecycle (initial phase, the development phase and the maturity phase), discussing three models that partners adopt to manage their collaboration and cope with their own perceived environmental VUCA: the emergent model, the brokering model and the platform model. Our field evidence highlights two dynamics related to the evolution of the partnership. First, partners set up the partnership as a strategic course of action to lower VUCA in their environments but, paradoxically, they end up perceiving their collaboration as impregnated with VUCA as well. Second, the VUCA model of each stage of the partnership is a result of partners' attempts to cope with the VUCA threats in the previous stage. We show that the perception of a VUCA environment triggers a tendency in hybrid partnerships to set off with a

highly open collaboration model which presents high degrees of volatility, uncertainty and ambiguity. We draw attention to the fact that as the partnership moves through the first stages, partners may feel tempted to adopt strategies that aim at lowering all three factors at once (i.e., brokering model). We also suggest that this can have unexpected negative consequences -i.e., an increase, instead of a decrease in perceived VUCA threats. We also show that in a more mature phase partners may set up a platform model. On the one hand, the platform model decreases volatility, uncertainty and ambiguity but, on the other, it increases the complexity of managing the partnership.

Our study brings a series of contributions to theory and practice. First, we advance the understanding of the relationship between hybrid partnerships for regional innovation and the turbulent environments that these partnerships try to face. To this regard, we also extend the traditional application of the VUCA framework from organizational to inter-organizational contexts. We also propose an increased attention to how partners perceive VUCA threats and how these perceptions change through time. As a contribution to both theory and practice, we highlight that organizations' attempts to reduce VUCA parameters at once and at all costs within a partnership frame, can have a detrimental effect on their ability to collaborate efficiently in the partnership and move the partnership forwards. In addition, by adopting a longitudinal perspective, we highlight the importance of seeing VUCA parameters as constantly mobile and transforming across the lifecycle of hybrid partnerships. We conclude by pointing out a set of common VUCA traps that both public and private organizations engaged in hybrid partnerships might fall into precisely as they try to lower VUCA threats present in their environments.

Hybrid partnerships for regional innovation and VUCA environments

Hybrid partnerships for regional innovation

Interorganizational collaborative activities have become more prominent and extensive not just in the private sector but in the public sector as well, with hybrid forms of collaborative engagement between business, government, and civil society being stipulated every day (Crosby et al., 2006; Hartley et al., 2013; Selsky and Parker, 2005). Many of these hybrid collaborations are constituted to address 'metaproblems'– broadly defined goals that go beyond the jurisdiction and competencies of single organizations and that have a broad impact on the public sphere. Supporting the industrial competitiveness of a region, fostering its sustainable development, managing urban development, improving social welfare and promoting social innovation are all examples of metaproblems being increasingly addressed through multi-party cross-sector collaborations (Googins and Rochlin, 2000; Linder and Rosenau, 2000; Selsky and Parker, 2005).

A relevant case is constituted by public and private organizations that condense their ambitions and long-term visions of innovation in complex partnerships with large scale impact. The popularity of the concept of regional innovation systems is related to both the increasing attention to regional nodes and clusters of industrial activity, and to the surge in regional innovation policies that identify the region as the most appropriate level for innovation-based economies (Doloreux and Parto, 2005; Cooke et al., 2000). One of the main ideas behind these partnerships is that innovation takes place where different frames and interests intersect, such as the interfaces of organizations as different as government laboratories, academic research groups, university spin-offs and firms of varied sizes. Many studies have shown that in one form or another, most regions are currently trying to attain some form of Triple Helix -i.e., partnerships between university, industry and government (Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz, 1996). Generally, the purpose is to build a partnership model that creates and captures value by combining and coordinating partners' heterogeneous resources—people, knowledge, finance, and technology. Two key aspects characterize these partnerships. The first is that very different organizations try to collaborate to achieve a desired innovation outcome in an environment full of threatening and turbulent events

(Hartley et al., 2013; Sawhney and Prandelli, 2000). The second is that in addition to attaining their own goals, partners should be able to contribute synergically to the social, economic and knowledge-based development of a given region (Etzkowitz and Leydesdorff, 2000; Fritsch and Franke, 2004; Leydesdorff and Meyer, 2006). Although there has been rising attention to the role of innovation systems as a solution to environmental turbulence, little is known about how partners' perceptions of environmental threats push them to seek for opportunities through collaboration. As follows, we turn our attention to the role of turbulent environments in the setup and evolution of hybrid partnerships for regional innovation.

Hybrid partnerships in turbulent environments: Opportunities or threats?

Some studies have shown that innovation partnerships represent a strategy by which very different organizations try to cope with changing conditions in their environment (Crosby et al., 2006; Hartley et al., 2013).

As far as the public sector is concerned, there has been growing attention to public entrepreneurship processes enacted by public institutions in response to their changing roles at the institutional level. An increasing body of literature has suggested that not only do regional governments become interested in promoting and supporting the innovation of private organizations, but they also become active stakeholders in such projects (Koppenjan and Klijn, 2004). One of the main motivations for this trend is the need of public organizations to cope with increasing uncertainty and change in their environments. Studies have reported that lack of funding, loss of legitimation in the public eye, and changing legislations at the national and European level have pushed public institutions to embrace collaborations that go beyond the institutional logics of the public sector (Borins, 2014; Leitao and Alves, 2016; Morris and Jones, 1999). Some frequently reported strategies for dealing with these environmental threats are expanding jurisdiction to new economic sectors, retrieving skills and competencies that are not available internally, achieving legitimation in private markets and fields, or simply adhering formally to the rhetoric of a New

Public Management based on openness and initiative (see Crosby et al., 2006; Cooke et al., 1997; Leitao and Alves, 2016; Linder and Rosenau, 2000; Morris and Jones, 1999; Skelcher, 2005).

Similarly, it has been extensively shown that environmental uncertainty and rapid change push private organizations to go looking for the support of organizations operating in different but potentially complementary sectors (see Oliver, 1990, 1991). Studies suggest that the more organizations deal with multiple external pressures and competing sources of turbulence, the more they may search for stability in collaborations. Some frequently reported collaboration-based strategies through which private firms try to cope with environmental turbulence have been: coopting financial constituents in markets with uncertain flow of funds, sharing risks in highly complex projects where outcomes difficult to foresee, sharing the risks of new market entry or stabilizing social capital in highly complex environments (see Fontana et al., 2006; Leydesdorff and Meyer, 2006; Mohnen and Hoareau, 2003).

As these examples suggest, organizations operating in turbulent environments or in environments going through significant institutional changes can use hybrid partnerships to respond to the perceived level of environmental turbulence. The core assumption is that shifting from innovation models with closed boundaries to open innovation models can increase an organization's responsiveness to uncertain, complex or fast-changing situations (Chesbrough and Schwartz, 2007; Sagawa and Segal, 2000). However, partnerships with heterogeneous members also present multiple challenges for those who enact them. For instance, there is evidence that although hybrid partnerships mobilize broadly-defined objectives that allow partners' divergent motives to co-exist, tensions between individual and common interests are often present, especially as the number of partners increases (Babiak and Thibault, 2009; Prichard et al., 2010; Turcotte and Pasquero, 2001). This may increase, instead of decreasing, partners' perception of environmental turbulence because in addition to the moves of clients, consumers, competitors and policy makers, also the next moves of their strategic partners must be considered. Moreover, the very turbulent environments that encourage organizations to come together may also be responsible for their difficulty to stay

together. For instance, several studies have documented the challenges of developing boundary spanning capabilities in hybrid partnerships (e.g., opportunism, distrust) (Kolk et al., 2010; Rondinelli and London, 2003), the communication and power asymmetries that derive from the collaboration of very different organizations (Koppenjan and Klijn, 2004; Koza and Lewin, 2000), the difficulty to negotiate interests inside the partnership (Crosby et al., 2006; Selsky and Parker, 2005) and the volatile and uncertain evolution of such partnerships throughout their lifecycle (Koppenjan and Klijn, 2004; Seitanidi et al., 2010).

To take advantage of collaboration opportunities and limit collaboration pitfalls, it is thus important to understand how organizations engaged in hybrid partnerships not only set up but also negotiate, implement and revisit the model of a partnership throughout its lifecycle. We suggest that Bennett and Lemoine's (2014a, 2014b) conceptualization of organizational performance in VUCA environments can be extended at the partnership level and used as canvass to systematize the challenges and opportunities of hybrid partnership collaboration. As follows, we illustrate the assumptions of the VUCA frame at the organizational level and connect them with the interorganizational level.

A VUCA approach to the challenges and opportunities of hybrid partnerships

The acronym "VUCA" has been coined for the mix of significant volatility, uncertainty, complexity and ambiguity observed in today's economic environment. According to the frame developed by Bennett and Lemoine (2014a; 2014b) these four aspects of environmental turbulence can significantly threaten an organization's performance. Volatility refers to the rate and unpredictability of change in an organization's environment over time, which creates doubts about future conditions of the organization. Price or demand fluctuations of a product, rapid changes in a service or market category, fluctuating availability of a resource or competency can make it difficult for an organization to decide the best way to allocate existing resources, or to set the areas for new investments. According to Bennett and Lemoine (2014a), agility is key to coping with volatility. Establishing partnerships with other organizations may enhance an organization's agility by

building slack resources (e.g. information or talents) which can be used to govern volatile changes inside or outside the partnership (see Barringer and Harrison, 2000; Lichtenthaler, 2009; Oliver, 1990).

Uncertainty refers to a lack of knowledge as to whether an event will create meaningful change, even when the cause and effects mechanisms are clearly understood. The investments and trajectories of innovation projects that organizations set up are significantly influenced by the extent to which they are acting in uncertain market conditions such as new moves by competitors or the degree of transformation of the market (Bennet and Lemoine, 2014b; Ozsomer et al., 1997). According to Bennett and Lemoine, (2014b), information is critical to reducing uncertainty. Organizations should move beyond existing information sources to gather new data about their environments and to consider it from new perspectives. From such standpoint, although not contemplated in Bennet and Lemoine's theorization, collaborating with other organizations can facilitate new opportunities for mutual learning, systematize the collection and processing of new data, and foster higher trust and knowledge in an uncertain market (see also Cooke et al., 1997, Eisingerich et al., 2010; Goes and Park, 1997; Leifer and Huber, 1977; Oliver, 1990).

Complexity refers to many interconnected parts forming an elaborate network of information and procedures which is difficult to manage, although it does not necessarily involve changing conditions. For instance, the need to consider the interests of different stakeholders (clients, policy makers, institutional actors, customers, specialists, regulators, etc.) in each market and the need to use standardized or formalized strategies to communicate with each of them can constitute perceived sources of environmental complexity (Bennet and Lemoine, 2014b). Restructuring internal operations to match and leverage the external complexity is indicated by Bennet and Lemoine as the most effective way to lower complexity. An alternative solution indicated by inter-organizational research is that of setting up collaborations with organizations from other sectors that are more agile in dealing with the single constituents of market complexity (Austin and Seitanidi, 2012a; Selsky and Parker, 2005).

Last, ambiguity refers to a lack of knowledge as to the basic rules of the game and to a lack of precedent for making predictions as to what to expect (Bennett and Lemoine, 2014a; 2014b). Just like uncertainty, ambiguity entails lack of clarity of information but also several other aspects including: (1) lack of clarity about the importance of environmental variables; (2) lack of clarity about cause-effect relationships between variables; and (3) confusion about available courses of action and their potential effects (Carson et al., 2006). Bennett and Lemoine (2014a) have proposed experimentation as best practice for reducing ambiguity. Accordingly, only through intelligent trials and errors can organizations clarify their main goals and determine what strategies are beneficial or detrimental in the new situations they must deal with. Studies show that companies that partner with others are more encouraged to engage in experimentation. Applying March's (1991) dichotomy of exploration and exploitation, several scholars (e.g., Koza and Lewin, 1998; Rothaermel, 2001) have distinguished between explorative and exploitative collaboration for innovation, suggesting that the first is instrumental to creating new knowledge and competencies for innovation (Koza and Lewin, 1998), while the latter is more related to efficacy concerns.

As shown in the arguments above, the frame of Bennet and Lemoine has contributed to a more systematic understanding of environmental turbulence but has referred, so far, exclusively to organizations' evaluations of their external environments. Based on the evidence reported above, we extend the VUCA frame to investigate how organizations perceive the internal conditions of a partnership and, more importantly, to establish the relationship between perceptions of environmental turbulence and perceptions of internal partnership turbulence.

Advancing a VUCA frame for hybrid partnership lifecycles

As shown above, interorganizational collaboration has always been considered an important tool for coping with VUCA environments. However, evidence about the relationship between perceived environmental turbulence and partnership solutions has been extremely scarce. Recently, best practices for setting up and managing hybrid partnerships have emphasized the need for highly flexible, adaptive and fluid models because they are expected to counterbalance VUCA threats

more effectively (see Hibbert and Huxham, 2005). However, little is known about how effective these solutions actually are in lowering perceived environmental turbulence. Interestingly, evidence suggests that the attempts to manage environments full of VUCA might introduce new sources of VUCA (Sydow et al., 2013; Ungureanu and Macrì, 2018). For instance, when organizations come together to deal with complex issues that they cannot solve alone, they may come to terms with new complexity deriving from the partnership governance or from other partners' heterogeneous goals and practices (Austin and Seitanidi, 2012b; Googins and Rochlin, 2000; le Ber and Branzei, 2010;). Similarly, the partnership can become uncertain and ambiguous if partners have troubles understanding their roles and responsibilities, volatile if they have different and unstable interests which they cannot monitor effectively, or excessively complex if partners gather too much information about each other before proceeding to action (Bennett and Lemoine, 2014a; Brugnach et al., 2008; Crosby et al., 2006). Therefore, it becomes paramount for each partnership, and for each partnering organization, to identify the best practices for reinforcing virtuous cycles and inhibiting vicious cycles of coping with turbulence through collaboration. As the evidence above suggests, time can play an important aspect in the relationship between perceived environmental turbulence and perceived partnership turbulence. Keeping track of how VUCA environments influence the evolution of hybrid partnerships through time is the first step in adopting a temporal perspective on how external and internal VUCA perceptions influence each other. Partners' ability to setup, negotiate and revise partnership models has a fundamental role in understanding, diagnosing and establishing best practices for the evolution of hybrid partnerships. As a consequence, the research question that motivates this study is: *"How does the perception of VUCA environments shape the setup and evolution of a hybrid partnership for innovation? In particular, how does the intent to cope with VUCA environments at a given (initial) stage of a partnership influence the partnerships' ability to cope with VUCA factors at the following stages?"*

Methodology

Context description

We draw on a multiple-year case study of a hybrid collaboration in Western Europe between a Municipality, a public University, three industrial associations, a Private Research Center, a Chamber of Commerce, a Public Utility Company, a Regional Innovation Office, and a Regional European Development Office that came together with the broad goal of fostering collaborative innovation at the regional level. The European Union Cohesion Policy has been supporting for many years hybrid collaborations between government, universities and the private sector to deliver innovation in E.U. regions (CEC, 2006; 2014). For instance, strengthening research, technological development and innovation is not only singled out in the E.U. Cohesion Policy for 2014-2020 as a leading way to generate smart specialization across European regions, but also as a high priority of local governments and an increasing concern of private firms looking to secure new competitive advantages or expand into new fields (Romano et al., 2014; Zerbinati and Souitaris, 2005).

In line with the institutional context in which it was inserted, the partnership that we studied was established in 2009 as a project of regional collaborative innovation. To become operative, stakeholders signed in September 2010 an Innovation Agreement in which they committed to join resources as to obtain mutual benefits related to innovation and knowledge transfer in their highly competitive industrial region. Among the most important projects, the partnership entailed the creation of a science park to host innovation projects of private and public organizations and the participation to competitive financing calls launched by the European Union. Following the Innovation Agreement, the partners increasingly committed to financing the Regional Innovation Office (RIO) in order to implement the agenda of the partnership. RIO's main tasks implied identifying concrete market opportunities for shareholders, managing innovation projects on behalf of the shareholders, and negotiating, in the process, their divergent goals and interests. As the partnership organization changed through time, so did the role that partners envisioned for RIO. By studying the evolution of RIO we could identify a series of critical points that have determined

partners to reconsider the initial governance model and move towards new partnership models that they deemed more appropriate. Given the heterogeneity of the involved parties, and the different frames, goals, and interests that animated them, the partnership constituted an ideal opportunity to study how a hybrid partnership for regional innovation evolved through time. Additionally, the high level of access to the field that we were granted as researchers allowed us to conduct preliminary interviews through which we investigated if and how partners considered that their environments were turbulent, and the strategies that they enacted in order to manage the perceived turbulences.

Data collection

We performed a qualitative study using inductive methods. Initially, we conducted a set of open-ended preliminary interviews with four informants, each representing a different organization (Municipality, RIO, Industrial Association 1 and University). During the preliminary interviews, we explored how the four organizations defined the environment in which they operated (whether they saw their environment turbulent and what they meant by turbulence), and whether the decision to join the partnership was in any way related to the environment perception. These preliminary interviews were followed by 38 semi-structured interviews with directors, politicians, managers, researchers and public officers that were responsible for innovation or technology transfer projects in the partnering organizations. We interviewed informants several times throughout the partnership lifecycle: in the beginning of the partnership (2012-2013), during its development (2014-2015) and in the maturity stage (2016-2017). All interviews lasted on average one and a half hour and they were fully recorded and transcribed. Interviews relied on different sets of protocols, according to the role and position of the interviewees inside the partnership, and the characteristics of the organizations to which they belonged. As we first entered the context, we asked all the informants to describe the environment in which their organizations operated, and to detail the main challenges and opportunities that these environments entailed. In addition to questions about the perceptions of their environment, we also asked informants what were their expectations about the partnership and about each other, what they wanted to accomplish through the partnership, and which challenges

and opportunities this would have implied for their organizations on the short and the long terms. To stay coherent with our qualitative and explorative approach, we did not want to constrain informants' answers, so we initially elicited open answers that we later used to develop a coding scheme. The initial analysis of our interviews highlighted that informants talked about their environments using some recurrent themes related to well-known literature concepts such as uncertainty, ambiguity and complexity and few others (information flow, agility, etc.) which could be traced back to existing models (i.e. the VUCA frame). They also connected perceptions of environmental turbulence to how the governance of the partnership and the relationship between partners evolved through time. We thus adjusted the interview protocol to explore these dimensions in all subsequent interviews. In other words, the provisional interpretation emerging from the analysis of our initial field notes guided our efforts towards the collection of data that would best support the development of a theoretical framework, i.e., theoretical sampling (Glaser and Strauss, 1967). For instance, during interviews conducted in stage 2 and 3, we asked our informants to comment on the presence or absence of environmental turbulence factors and to compare the current situation with situations in the previous stage(s).

As we participated in BoD meetings and other events related to the partnership, we also performed short interviews with participants, asking questions about the operative life of the partnership -i.e., who was in charge, who did what, how goals were met, how specific problems were solved, how conflicts/misunderstandings were managed, etc. Finally, our sources of data also included 250 official documents and press articles (i.e., websites, protocols, public announcements, brochures), and a social network survey to measure ties and shared projects among partners (Bertolotti and Tagliaventi, 2007). We used all the data sources to build a grounded model which explains the evolution of the partnership governance at different points in time (Strauss and Corbin, 1998).

Data analysis

We collected and analyzed all our data following the grounded theory approach (Strauss and Corbin, 1998). During the first phases of development of the grounded model, we open-coded for recurrent first-order concepts. For instance, for each stage we identified the recurrent field notes where informants talked about factors of environmental turbulence and the main aspects that described the business model of the partnership -governance, organization and functioning principles, for instance, how value was captured at the partnership level, how goals were set, how roles were distributed (i.e., who did what), how coordination was obtained, how decision processes unfolded, whether there were conflicts and how these were solved, and what were the main outcomes of the partnership. During open coding, we tried to remain as anchored as possible to informants' words and descriptions which we used to label our first-order concepts. We then grouped convergent first-order concepts into more inclusive theoretical categories or 'second order themes' (Gioia et al. 2013). The 43 recurrent first-order themes and their properties were compared and contrasted until they were grouped into five dimensions (second order themes): *governance, goal articulation and negotiation, roles and responsibilities, available assets and resources, learning and knowledge flow*. As we checked for these five categories in our data (i.e., interviews, documents, meeting observations), we also coded for different moments in the lifecycle of the partnership. This way, we managed to organize our second-order themes according to a temporal perspective. Organizing first and second order themes according to a temporal order allowed us then to identify three models that displayed homogeneity within and heterogeneity between the five dimensions (in Strauss and Corbin's (1998) terms, we identified "theoretical aggregates"). We labelled these three models as the *emergent model, the platform model* and *the brokering model*. For each model, we identified characteristics of the partnership model and measured how recurrent VUCA themes were in informants' interviews. For this purpose, we counted the frequency with which informants' words were coded as volatility, uncertainty, complexity or ambiguity in each stage. This allowed us to infer about whether partners perceived higher or lower levels of VUCA

from one stage to another. Frequencies of perceived VUCA across stages are synthetized in table 1 (see findings section below), together with the respective percentages (e.g., number of times the partnership governance of the emergent model was described as volatile out of total number of times in which it was described as turbulent -i.e., volatile, uncertain, complex and ambiguous). In line with the qualitative grounded theory approach, each phrase/paragraph that we coded could be assigned one or more codes (for instance, if an informant lamented in the same phrase about the volatility, uncertainty and ambiguity of the partnership governance in the emergent model, we attached to the phrase three different codes).

As a last step of our coding, we identified relationships between second-order themes and aggregate theoretical dimensions. This allowed us to say how model 1 was different from model 2 and model 3 in terms of governance (organization and partnership governance run in parallel for model 1, split hierarchy for model 2 and concentrated governance and wide participation for model 3), in terms of roles and responsibilities (dispersed partnership responsibilities for mode 1, double unaccountability for model 2, and disintermediation for model 3), and the same applies to the remaining dimensions. The data structure of our data analysis is included as figure 1 below.

At the end of the data analysis process, we also conducted a set of four interviews to validate the grounded model. The four informants, who belonged to different organizations (Municipality, University, Industrial Association 2 and RIO), were asked whether they agreed with our interpretations about the presence and intensity of VUCA factors at each stage. Additionally, we asked them to give us their view on the table that synthetizes the VUCA comparisons across the three stages. Prior to receiving informants' feedback (which were congruent with our interpretations in cca 80% of the cases), we further adjusted the coding scheme to include their suggestions.

Insert figure 1 here

Main Findings

The case study describes partners' perceptions of their environment at the time in which they decided to set up the partnership, and the three stages in the evolution of the partnership, the initial phase, the development phase and the maturity phase, which correspond to three different organization models: *the emergent model, the broker model* and the *platform model*. Each model refers to the following five dimensions: 1) partnership governance, 2) goal articulation and negotiation 3) roles and responsibilities inside the partnership, 4) available assets and resources and 5) learning and knowledge flow. For the sake of clarity, we anticipate table 1 that describes the characteristics of the three models and provides an assessment of VUCA characteristics for each model, as they resulted from our informants' words and as synthetized by our grounded model. The table computes the frequencies with which our informants mentioned, in relation to each stage, factors of partnership turbulence that we coded as volatility, uncertainty, complexity and ambiguity, and their respective percentages. It shows that each model had a different configuration of perceived VUCA. For instance, the emergent model was characterized by perceived volatility, uncertainty and ambiguity, the brokering model had high levels of perceived volatility, uncertainty, ambiguity and complexity, while the platform model was characterized by a predominant perception of complexity. In addition to table 1 and to the field notes that are present in this section, tables 2, 3 and 4 include additional field note excerpts that exemplify how informants perceived VUCA factors in relation to the emergent, brokering and platform models, respectively. The tables provide excerpts for those VUCA factors that were reported more frequently for each model, and eludes excerpts for the factors that were the least frequently reported (less than 10%). At a close analysis of the tables, it can be seen that the five dimensions in the brokering model are in contrast with the five dimensions in the emergent model, and the same applies to the platform model when compared with the previous brokering model. As we further investigated these configurations with our informants, we found out that each new model was proposed as a solution to the VUCA threats of the previous model.

Insert table 1 here

Insert table 2 here

Insert table 3 here

Insert table 4 here

Summing up, with the support of tables 1, 2, 3 and 4, the findings in this session show that the three partnership models have different VUCA characteristics, such that each new model is a consequence of partners' attempts to deal with the VUCA conditions in the previous model. Specifically, it will be shown that the emergent model was a consequence of partners' attempt to answer the VUCA configuration of their external environments (as perceived by the partners at the moment in which the partnership was created); the brokering model was a consequence of the difficulties that partners experienced internally with the emergent model, and the platform model was a consequence of the internal difficulties that partners faced after implementing the brokering model. As follows, we detail these findings by presenting first how the partners perceived their external environments upon embarking in the partnership project. Then, we describe the three consequent models that they applied to their partnership in the continuous attempt to reduce perceived VUCA threats.

Collaboration as answer to an increasing level of perceived environmental VUCA

We found that partners framed interorganizational collaboration as both a necessity and an opportunity to deal with increasingly volatile, uncertain, complex and ambiguous market exchanges

with other stakeholders such as clients, competitors, financers, and social stakeholders at large (citizens, journalists, consumers, etc.)

One of the documents co-written by partners in the preliminary phases of negotiation of the partnership was suggestively entitled "Born out of the Need to Cooperate". The document made reference not only to the increasing challenges perceived by each partner in facing market conditions alone, but also to the belief that cooperation among organizations constituted a "powerful weapon" -as our informants termed it- against the "fast-paced", "uncertain", "unclear" and "crisis-plagued" times that each of them faced in their environments. According to the statements provided by our informants, an individualistic model of economic behavior had gradually led partnering companies adrift from the historical values of their community and into a situation of generalized socio-economic crisis which had generated a partial identity loss. The fast pace of social and economic relations and the uncertainty of the market transactions in which they were involved, were the most frequently inoked reasons for entering the innovation partnership. The following excerpt from an interview with the Innovation Manager of Industrial Association 1 provides an evoking example of these motivations, which is representative of the statements of many other partners that we interviewed, such as the urban planning manager of the Municipality or the general manager and the president of RIO, the University dean and the heads of the research groups that we interviewed:

"It has become crazy for us Industrial Associations, I guess it's normal considering the hard times our clients are having trying to figure out what the market is expecting from them these days, what they need to do to exit this crisis (…) This has also reduced our client base over the last two years and it definitely worries us. We are trying to propose investments in new innovation projects and we also need to find the time and the money … the fact is that things are moving so fast, and everybody is trying to stay alive, so the lifejacket logic prevails, and new investments are never a priority (…). So this is why I think joining forces is the only way to pull it through uncertainty" (Innovation Manager Industrial Association 1)

"Universities are having difficult times and we are all worried with how ambiguous our position is for this government (…). We are basically wrapped in a bubble of uncertainty, we don't know how and if new funding will be stipulated, we don't know whether one day the decision to freeze our salaries will be revoked. And times are increasingly changing (…) I just came back from a meeting about the third mission of the University (….) it means opening up to citizens, companies

and public institutions to regain our legitimation as a social and cultural institution (…) (University Dean)

As these excerpts suggest, collaboration was seen as the only way to resolve problems that each partner faced on its own, such as fighting against uncertainty, attracting new resource, managing increasingly complex cross-border projects, and keeping pace with fast-evolving socio-economic trends. As the following excerpt shows, apart from volatility and uncertainty, partners also lamented ambiguity of their position with respect to other relevant stakeholders, and the complexity of retrieving and appropriating new resources:

"I think that applying for EU funding is becoming more and more complex. Did you know for instance that in this region the competition is ten times higher than in (name of other regions)? Companies, universities and local governments must understand that force lies in unity, and only by splitting (the cake) according to their core abilities, will they be able to manage increasingly complex calls (for funded projects)" (Innovation Officer, European Regional Agency)

Joining a hybrid interorganizational partnership symbolized for partners the need to find advanced solutions to perceived VUCA threats in their environments, and at the same time represented a test of their ability to engage in meaningful collaboration at the regional level. Interorganizational public-private collaboration was thus seen as the one-best-way to deal with VUCA threats because it allowed partners to take advantage of each other's distinct characteristics, to gain competitive advantages with respect to their competitors and to achieve national and international prestige as an innovation hub. The following excerpt shows in which way the environmental turbulence (i.e., VUCA factors) was considered a stimulus to engage in a hybrid partnership for regional innovation:

"As I said also during the last BoD meeting, these are times of uncertainty, times in which things happen fast and change from one day to the next (…) competition is thicker for all of us. Also the Municipality is pressured by competition, and also the Chamber of Commerce is, just in a different way than the one private companies are used to. If we want not just to survive but also to thrive at some point, we need to become more agile about what we can do together (…) this is why we decided to set up this partnership that still needs to find its identity" (President of Chamber of Commerce)

As follows, we describe the emergent model that characterized the partnership in its initial phase, reflecting partners' need to deal with VUCA threats in their environment.

The emergent model

In the first phase of the collaboration, the partnership adopted an emergent model. Since partners had collaborated only occasionally and predominantly in dyads but never around long-term projects and never together in formalized partnerships, they had little knowledge of each other's goals and interests, and even less understanding about how to interconnect them. Therefore, all partners expressed the intention to create a highly fluid, unstructured partnership environment. According to partners, lack of structure would have allowed them to start dealing with VUCA threats in their environments in a flexible manner, hoping to make adjustments to the partnership as they got to know each other better, defined a set of common goals and built a common ground for communication. For this reason, we labelled the partnership stage as 'emergent'. RIO was in charge of supporting the emergent partnership. Its main tasks were organizing meetings, drafting the vision and the mission of the partnership according to partners' indications and ensuring communication between partners. However, after two years, partners realized that the emergent model was too fluid: Not only was the partnership unmanageable and did not provide concrete opportunities for partners' growth, but goals and activities were also highly dispersed inside the partnership. The main result was that partners showed low levels of commitment to the very goals that they had set for themselves. As follows, we show that despite having been set up as a solution to the high levels of perceived environmental VUCA (i.e., external turbulence), the emergent model was soon pervaded by high volatility, uncertainty and ambiguity (i.e., internal turbulence). In addition to this description, table 2 anticipated above provides interview excerpts that exemplify our informants' perceptions of VUCA threats for each of the five dimensions of the emergent model.

1. Single organizations' governance systems and partnership governance systems run in parallel: Organizations had to carry forward both the agenda of the partnership and their own agendas. Since the partnership was at an early stage and common goals were still to be defined, agendas were rarely aligned. For instance, the members of the RIO BoD did not always hold top management positions in the organizations that they represented. As such, the issues dealt with and

the decisions taken inside the BoD were not always on the priority list of the top management of each organization. Additionally, since top management considered the partnership as a "*risky endeavor in an already complicated scenario*" (Industrial Association 1 President's words), they did not significantly delegate decision making to RIO's BoD members. Instead, extraordinary BoD meetings with the top management of the single organizations (Mayor, University President, President of Chamber of Commerce, etc.) were organized once a year for the most important decisions. Given that the single organizations dealt with high levels of perceived external VUCA (see previous section), they decided to keep the strategies of the partnership loosely coupled with those of the single organizations as to allow partners to be more flexible and intervene quickly both in the partnership and in their environments. For instance, since partners struggled with volatile and uncertain organizational scenarios (e.g., how much to invest in innovation, how their main stakeholders would react to their investment decisions, which projects to interrupt, which ones to run separately, which to run as open innovation), they decided to build the partnership gradually, defining its structure step by step, according to the changing needs and requirements of their own organizations. Also, since the partnership was seen as work-in-progress -*"a painting that could still be anything we want it to be"*, as the head of a University research group termed it, partners did not use BoD meetings to talk about what went on in their own organizations, and how it mattered for what was going on inside the partnership. This aspect is exemplified by the following words of Industrial Association 2's innovation manager:

"We are trying to build something from scratch here. We can't pretend that we are ready to go. Companies that fail, association rules that are changing, (name of law that changes the rules of national funding for public institutions), markets that become more and more crowded (...) aligning each other will take time (...) we don't even know well what we need for ourselves, so how can we clearly communicate it to each other? It needs time".

As the excerpt above suggests, partners perceived the disconnection between the governance of the partnership and the governance of the partnering organizations as a cause of volatility because events happened fast in each organization and remained disparate at the partnership level. Furthermore, partners complained that running multiple governance systems in parallel was not

only a consequence of their difficulty to read clear trends in their environments (i.e., ambiguity) but also a consequence of the ambiguity that had gradually taken ahold of the partnership, given that organizations often remained vague about the decisions taken internally, stimulating, this way, the free interpretations of the other partners. For instance, in the following interview excerpt, the urban planning director of the Municipality complains about the volatility and ambiguity of a tentacular governance system (for other interview excerpts, see table 2).

"We continue to talk about becoming one but we keep on minding our own affairs, and making decisions without informing the others. I was talking with (name of Municipality legal advisor) the other day about it. Things happen so fast that by the time I find out about a partner's project it's already too late to jump in, and to say the truth, I still don't know what each partner is doing, I have a vague idea but (...) the Mayor does not invest in vague ideas" (Municipality Urban Planning Director)

2. Collaboration goals are heterogeneous, broadly defined and constantly transformed: The partnership entailed multiple partners and each of them expressed different goals about fighting VUCA, according to their own organizational agendas. To give an example, the Municipality was mainly concerned with finding new sponsors for projects of urban regeneration and social welfare. For the University, the partnership implied identifying new sponsors for research projects; for the industrial associations, the partnership afforded connections to a wide range of innovation skills and competencies that they could have offered their members without developing them internally. Consequently, each partner prioritized different stakeholders: the Municipality felt a pressing need to discuss the partnership projects with citizens, the industrial associations with private firms, the University with the National Association for University Research, the Chamber of Commerce with the government, the Public Utility Company with its shareholders, and so on.

Since each partner had different ideas about how to lower environmental turbulence, they perceived the partnership model as a cause of uncertainty about future returns (i.e., perceived uncertainty). Additionally, since partners were not able to find a way to both achieve their own goals and respect the partnership framework, the partnership goals remained broad, inclusive and highly ambiguous (i.e., perceived ambiguity). Moreover, since the partnership structure was

intentionally kept flexible, each organization modified partnership goals according to purposes at hand and reordered their priorities according to changing conditions in their environments. To give some examples, since the Municipality experienced a change of governance, its priorities about the partnership changed (from building the science park to gathering new funds for a bigger and more inclusive science park called "the innovation multiplex" which would have served better the its relationship with citizens). Constant change of priorities destabilized the partnership, introducing volatility -i.e., partners lamented the difficulty of staying up to date with other partners' changes of priorities- and uncertainty -i.e., partners lamented the perceived loss of direction in the partnership, which made its future uncertain (for interview excerpts, see table 2).

3. Responsibilities are dispersed by partnership's gradual implementation: Since the partnership entailed a high number of partners, responsibility belonged to everybody and to nobody at the same time. To give an example, when partners decided to build a science park to host the collaborations projects of the partnership, they unanimously agreed about the usefulness of the project and deliberated to invest in its realization (albeit to different extents –i.e., the Municipality managed the realization of the building, the University agreed to transfer research staff and facilities to the park, the Chamber of Commerce destined financial resources to the project, RIO was in charge of the project management, etc.). However, since partners wanted to respect each other's autonomy and keep the partnership as agile as possible, roles and responsibilities were not clearly set up. This made project outcomes both uncertain and ambiguous. As the following excerpt suggests, it often happened that partners could not clearly specify the functions that the science park would have had, or to whom, and in which way, it would have brought benefits (for other interview excerpts, see table 1)

"I think it's really beneficial, I really think it is, it's just that we're really novice about it, so it's quite messy and blurry. Nobody knows who's doing what, and the worst part is that we don't know who to call to get the information we need. We need time to make the process less uncertain (…) more anxiety-free" (Head of Private Research Lab)

Additionally, partners lamented high levels of volatility. As the previous extract testifies, the projects in the emergent phase followed the flow of interaction between partners. As a consequence, they were born spontaneously and went extinct spontaneously, usually after short intervals of time. Although long-term projects such as the science park did exist, they were set up without significant upfront planning. To give an example, responsibilities for projects were decided on the fly inside the BoD but were often modified afterwards, as the projects evolved. This allowed to accommodate partners' multiple interests as they emerged, and to keep projects open, flexible and collaborative. Yet, it also generated volatility. For instance, it often happened that partners made extemporaneous decisions outside of plenary meetings, such as reducing RIO's funding, increasing the budget of existing projects, or extending the scope and deadline of specific projects of interest. Such behaviors enhanced partners' perception that the partnership was both unpredictable and uncontrollable.

4. Partnership growth depends on partners' investment arrangements: The activities of the partnership largely depended on partners' financing. At the end of each year, RIO presented business plans and budgeting plans for the following year. Each member of the BoD discussed RIO's budgeting with the top management of their organization. As partners often found RIO's financial request beyond their scope and possibility (i.e., most partners informed us that they intended to keep their investments to the lower limit until the partnership crystalized its form), renegotiation of the business plan was a frequent practice. As shown in the following dialogue which is drawn from a BoD meeting, reluctance to invest in the partnership was lamented as a cause of volatile decision making and pervasive uncertainty:

Director, Chamber of Commerce: "I'm sorry but this is too much for us to handle right now, it is not a mystery that Chambers of Commerce are in a very peculiar situation due to the new legislation of this government. As we said also before, we cannot guarantee anything right now, we need to stay light on our feet (…)

Legal Advisor, Municipality: "Yes, I understand, we all are going through times of big changes, so is the Municipality, you know it well, but this is making things really uncertain"

RIO GM: "And for us impossible to plan something, or be able to give timely answers to your requests"

Since the reluctance to finance the partnership impacted the functioning of RIO (i.e., reduced the number and type of projects in the partnership), partnering organizations also tried to mobilize resources coming from outside the partnership to meet RIO's financial requirements (e.g., trying to convince their business partners to invest in RIO). However, such behavior often caused additional volatility and uncertainty about which investments were realistic and which projects would have never been financed. In turn, the situation made partners even less prone to finance RIO's activities, as lamented by RIO's President in the following excerpt.

"I know they (Chamber of Commerce) don't know what will happen to them this year, but it's unfair that this impacts us as well, (and that) I also have to say to my employees that I don't know what will happen to them the upcoming year." (RIO President)

5. Information shortage: Since information was flowing very fast and unevenly (i.e., in partner dyads, between RIO and single partners, etc.), partners had limited information about each other's projects, initiatives, goals and activities. The communication system was deemed by all parties faulty and dispersive and, as shown in the following excerpt, it thus increased partners' perception of volatility and uncertainty (see also table 2).

"We don't talk to each other a lot, and we don't know what the others are doing, so we can't tell if a project is an opportunity for us or not, whether it is a good idea to jump in or not, because we just don't have enough information. This is what we're expecting from RIO (...) to become the megaphone in this partnership" (Innovation Officer 2, Industrial Association 1)

Summarizing, the main advantage of the emergent model was keeping boundaries between partners' external environments and partnership environment highly mobile and permeable. An open and flexible collaboration model allowed partners to gradually acclimatize to working together, without worrying too much about the partnership evolution, the intentions of the other partners or the partnership events. Freedom to make experiments and the possibility to choose when and how much to invest were also important advantages of the emergent model. However, the volatility, uncertainty and ambiguity that characterized the model gave the perception that the partnership was not moving forward.

The brokering model

In the second phase of the collaboration, RIO was designated as broker –i.e., boundary organization that was expected to collect, assemble and enact the multiple interests of its shareholders. Specifically, to deal with the VUCA threats that had characterized the emergent model, partners asked RIO to act as the accelerator of a dense and cohesive network of actors, resources and projects. Since partners felt the pressure to act as a collective organization, they expected RIO to scout, manage and carry out projects on their behalf. RIO thus became the central node inside the partnership and all activities were expected to run through its staff. At the end of 2014, RIO traversed financial and legitimacy crises, mostly due to partners' reluctance to make further investments. Partners' perception that RIO was unable to generate value for their organizations determined them to publicly acknowledge that the adoption of the brokering model had been a mistake. Not only the model did not generate value for the single organizations, but it also failed to make the partnership grow. As time passed, RIO was perceived as a third party that no longer represented partners' interests. In particular, the intention to delegate to RIO all aspects of partnership management, on the one hand, and their unwillingness to give up control, on the other hand, generated an environment with a higher level of VUCA, as follows:

1. Split hierarchy: In the attempt to give structure to the emergent flow of interactions that characterized the first stage, RIO was formally assigned the responsibility to coordinate common projects although was not provided with the authority to do it. On the one hand, the decision to run everything through RIO lowered partners' levels of perceived partnership volatility (see table 3). However, the very lack of structure that partners tried to solve by making RIO a broker conditioned their willingness to invest in the new partnership governance. Specifically, most partners considered the new governance "messy and unpredictable" (i.e., complex and uncertain) and "blurry about who is in charge" (i.e., ambiguous), as our informants termed it, because it did not allow them to clearly understand how the new model would have worked to their advantage. As a consequence, they continued to run decision processes internally without coordinating with the other partners. In turn,

the process by which partners doubted that RIO could have accomplished its brokering mission steered discussions about who was actually in charge of the partnership (i.e., ambiguity), which in turn generated further uncertainty about the future of the partnership, and especially fear that the partnership could have been monopolized by the single interests of the partnering organizations.

"But the question is: Whose interests does RIO actually represent? Will it be able to represent us all? This will be the big test for them, I think (Innovation Manager, Ind. Ass1)

2. *Overflowing goals:* As the partnership evolved, partners' different goals proliferated in uncontrollable ways. [1]Specifically, partners continued to pursue multiple and highly divergent goals individually or in dyads, instead of negotiating them with the other partners. To give an example, it often happened that partners tried to assign tasks to RIO without prior consultation with the other partners. Additionally, it often occurred that partners acted opportunistically, bringing inside the partnership only projects with scarce resources or limited internal support, hoping that the collaboration with the other partners would compensate for lacking resources, or would provide the necessary legitimation to move these projects forward. As a consequence, RIO's assignments were fluctuant, ambiguous and uncertain; Its brokering mission became increasingly complex as it had to supplant for the lack of organizational transparency in the partnership:

"Until three weeks ago, I actually didn't know much about the Municipality's request for RIO to be official organizer of the (name of international fair and exposition). When I talked to (RIO President) in the beginning he was exhilarated to finally see a big assignment, but yesterday (RIO general manager) was complaining that they haven't seen a dime and (name of Municipality advisor) said that they are thinking about not paying because there was a misunderstanding about the project location (…) to me these are just excuses to hide one's real intentions, all these situations are making the partnership fuzzier every day"(Head of Department, University)

3. *Double unaccountability in goal implementation*: RIO was evaluated each year based on a generic mission of 'innovation and technological transfer', and not on clearly established project outcomes. This was motivated by partners' intention to allow RIO high autonomy and flexibility,

[1] To give an example, the Municipality was concerned with urban development, social welfare and cultural initiatives, the University with obtaining new research funding, the Chamber of Commerce was interested in legitimating its choices for funding allocation, the Public Utility Company was concerned with a specific urban regeneration project, the European Office aimed at implementing a network of science parks across the region, and the trade and industrial associations were animated by the need to defend the interests of the firms they represented, and their own interests as well (e.g., mergers with other industrial associations).

on the one hand, but also by their intention to avoid direct responsibility for the partnerships' projects. Partners complained that RIO only rarely acted like a partnership broker. For instance, they lamented that RIO's staff rarely took initiative to create new opportunities for the partners and for other regional stakeholders. In their defense, RIO top management invoked their lack of institutional legitimation and blamed the partners for not trusting them enough to delegate more.

"To me this is pure unaccountability. They accuse us of not delivering results but they hardly give us anything to be accountable for (...) they themselves refuse accountability of new projects (...) as complex as (in) a regional innovation office (General Manager RIO)

As can be seen also in the excerpt provided above, the unaccountability of which partners and RIO accused each other generated high levels of perceived volatility, uncertainty, complexity and ambiguity in the governance of the partnership, specifically in relation to setting up new projects, as shown also in the interview excerpts in table 3. To give some examples, partners experienced ambiguity about *"who is doing what for this partnership"* (President of Industrial Association 2), and an increasing perception that the partnership was not only *"getting more and more difficult to make sense of*" (Head of Research Lab University) (i.e., volatility) but also more *"unpredictable, especially when it comes to implementation*" (Innovation Officer, European Regional Agency).

4. Decreasing investments: As they adopted the brokering model, partners intended to leave behind the informal and unpredictable agreements that characterized the emergent model. As a consequence, in the context of an 'urgent BoD meeting", they committed to increase financing of RIO's activity. Nevertheless, we found that throughout the brokering stage, shareholder's financial support to RIO was limited, and diminished each year. We argue that also in this case partners were conditioned by that which they tried to put an end to. For instance, during interviews partners often manifested the concern that RIO was not generating value for their organizations. The consequence was that they started acting unpredictably and changed their financing plans without notice. Additionally, it was also common that partners did not financially cover the projects they assigned to RIO. Since RIO's budget was constantly fluctuating, plans for the future became increasingly volatile and uncertain. Also, the ambiguity about RIO's ability to keep projects alive, and deliver

them according to plans was on the rise. The excerpts above manifest partners' and RIO's frustration concerning the volatility and ambiguity of investment decisions in the partnership. We found that discontent was the strongest in informants that worked for RIO because they felt accountable for results for which they did not receive commensurate funds.

5. *Information flows fast, asymmetrically and unpredictably*: Since partners saw a more integrated knowledge flow as beneficial, they expected for RIO to provide an adequate platform for efficient knowledge exchanges (see also table 3). Yet, although partners were connected through RIO, the flow of projects, plans, objectives and expectations that each partner brought to the partnership was higher than what RIO could filter, code, stock, retrieve and retransmit -something that partners had already lamented in the previous stage (see table 3). Thus, we found that also during the brokering stage partners' communication ran mostly through informal relations and depended on RIO's ability to use informal relations to create consensus among partners. Since partners assembled and disassembled information swiftly, according to purposes at hand, perceived informational volatility was on the rise. Moreover, since information flowed asymmetrically, informants also mentioned pervasive uncertainty and ambiguity about each other's knowledge and intentions.

Summarizing, to deal with the VUCA threats of an emergent partnership, partners may be tempted to propose more centralized organizational models. The adoption of a brokering model can generate a sort of ambidexterity by which partners remain focused on their core missions while creating boundary organizations to operate on their behalf in new fields of interests. We have exemplified the reasons why the brokering model was perceived as a failure by partners, and have shown that such perceptions caused higher levels of perceived turbulence than the ones partners tried to solve. Table 1 shows that that the number of times that partners mentioned VUCA factors in the brokering stage was higher than in the emergent stage. The main risk of the model, we argued, had to do with partners' unrealistic attempts to switch from a situation with high perceived VUCA

threats to a model that was theoretically low on VUCA because it delegated all sources of turbulence to a third party (i.e., RIO).

The platform model

After a long and hurdled period of transition, partners decided to keep the partnership alive and to restructure RIO according to a new model that they hoped would have reflected more closely their specific needs and interests. Despite the discontent with the brokering model, multiple institutional pressures prevented partners from declaring the failure of the partnership. Since partners were inserted in a natural ecosystem (i.e., the region), the failure of the partnership was perceived as a potential threat for the public domain -a *"point of no return in the evolution of the community"*, as some of our informants termed it. As a consequence, partners were motivated to avoid breakpoints at all costs, and find new solutions to carry the partnership forward. Starting with the end of 2015, partners engaged in a one-year consultation process aimed at reorganizing RIO according to a business model that we labeled platform. The platform model was designed, prototyped and is currently being tested, as follows:

1. *Concentrating governance and widening participation:* To avoid the emergent interaction in the first stage and the centralization conflicts of the brokering stage, partners decided to reduce the shareholder base as to concentrate authority, responsibility and decision making inside a 'circumscribed perimeter', as they often called it. Moreover, in order to avoid the split hierarchy issues and put an end to urgent BoD meetings, RIO's BoD was renewed to include the top management of the partnering organizations (Mayor, University Dean, Presidents of Industrial Associations, President of Public Utility Company, President of European Regional Agency and President of RIO). This also contributed to the creation of a more circumscribed circle of decision makers, which could make events less ambiguous and unpredictable. At the same time, partners also believed that widening the stakeholders base could attract more resources and foster partnership growth. The solution chosen was to concentrate governance and widen participation at the same time. We found that this solution significantly decreased the perceived uncertainty and

ambiguity, and moderately also that of volatility, but also increased the perceived complexity of the partnership governance, on the other. For instance, at times shareholders lamented that it was difficult for them to understand their advantages with respect to external stakeholders that could enter and exit the partnership as they pleased. Therefore, while the new governance had the potential to solve some of the problems of the previous models, as the number of involved parties increased, so did partners' perception of partnership volatility.

"I mean, I think we need something that is both structured and flexible because we are a very different bunch of people (…), we need accountability and I've been saying it for years, a more accountable BoD would do us good (…) But it's not easy to see the advantages of investing in this platform (…) (Why) sit in the BoD if anyone can have access to our competencies… I know we are the ones to approve new innovation units but I see that a bit complicated and unrealistic, to say the truth" (General Manager, Chamber of Commerce)

2. Multi-layered platform hosts heterogeneous but highly specific goals: RIO's old mission regarding generic activities of innovation and knowledge transfer had to undergo transformation. Every activity that RIO engaged in had to become the direct expression of stakeholders' interests, transforming RIO from a boundary organization that operated on the market with the mandate of its shareholders to a boundary-less organization that coopted projects from a wide number of local stakeholders (i.e., private companies, investors, research centers, government agencies). While the interests of such local stakeholders were generally broad, the partnership set the rule that only highly specific goals could have been considered for the startup of new projects. Thus, for a goal to become a project, the interested stakeholders had to set up a specific innovation unit (see point 3 below). In addition, partners were encouraged to take initiative according to their own organizational systems of relevance (i.e., interests, goals, work cultures) and launch projects themselves. Differently from the broker model, RIO was no longer a central node in partners' interactions but a support function for specific initiatives. On the one hand, this measure aimed at decreasing both partners' uncertainty about RIO's performance and the ambiguity about RIO's ability to generate value. On the other hand, however, negotiating partners' systems of relevance

and coordinating them with those of other stakeholders also became a more complex and volatile matter, as exemplified by the words of our informants retrievable in table 4.

3. *Disintermediation of goal implementation:* Rather than delegating projects to RIO, shareholders and stakeholders decided to launch projects themselves under the form of innovation units. These latter must be set up on the basis of a clear project goal which requires collaboration between organizations inside or outside the partnership. So far, innovation units set up regarded the setup of the science park, the plan to create a joint industry-academia PhD and the design of a national database of technology transfer projects. With the help of RIO, the triggering organization identifies and mobilizes relevant partners to set up the rest of the innovation unit. The intention of this rule is that partners maintain high responsibilities inside innovation units, including defining the purpose of the project, clarifying goals and sub-goals, budgeting the project activities and composing project management teams. Each innovation unit is thus designed, managed and evaluated only by those organizations that directly participate to its implementation. The main mission of RIO is the coordination of the innovation units. First, RIO is responsible for providing a set of basic and customized services to the innovation units, either by using internal resources or by drawing on a pool of external collaborators -consulting firms, professionals, freelancers, etc.

Specifying the functioning of innovation units and clarifying the role of RIO in the platform model was highly appreciated by partners. Specifically, as shown also in tables 1 and 4 our informants manifested a perceived increase of control over partnership's resource allocation, and, consequently, a lower level of volatility, uncertainty and ambiguity. However, both partners and RIO lamented the coordination costs deriving from the complexity of finding the resources and interested stakeholders to launch innovation units.

4. Mobilizing network externalities: The platform model requires that in addition to supporting innovation units, RIO collaborates with the BoD of the partnership to create synergies between innovation units, scout for new resources outside the partnership, encourage new entrances and anticipate exits, manage the overall portfolio of innovation units, and plan its short and long-

term development. As far as financing is concerned, partners agreed to issue an annual contribution for RIO's basic services to the platform, and to pay variable fees for RIO's support to the single innovation units. As shown in the following excerpt, the active participation of the partners to the operative life of the partnership downplayed the role of RIO, and thus also partners' perceived uncertainty about their ability to finance RIO's activities. On the other hand, however, informants lamented the increasing complexity of funding and effectively managing projects of interest, especially at the light of the volatilie intentions of external stakeholders:

"The strength of this model is in my view also its biggest weakness. We are dealing with a total lack of predictability about the number and scale of innovation units we will host this year, next year, the year after and so forth (...) Assuming that an organization like RIO that has salaries to pay every month can depend on the incomes of these innovation units, is a bit too optimistic. Best case scenario it will take time, and drawing so many different resources will be complicated, I assume" (Municipality Legal Advisor)

5. *Focus on communication and reporting infrastructures*. As part of the new platform model, RIO should also play an active role in facilitating information flows inside, across and outside innovation units. Specifically, each innovation unit is required to communicate the state of art of its project to RIO's staff, which in turn are required to report to the BoD. While all involved actors highlighted the need to build a functional reporting structure for the partnership, they also expressed concerns about the increasing complexity of the envisioned structure, and feared that a more structured communication would have introduced rigidity in the partnership's ability to answer threats and opportunities in its environment.

In synthesis, in an open platform, the boundaries between shareholders and stakeholders (i.e., interested individuals, organizations or communities that are situated outside the partnership) become blurred, creating a set of advantages such as capacity to mobilize network externalities, the generation of new ideas, and the ability to deal with them more systematically than in the previous model. The innovation units can be imagined as small businesses that plan, finance, implement, promote and monitor projects of direct concern for which they act as entrepreneurs rather than as representatives. The parties involved in innovation units maintain full control on goal setting,

resource allocation and project implementation, which lowers perceived levels of uncertainty and ambiguity. However, open platforms also bring about very high levels of perceived partnership complexity regarding coordination costs and available resources.

Discussion

From emergence to brokering: How do partners go from perceptions of external turbulence to perceptions of turbulence at the partnership level?

Our field study investigated the evolution of a regional innovation hybrid partnership as a consequence of perceived environmental turbulence. Summarizing the three models described above (see table 1) the emergent model was intended as fluid, unstructured and interactive and thus had high degrees of volatility, uncertainty and ambiguity. The brokering model implied giving additional structure to the partnership and was conceived as a remedy to the VUCA threats in the emergent model. However, it failed because it created an environment with even higher levels of perceived VUCA. In the mature stage, partners designed a platform model to restore a fluid organization model which reduced the uncertainty, ambiguity and (moderately) volatility perceptions inside the partnership but it entailed perceptions of higher complexity.

As a first contribution, our paper discusses the relationship between perceived environmental turbulence and the collaboration strategies by which organizations try to solve them. In particular, while the VUCA framework has referred to volatility, uncertainty, complexity and ambiguity as environmental contingencies, we show that VUCA factors are also present at the partnership level. From such standpoint, VUCA factors are not only drivers of collaboration but can also become outcomes of the very collaboration by which partners try to deal with turbulent environments. Therefore, differently from previous studies, our paper discusses VUCA factors as both external (i.e., environmental) and internal (i.e., partnership) threats, emphasizing that the existence of VUCA is connected to perceptions that actors develop about what is inside and outside their organizational perimeters. Specifically, although it has become almost commonplace to think about public and private organizations in collaborative terms, it is also important to consider that partnerships are

highly dependent on the characteristics of the environments in which they develop. We have shown that organizations may decide to enroll in an innovation partnership to cope with perceived VUCA threats in their own environments. This may lead to the paradoxical situation by which very different organizations enter a partnership for a similar reason -i.e., to escape VUCA threats, but given that they interpret these VUCA threats differently, their collaboration mobilizes divergent priorities, creates misunderstandings and triggers informational overflow, thus way increasing, instead of decreasing, perceived VUCA threats.

Additionally, we argue that perceptions of environmental VUCA are central not only in the setup of a hybrid partnership but also in its transformation. From such standpoint, we suggest that hybrid partnerships could be seen as micro-environments able to recreate internally the VUCA conditions of partners' external environments (Cooke et al., 2002; Gulati, 1998; Murphy and Arenas, 2010). If we do not account for circles of interdependencies between internal and external VUCA perceptions, the risk is to adopt some remedies without attaining the desired benefits. In particular, we here drew attention to different mechanisms by which the attempts to reduce one VUCA factor at a point in time can lead to an increase in other factors or even in that same factor at the next point in time.

Relatedly, we draw attention to the unintended consequences of dealing with VUCA factors. For instance, extant research that considers VUCA factors only as antecedents of organizational strategies (and not also as interrelated consequences) highlights a series of strategies by which VUCA factors can be lowered. Accordingly, experimentation can represent a strategy to escape ambiguity, internal restructuring a way to deal with complexity, gathering additional information a tool to limit uncertainty and complexity, and accumulating slack resources a way to stay agile and fight volatility (Bennett and Lemoine, 2014a; Oliver, 1991). Conversely, we show that in interorganizational partnerships, volatility, uncertainty, ambiguity and complexity are relational constructs –i.e., they cannot be defined outside relations with partners' systems of meaning (Sydow et al., 2013). From a relational standpoint, the actions described above could make matters worse

instead of bettering them. For instance, partnering with others to accumulate new resources allows an organization to fight volatility by staying agile. However, if the partnership has a complex articulation and members pursue multiple and heterogeneous interests, partners' perceptions of volatility might increase, despite their intentions. Similarly, the uncertainties experienced by each partner are a function of their roles, meanings, and relationships with the other partners (see Bennett and Lemoine, 2014a; Brugnach et al., 2008). Partner, task, or technological uncertainties strongly influence the governance model that organizations choose for a partnership, which in turn impacts a partnership's ability to grow (Cooke 2002; Koppenjan and Klijn, 2004; Santoro and McGill, 2005). From such standpoint, also solving uncertainty by gathering new information can have an opposite consequence than envisioned by partners. Analogously, when it lacks systematization, experimentation can have a dramatic impact on hybrid partnerships because it further propagates partnership heterogeneity and prevents partners from developing a common ground for successful interaction (Austin and Seitanidi, 2012a, 2012b; Babiak and Thibault, 2009). Last and most importantly, complexity, which reflects the difficulty of coordinating independent organizations with irreducible cultures, interests and business models, is one of the main factors responsible for the failure of interorganizational collaboration (Barringer and Harrison, 2000; Ring and Van de Ven, 1994). It is important to highlight that in our study, organizational restructuring, which Bennett and Lemoine indicate as the most viable solution to reduce environmental complexity, was the strategy that paradoxically brought the highest level of complexity (see in particular the transition from the brokering to the platform model). In sum, we argue that the connections between perceptions of external and internal VUCA can be explained by the concept of relational VUCA. The relationality in VUCA factors explains why partners that are unsatisfied with a partnership model may draw on models that are completely different but without actually solving the perceived VUCA threats.

The other key contribution of this study is having shown the trial and error mechanisms by which partners pass from one organizational model to another to deal with perceived VUCA threats.

Ecosystems that encompass the public and the private domain develop around fuzzy sets of relations between multiple organizations with heterogeneous goals and interests (Hartley et al., 2013; Selsky and Parker, 2005; le Ber and Branzei, 2010). Studies suggest that a main factor to shape the developmental path of a hybrid innovation partnership is partners' ability to modify its model (Bryson et al., 2006; Cooke et al., 1997; Doloreux and Parto, 2005; Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz, 1996, Iammarino, 2005). We have shown that a partnership can have different organizational models throughout its lifecycle, and that each model can have a unique VUCA configuration. Our findings show that perceptions of VUCA environments influence how members of hybrid partnerships decide to structure their collaboration at different points in time, and how VUCA perceptions at point t1 influence partners' decisions to introduce changes to the partnership model at points t2 and t3. This study has shown that ambiguous objectives, uncertain outcomes and divergent and rapidly-changing interests might induce partners to opt for an emergent partnership model in the initial stages but that, despite partners' expectations, this model may not solve the external VUCA threats for which it was created. Additionally, partners' perceptions in later stages that turbulence is rising despite their attempts to lower it, may push them to try completely different models. In our case, the more centralized model (i.e., brokering) expected that a partnership broker could have isolated partners from their perceived VUCA threats. Importantly, we have suggested that the will to delegate all responsibility to a broker, on the one hand, and the fear of letting go of control, on the other, may generate paradoxical situations inside the partnership and lead to opposite effects from the ones envisioned, especially when partners make an abrupt step from an emergent to a centralized model. This does not mean that the brokering model is destined to fail in any situation but that in the environmental conditions here described, only difficultly could have partners' goodwill or best practices avoided the failure of the model. In particular, while there are examples of regional innovation systems that use a brokering model successfully (Klerkx and Leeuwis, 2009; Villani et al., 2017), we suggest that the likelihood for brokering organizations to reach the objectives for

which they were created decreases as the number and heterogeneity of goals assigned to these brokers increases, especially when partners are reluctant to hand over control. Our findings thus integrate existing evidence on the complex relationship between partnership interests, broker delegation and need for control (see Rein and Stott, 2009, Stadtler and Probst, 2012).

We have shown that the platform model overcomes the problems of the brokering model because it gives space to public institutions, businesses and other social institutions to come together directly, without intermediation. Nevertheless, the platform model is also difficult to manage because it can increase the perceived complexity and volatility of partnership conditions. As a matter of fact, a functioning platform model requires elevated levels of volatility and complexity (Selsky and Parker, 2005). For instance, the flow of resources and information on the platform depends heavily on how much partnering organizations actually behave like entrepreneurs and on their ability to mobilize other actors inside and outside the partnership. In the absence of these conditions, the network becomes less dense, and the ability to mobilize network externalities also becomes more modest. While these two aspects have been discussed in the regional innovation literature (Cooke et al., 1997; Etkowitz, 2008; Fontana et al., 2006), our study brings evidence of the underlying process-based mechanisms by which partners create the conditions for their partnership model, both intentionally and unintentionally. Summing up, we argue that increasing attention should be paid not only to how partners *intend* to reduce VUCA factors, but also to the *unintended consequences of their actions* on how the partnership evolves.

Limitations and future directions for research

Of course, one of the main limitations of this study is the single longitudinal case. Further research is needed to document the emergent-broker-platform sequence, or show the existence of alternative sequences and their respective VUCA configurations. Future research is also needed to investigate when the transition from an open model such as the emergent model, to a delegation model such as the brokering model, generates negative rather than positive consequences for the evolution of the partnership. Our findings suggest that partners' battle to maintain control over partnership activities

(even against the organization that they themselves had created ad hoc!), was a spontaneous reaction to their perceptions of high partnership VUCA. Future studies may further investigate the relationship between perception of control over the partnership, degree of partnership heterogeneity and partnership model innovation, to join the current conversation on the relationship between control, uncertainty and interorganizational governance (e.g. Klerkx and Leeuwis, 2009; Dekker, 2004; Santoro and McGill, 2005).

Additionally, our data collection ends with the platform stage which, as we have shown, is not free of challenges (i.e., increased complexity). We cannot exclude that the partnership will adopt in the future a new model to deal with the complexity of the current model. Future research thus may investigate when and whether partnerships that adopt sophisticated models which lower volatility, uncertainty and ambiguity by increasing complexity, may be downgraded to simpler models such as the brokering model here described. In other words, it is important to understand which VUCA factor (if any) is more important for a hybrid partnership, and whether its importance remains stable across the lifecycle of the partnership, or changes according to development stage.

Implications for practice: Can and should hybrid partnerships escape VUCA threats?

Our study highlights that modifying a partnership's model can sometimes make things worse as far as perceived volatility, uncertainty, complexity and ambiguity. This happens when partners tend to overestimate existing environmental threats, and downplay the additional threats of collaborative solutions. This is even more the case when members of different organizations decide to collaborate not for a clearly defined common goal, but to solve their own -different and thus, potentially irreconcilable-VUCA threats. It is thus highly important to keep in mind that strategies to deal with VUCA are not neutral, as they themselves can become impregnated with VUCA and further complicate the situation of each partner. In particular, we draw attention to the importance of considering VUCA also as a consequence of how each partner decides to interact with the others. We also suggest that although in cases of high perceived turbulence adopting a completely different partnership model may seem the best solution to turn the table around, such decision may actually

worsen the situations if partners are not ready for a big jump (e.g., from a highly emergent to a very structured model). Thus, monitoring the trial and error processes of model innovation can provide greater knowledge and control over VUCA environments. We suggest that participants and managers of hybrid partnerships should pay attention to identifying, signaling and managing both advantages and disadvantages of VUCA environments in a dynamic manner. This implies understanding how adopting a new model will change each VUCA parameter of the current model and, at the same time, how manageable the parameters of the new model will be in terms of partnership strategy, structure and mobilizable resources. We have shown that although more articulated partnership models can lower volatility, uncertainty and ambiguity, they also can be more complex to manage. When adopting such models, it is particularly important to set up appropriate infrastructures to support the professionalization of platform managers such as training offers, policy guidelines or access to existing best practices (see also Stadtler and Probst, 2012). In the same way, whenever platform managers are used as brokers, partners must both delegate and empower them, avoiding extemporaneous separations between their roles and responsibilities and those of the broker. In sum, we argue that for the benefits of hybrid partnerships to be achieved, each partner must have a realistic understanding of both the challenges and potential pitfalls of their relationships (see also Sagawa and Segal, 2000; Vurro et al., 2010).

Last, Bennett and Lemoine (2014b) have suggested that agility, information gathering, experimentation and alignment between organizational structure and external environment, respectively, represent useful strategies to reduce VUCA. Although these suggestions make sense singularly, when implemented as a whole they may generate unexpected interactions as the ones shown in this study. A clear business agenda, strong partners committed to change, investments by all involved parties, links to other organizations outside the partnership, and attention to how VUCA factors oscillate in time, can push hybrid partnerships forwards and help them cope with pervasive threats of turbulence.

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Figure 1. Data structure

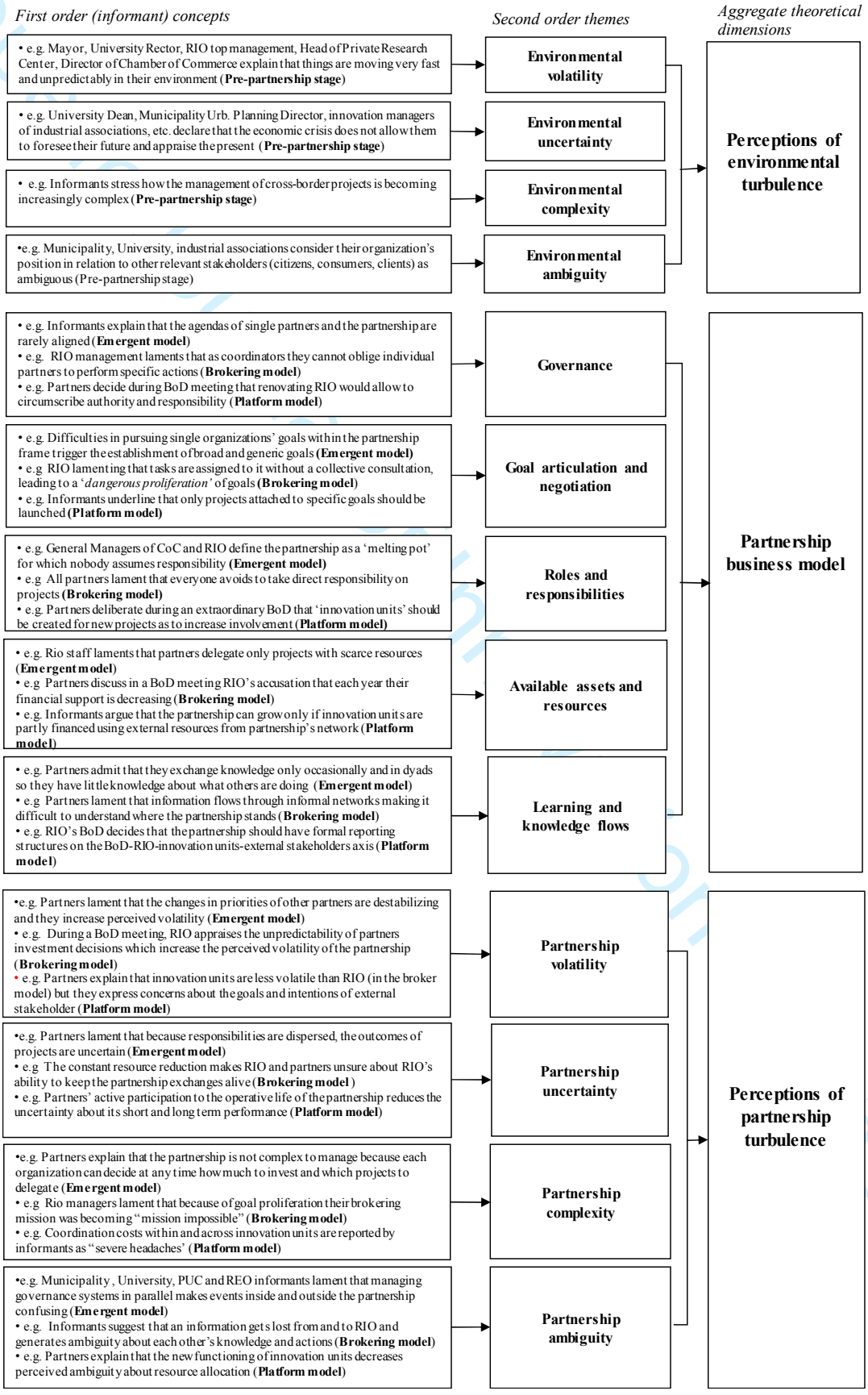

Table 1. Three organization models across a partnership's lifecycle (emergent, brokering and platform models) and the perceptions of VUCA factors for each model

Partnership Dimensions	Emergent Model	V	U	C	A	Brokering Model	V	U	C	A	Platform Model	V	U	C	A
1. Partnership governance	1. Organizational governance and partnership governance run in parallel	34 (37,8%)	13 (14,4%)	2 (2,2%)	41 (45,6%)	1. Split hierarchy	11 (7,7%)	53 (37,3%)	31 (21,8%)	47 (33,1%)	1. Concentrated governance and wide participation	19 (20,9%)	9 (9,9%)	54 (59,3%)	9 (9,9%)
2. Partnership goal articulation & negotiation	2. Collaboration goals are heterogeneous, broadly defined and constantly transformed	27 (23,1%)	35 (29,9%)	9 (7,7%)	46 (39,3%)	2. Overflowing goals	55 (26,2%)	63 (30,0%)	45 (21,4%)	47 (22,4%)	2. Multi-layered platform hosts heterogeneous but specific goals	35 (28%)	8 (6,4%)	72 (57,6%)	10 (8%)
3. Roles & responsibilities	3. Responsibilities are dispersed by gradual implementation	22 (13,8%)	60 (37,7%)	10 (6,3%)	67 (42,1%)	3. Double unaccountability in goal implementation	46 (18,8%)	78 (31,8%)	65 (26,5%)	56 (22,9%)	3.Disintermediation of goal implementation	8 (10,3%)	7 (9%)	60 (76,9%)	3 (3,8%)
4. Available assets & resources	4. Growth of the partnership depends on partners' investment arrangements	47 (47%)	39 (39%)	5 (5%)	9 (9%)	4. Decreasing investments	24 (12,6%)	52 (27,4%)	41 (21,6%)	73 (38,4%)	4. Mobilizing network externalities	12 (16,7%)	6 (8,3%)	51 (70,8%)	3 (4,2%)
5. Learning & knowledge flow	5. Lack of shared information	28 (39,4%)	34 (47,9%)	2 (2,8%)	7 (9,9%)	5. Information flows fast, asymmetrically, and unpredictably	38 (18,8%)	46 (22,8%)	57 (28,2%)	61 (30,2%)	5. Focus on communication and reporting infrastructures	5 (9,6%)	3 (5,8%)	39 (75%)	5 (9,6%)

Table 2. Perceptions of VUCA threats in the emergent model

Partnership Dimensions	Emergent Model	Perceived partnership volatility	Perceived partnership uncertainty	Perceived partnership complexity	Perceived partnership ambiguity
1. Partnership governance	1. Organizational governance and partnership governance run in parallel	*"Each of us faces multiple challenges (…) on the one hand we must become more flexible internally, in how we optimize our costs while serving our main stakeholders, on the other, we need to increase our aggregation skills, and develop an appropriate platform for coordination (…) autonomy must be maintained, of course" (Dean, University)*	*N/A**	*N/A*	*"By now the difficult economic times we are facing have made us all realize we cannot act alone. Standing together is essential for the growth of our community, it may seem a blurry goal, but it is in the interest of us all (…), we need to develop the habit of coordinating the inside and the outside" (President, RIO)*
2. Partnership goal articulation & negotiation	2. Collaboration goals are heterogeneous, broadly defined and constantly transformed	*"Will we come up with a common goal in two months' time? I see priorities change, of course, this is also due to the constant changes in governance, in legislations (…) it's a mess actually" (Head of Research Laboratory)*	*"We are now in a moment in which most partners have had some governance change, like the Municipality, or like ourselves. Of course, this impacts on goal continuity, hopefully newcomers will be willing to work towards a common goal, but you never know" (President, Chamber of Commerce)*	N/A	*"More than once I noticed that what each of us means by innovation is quite different () depends a lot on the background (…) I expect this to come through when we decide what we want to do with the science park project" (Dean, University)*
3. Roles & responsibilities	3. Responsibilities are dispersed by gradual implementation	*"There are some guidelines, but we still need to build everything, who is responsible for what, we still have to figure it out" (Innovation Officer, Ind. Association 2)*	*"It's hard to tell because it's not that clear how the project will evolve, RIO will have a pivotal role, but we need to also contribute, of course, first we must know each other, and decide how much we want to do together (…) (Officer, Trade Association).*	*N/A*	*"There are so many people involved in this, so what we will offer through these projects will be very qualified, and important. But I have to be honest, it's very difficult to get lost in this. We represent small firms (…) I'm not able to tell them exactly what this offer is, and how they can make the most of it (Director, Ind. Association 2)*
4. Available assets & resources	4. Growth of the partnership depends on partners' investment arrangements	*"It's not true that there aren't enough resources in this region. They just need to be directed towards joint investment if we want to think on a big scale" (Government Minister)*	*"We also have to figure out investments, I think the best way is to give people the freedom to participate in the projects they are most interested in" (Innovation Officer, Ind. Association 1).*	*N/A*	*N/A*
5. Learning & knowledge flow	5. Lack of shared information	*"The ideal would be to have a perfectly functioning, high speed communication system to keep up with all the messiness, and deliver knowledge flows efficiently, I think we are quite far from that at the time being (Head of Department 1, University)*	*"So, my question is: Will we be able to communicate this to our clients if for first we don't become very good at communicating with one another?" (Director, Ind. Association 2)*	*N/A*	*N/A*

***N/A stands for cases in which the frequency of a VUCA factor report was <10% of the total VUCA reported for each dimension**

Table 3. Perceptions of VUCA threats in the brokering model

Partnership Dimensions	Brokering Model	Perceived partnership volatility	Perceived partnership uncertainty	Perceived partnership complexity	Perceived partnership ambiguity
1. Partnership governance	1. Split hierarchy	*"We are all busy, things are happening fast so there isn't much time to coordinate things going on there with things we are trying to do here" (Innovation Officer 1, Municipality)*	*N/A**	*"I think one of the reasons we're having a hard time moving forward is that companies, Universities, research centers are still not able to figure out what they mean by innovation" (President, Chamber of Commerce).*	*"We need to build clear bridges between what goes on inside the organization and what goes on in the partnership. Otherwise, we risk getting confused (…) and (…) get stuck" (Innovation Officer, Ind. Association 1).*
2. Partnership goal articulation & negotiation	2. Overflowing goals	*"I'm afraid we'll end up paying for this lack of global planning. They (partners) blame it all on us but they don't realize we can't work to implement everyone's goals, it's dispersive (…) (President, RIO)*	*"The truth is we started this project because they (Municipality) officially named us project managers, we won a call about (name of project), but now we don't know if there is enough money, and the deadline is approaching, (…) we also have not been communicating optimally with other members of the project team (…)" (Innovation Officer 2, RIO)*	*"We've been talking about this science park for years now, right? (…) First, they said they wanted (…) an incubator, then a co-working zone, we also proposed the technology museum (…) It can become confusing, and for an architect's job it becomes increasingly complicated to modify the project like that" (Urban Planning Director, Municipality)* *It becomes a prisoner's dilemma (…) If you give me the gun and ask me to protect you from the wolves, but instead of loaded you hand it empty, or half empty, what should I do? So, the question is, do I turn over the gun and risk being considered dishonest, or do I keep it and try to prove you're wrong about me?" (General Manager, RIO)*	
3. Roles & responsibilities	3. Double unaccountability in goal implementation	*"There is this tendency to start acting right away, present, promote, show plans, bring evidence (..) in this partnership the emphasis is more on showing rather than actually thinking about what we want to do and who will be doing what. Instead of renderings, we need more accountability" (President, Chamber of Commerce)*	*"To be honest, I think it is a beautiful project, but I don't see anybody stepping up for what they want to do (…). This is difficult to understand for people outside the partnership, they just want to know who to turn to (Development Officer, Industrial Association 3).*	*"If we don't decide what we want to do, how much responsibility we want to take, I'm afraid it will become more complex as we move ahead" (Head of Research Group 2, University)*	*Let's say it's moving slow (…) According to us, the brokers are doing the best they can but it's not an easy situation (...)The challenge is to keep people focused, and state clearly what we want to accomplish (…) (President, European Office for Regional Development)*
4. Available assets & resources	4. Decreasing investments	*"Unfortunately, I'm lost in who has to do what (…) (Director, Ind. Association 2)*	*"The linear budget cuts have been devastating for all of us, so If the Municipality tells you out of a sudden: I don't have the money anymore, and the same for the University what do you do, then? (President, Ind.Ass.3)*	*"As you know, some partners have blamed us for keeping it (the partnership) on hold. But let me ask you something: Without resources, how can you push projects forward? We need support, tangible, support, otherwise we risk placing blames, instead of solving problems (…) For instance, RIO is close to bankruptcy because of lack of proper investments. The more we postpone clarifying our positions, the more things complicate"*	
5. Learning & knowledge flow	5. Information flows fast, asymmetrically, and unpredictably	*"So here I am talking to you and I find out that next week there will be a celebration for the science park opening (…) You see? This is exactly the kind of communication defaults I was telling you about (…)" (Head of Research Laboratory)*	*"I can't tell you if things evolved, when we spoke last, they were planning a shareholder meeting, and we haven't heard from them since (…). Since the future of RIO appears uncertain, we would need more information before jumping on another project (PM, Ind. Association 3).*	*"When we appointed RIO we thought it would help us find out about new projects, and funding opportunities, and why not, also learn more about others' projects but I can't say I have seen much of that so far (…) Instead of simpler, it's just more and more complicated" (Head of Research Group, University)*	*"If you don't communicate with us, how can we know that RIO is doing everything possible to make this partnership work? We see each other in this meeting every two months but it's still difficult to understand where we stand" (BOD member representing Municipality)*

*** N/A stands for cases in which the frequency of a VUCA factor report was <10% of the total VUCA reported for each dimension**

Table 4. Perceptions of VUCA threats in the platform model

Partnership Dimensions	Platform Model	Perceived partnership volatility	Perceived partnership uncertainty	Perceived partnership complexity	Perceived partnership ambiguity
1. Partnership governance	1. Concentrated governance and wide participation	*"After this meeting I feel I really understood the new model and I believe it can help us push the partnership forward. I just need to reflect a bit more about this fluid membership thing because I see it problematic, for us, partners, I mean" (President, Ind. Association 1).*	*N/A**	*"If you agree, I would first start by focusing on the innovation units and only at the end, when we have a feasible project, we can decide if to make changes in the governance, and (...) how to combine permanent and transient members, without freeriding (...) it is easier said than done" (Vice Director, Chamber of Commerce)*	*N/A*
2. Partnership goal articulation & negotiation	2. Multi-layered platform hosts heterogeneous but specific goals	*N/A*	N/A	*"One of the most complex parts will be co-opting interested parties within an innovation unit (..)"(Technological Transfer Representative, University)* *"(...) Especially, as complicated as this may sound, we must make sure nobody will come in and generically talk about "technological transfer" no more, we need specific goals and responsibilities on specific projects" (Technological Transfer Representative, University)*	*N/A*
3. Roles & responsibilities	3. Disintermediation in project implementation	*N/A*	*N/A*	*"We must make sure that each organization delegates the right people to each innovation unit, but the truth is we have never been able to influence how the partners assign people to the partnership. I understand this must change with the new model, but I don't exactly see how it will happen" (General Manager, RIO)*	*N/A*
4. Available assets & resources	4. Mobilizing network externalities	*"So how mamy people will we be able to coopt around innovation units? (Name of University Responsible for Technological Transfer) presented some projected numbers the other day, but it could be anything, people coming in and out as they please" (President, RIO)*	*N/A*	*"One of the hardest parts I see about this model is this, I mean, how do you motivate people to look for partners and for resources?" (BoD member representing Municipality)*	*N/A*
5. Learning & knowledge flow	5. Focus on communication and reporting infrastructures		*N/A*	*"The challenge is to make this whole machinery work. RIO will have a big responsibility, just as before, but now the relay is in the hands of each partner who must run this marathon for himself (...) I don't want to be cynical but when I think about coordination costs I get a headache (...) also because so far, our weak point has always been communication. In theory, if we work together in innovation units (...) I'm afraid we'll end up blocked in (this) complex turning wheel (...) (Innovation Officer, Ind. Association 3)*	*N/A*

***N/A stands for cases in which the frequency of a VUCA factor report was <10% of the total VUCA reported for each dimension**

Letter to Editor in Chief:

Manuscript ID EJIM-05-2017-0066 entitled "Brokers or Platforms? A Longitudinal Study of How Hybrid Interorganizational Partnerships for Regional Innovation Deal with VUCA Environments" which you submitted to the European Journal of Innovation Management, has been reviewed. The comments from reviewer(s) are included at the bottom of this letter.

In view of the criticisms of reviewer two, I must decline the manuscript for publication in the European Journal of Innovation Management at this time.

Reviewer 1 recommended acceptance, but I agree with reviewer two that a major limit of the paper is its lack of a scientific approach in justifying the proposed framework.

However, a new manuscript may be submitted which takes into consideration these comments.

Please note that resubmitting your manuscript does not guarantee eventual acceptance, and that your resubmission will be subject to re-review by the reviewer(s) before a decision is rendered.

Dear Prof. Corvello,

I would like to begin by thanking you for the responsiveness and support demonstrated in the course of this review process. Following your indications and those of the Reviewers, we have decided to resubmit our work to your attention, convinced that it has a strong fit with the mission and approach of your Journal and that it is worth being considered for publication. Over the last months, we have given our best to push the manuscript as closer as possible to the standards of EJIM and to the expectations of the Editor in Chief and the two Reviewers.

As you know, we received two reviews with contrasting feedback and indications. Over the past months we developed a new version of the manuscript, which we re-wrote almost completely in all its sections, to make sure that we live up to the expectations of all involved parties while also remaining true to our explorative research questions. The objectives that guided us through the revision process were the intention to preserve the strong aspects highlighted by both reviewers, on the one hand, and the motivation to answer the concerns and suggestions of Review 2, on the other hand. For these purposes, we have streamlined and systematized our theoretical frame, integrated the description of the methodology, re-elaborated the data analysis section, systematized better our field evidence as well as the discussion and the implications for practice.

In particular, the main changes that we have introduced in the new version of the manuscript are the following:

1. Theoretical frame: We streamlined the introduction and the theoretical frame to account for all the suggestions of Reviewer 2 (see points b2.1, b2.2., b3.1, b3.2 in the Letter to Reviewer 2).

- Specifically, we rewrote the introduction section to better emphasize the unique contribution that our paper brings to the VUCA model and to the literature on hybrid partnerships for regional innovation. We now highlight that while previous studies have focused on the role of environmental turbulence and have studied the solutions that organizations adopt against environmental turbulence, we make a distinction between perceptions of external turbulence and perceptions of internal (i.e., partnership-level) turbulence. We show that organizations may see partnerships as tools to cope with external turbulence but that, as soon as these tools are put into use, they also risk becoming impregnated with VUCA. In synthesis, we show that despite partners' intentions, collaborative attempts to solve perceived external turbulence can trigger perceptions of internal (i.e., collaboration) turbulence.
- We rewrote almost completely the section "Hybrid partnerships in turbulent environments: Opportunities or threats?" (now at page 7) to further highlight what we know about the role of environmental turbulence in the setup and evolution of partnerships, as suggested by Reviewer 2 (see our full response at points b2.1 and b2.2 in the Letter to Reviewer 2). We also rewrote almost completely the section "A VUCA approach to the challenges and opportunities of hybrid

partnerships" (now at page 9) to account for Reviewer 2's suggestion to emphasize the assumptions of the VUCA model as developed by Bennett and Lemoine in the initial conceptualization, instead of directly adopting their arguments to the level of the partnership as we had done in the previous version. Additionally, we also revised the last section of our theoretical frame called "Advancing a VUCA frame for hybrid partnership lifecycles" (now at page 11), as to state more clearly the research question of our study and stress the ways in which it sets our work apart from previous studies.

2. Methodology:

After engaging carefully with Reviewer 2's concerns regarding our approach to research and the quality of our data and method, we have decided for a two-step intervention. First, we went back to our data and engaged in a new round of coding which hopefully will provide the required details and clarifications between findings and method. Second, we included additional details about the data collection and analysis, hoping to make our method better understood, and hopefully also appreciated for its explorative power, rigor and precision. In particular, the main changes introduced are as follows:

- In the new version of the manuscript, we give more details on the grounded theory approach (stages of data collection and data analysis), including a table with the data structure of our grounded theory (i.e., the process by which we show how categories have formed during the process of coding, from the first order concepts elicited from our informants and up to the aggregate theoretical dimensions which allowed us to reach higher levels of abstraction).
- Thanks to the suggestion of Reviewer 2, we now distinguish between perceived environmental turbulence (external) and perceived partnership turbulence (i.e., internal). We describe better partners' initial perceptions of VUCA threats in their environments and show the trial and error adoption of three partnership models which were intended as solutions to external VUCA threats but ended up themselves pervaded by perceptions of VUCA (i.e., partnership VUCA). Upon Reviewer 2's indications, we now describe better the process by which mutual shaping occurs between external and internal perceptions of VUCA.
- We reworked our coding scheme. Consistent with the indications of a grounded theory approach, a new round of coding pushed us toward modifications of the grouping of some emerging categories. For example, to increase focus and parsimony, for each partnership model we now present 5 organizational dimensions (instead of 7) and show how our informants assessed each dimension in terms of VUCA factors.

Findings:

To increase the solidity of our findings and bring further evidence of how we coded our data and assembled our theoretical arguments, we expanded the description of the five organizational dimensions observed for each model (i.e., governance, goal articulation and negotiation, roles and responsibilities, available assets and resources, and learning and knowledge flow). Additionally, we tried to show as clearly as possible how the dimensions of each model are connected with partners' VUCA perceptions. Specifically, we now provide evidence of how informants assess dimensions from a VUCA perspective and we connect their perceptions with properties of the emergent model, brokering and platform model.

To support these aims, we also re-elaborated the tables presenting field note excepts. In addition, to make the relationship between findings and field notes more immediate, we inserted field note excerpts in the text of our findings. Additionally, upon Reviewer 2's recommendation, we created a new table (table 1) that displays the frequencies of the themes related to VUCA perceptions in each model. Specifically, the table computes the frequencies with which our informants mentioned (in documents and interview field notes), in relation to each stage, factors of partnership turbulence that we coded as volatility, uncertainty, complexity and ambiguity, and their respective percentages. The table allows us to show more convincingly that each model had a different configuration of perceived VUCA (see our full response at point b3.2 in the letter to Reviewer 2).

Discussion and Implications for practice:

We have re-written almost completely the discussion of our study to make it sharper and punchier. We now highlight our main contributions more concretely, emphasizing the importance of extending the VUCA frame to the partnership level, and investigating how organizations perceive the internal conditions of a

partnership and, more importantly, to establish the relationship between perceptions of environmental turbulence and perceptions of internal partnership turbulence. As highlighted above, a main contribution of our study is to show that despite partners' intentions, attempts to solve perceived environmental turbulence through collaboration can lead to perceived turbulence inside the collaboration. In the findings and discussion sections, we detail how and why that happens.
Additionally, we have adopted a more specific focus on the common traps that organizations engaged in hybrid partnerships might fall into precisely as they try to lower VUCA threats in their environments. This allowed us to answer Reviewer 2's invitation for a more specific discussion of our implications for practice. As implications for practice is something that we are particularly concerned about, we hope that in the new version we have managed to provide a more engaging conversation with practitioners.

Last, we would like to spend a few words on what seemed to be the main concern in our review letter, i.e., the fact that the paper lacked a scientific approach. While we do agree that for parsimony reasons we had left out some of the specifics of the data collection and data analysis, ours is a qualitative paper that is based on the methodology of grounded theory that has been a standard for decades, both inside and outside the field of management. Such methodology not only has a high ecological validity but also guarantees rigor thanks to a highly systematic, step-by-step approach to data analysis, which implies many iterations with the data and among data analysts, before reaching the final model. Just as quantitative methods require to follow specific protocols, so do qualitative methods, but as we usually do not enter into the details of why a regression allows researchers to study some aspects (thus, repeating each time what a regression is), in the same way, research standards of qualitative research normally take for granted that the philosophical underpinnings and underlying principles of the grounded theory are known to researchers. This convention, together with the fact that explaining all the details of qualitative work can be very lengthy, have pushed us to leave out some of the specifics of the study. Although we cannot enter into all the details of the grounded theory, in the new version of the manuscript we have tried to give readers as much as possible "a taste of the field", as well as all the necessary elements to understand our data analysis step by step.

Given these changes, we believe our revised manuscript is substantially improved and look forward to receiving further comments. In the following pages we detail the responses to each of the Reviewers' concerns.

Finally, let us thank you again for the support that have guided us in the revision process and pushed us to improve our paper.

Please do not hesitate to contact us should you need any further clarification.

Sincerely,

The Authors

Letter to Reviewer 1:

Reviewer(s)' Comments to Author:
Reviewer: 1

Recommendation: Accept

Comments:
I like the paper much, both theory and empirical results

Please let us express our deep gratitude for your appreciation and support. In the past months in which we revised our paper your comments and suggestions have been very motivational for our attempts to improve this work as much as possible and make it an important contribution to EJIM. To this purpose, we have almost completely rewritten the manuscript such that it now focuses more specifically on the relationship between perceptions of environmental turbulence (external VUCA) and partnership turbulence (internal VUCA).
The objectives that guided us through the revision process were the intention to preserve the strong aspects highlighted by both Reviewers, on the one hand, and the motivation to answer the concerns and suggestions of Review 2, on the other hand. For these purposes, we have streamlined and systematized our theoretical frame, integrated the description of the methodology, re-elaborated the data analysis section, as well as the discussion and the implications for practice.

In the Letter to the Editor in Chief we provide a full synthesis of the changes that we have implemented in the new version of the manuscript. The synthesis further discusses the positive remarks you had provided in the 'Additional Questions' (included below). Hoping that you will be persuaded that we have managed to further improve our work and make it a perfect fit with EJIM, we thank you for your attention and remain available to provide further details at all times.

Additional Questions:
1. Originality: Does the paper contain new and significant information adequate to justify publication?: The paper contributes to the literature on hybrid partnerships ans RIS. It contains new and significant information: up to now little is known about how turbulent environments shape the setup and evolution dynamics on hybrid partnerships for regional innovation. The paper sheds light on some aspects of this issue.

2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The paper cites an appropriate range of literature sources. Of course, there is a huge amount of literature on the subject, still the author{s} from our point of view, have mentioned sources that are the most relevant to discuss in this particular paper.

3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: The methods employed are relevant: qualitative methods are the most appropriate if understanding and explanation are the main target of research. The study draws on a multiple-year case study of a hybrid collaboration. The idea to use the VUCA model for analyzing turbulent environments is fruitful to bring new knowledge. The author(s) show that it is possible to use this model at the interorganizational level.

4. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: Results are presented clearly and analysed appropriately

5. Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: The research helps to better understanding of the dynamics through which hybrid partnerships function overtime that is important for choosing strategy, with the aim to rise performance. The author(s) contribute to practice by pointing out a set of common VUCA traps that organizations engaged in hybrid partnerships might fall into precisely as they try to lower VUCA threats present in their environments. it is very important for practitioners to find appropriate ways to avoid collaboration pitfalls.

6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the fields and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: Quality of communication is good, except some misprints (i.e. "evolution of regional evolution system"? "We also show that his can have unexpected negative consequences")

Letter to Reviewer 2

Recommendation: Reject & Resubmit

Comments:
This study intends to explain the formation and development process of the VUCA effects on hybrid partnership for regional innovation. Although the paper helps to understand the development mechanisms of hybrid partnership for regional innovation, it fails to explain the obvious relationship between VUCA and hybrid collaboration. Furthermore, the study lacks a scientific approach. For example, the basis for emergent models and the classification of the stage, and the way the seven dimensions are extracted are not clearly presented. For this reason, the results of this study can only provide very limited implications.

We would like to sincerely thank you for having provided clear, insightful and stimulating suggestions to help us revise our paper. Following your concerns, we have substantially rewritten our manuscript to account for the relationship between external and internal perceptions of VUCA in hybrid partnerships for regional innovation, and, in particular, to reach a better understanding of what happens when organizations choose to enter hybrid partnerships in order to deal with perceived threats in their environments. To this purpose, we now focus more closely on the relationship between perceptions of external turbulence, collaborative solutions for coping with external turbulence, and consequences at the partnership level in terms of perceived internal (i.e., partnership) turbulence. From such standpoint, we are grateful for your suggestions because they have been at the center of our revision efforts.
As you will see, our paper has gone through substantial revision. In particular, we have re-written almost completely most of the sections of the manuscript. Not only have we streamlined and sharpened the framing of the paper, integrated and further explained the methods for our data collection and analysis, but we have also gone back to recode our data, revised our grounded model and proposed partially different contributions to literature and to practice. Significantly, we have tried to strengthen our message for practitioners, and make it more powerful and straightforward. Below we respond to each of the points raised in your letter. Additionally, in the Letter to the Editor in Chief you can find a synthesis of the major changes that we have implemented in the new version of the manuscript.

Additional Questions:
1. Originality: Does the paper contain new and significant information adequate to justify publication?: This study intends to provide useful information about hybrid collaboration management by dividing the evolution process of collaborative organizations that consist of various stakeholders including the public into three stages, extracting seven partnership dimensions for comparison, and then applying VUCA factors.
However, in the development of the discussion, the authors only present the core contents of the stages they define from a subjective point of view, failing to make a proper scientific approach. The validity of the analysis results is also insufficient. In particular, a rationale for the three models and the seven partnership dimensions is not provided in this study, which requires further supplementation.

We were very sorry to read that you found our paper to be lacking a scientific approach. Ours is a qualitative paper that is based on the methodology of grounded theory that has been a standard for decades, both inside and outside the field of management. Such methodology not only has a high ecological validity but also guarantees rigor thanks to a highly systematic, step-by-step approach to data analysis, which implies many iterations with the data and among data analysts, before reaching the final model. However, we do agree that for parsimony reasons in the previous version we had left out too many specifics of the data collection and data analysis. Just as quantitative methods require to follow specific protocols, so do qualitative methods, but as we usually do not enter into the details of why a regression allows researchers to study some aspects (thus, repeating each time what a regression is), in the same way, we took for granted some research standards of qualitative research and their philosophical underpinnings. This convention, together with the fact that explaining all the details of qualitative work can be very lengthy, have pushed us to leave out some of the specifics of the study. In the new version of the manuscript, although we could not enter into all the details of

the grounded theory, we tried to transmit as much as possible "the taste of the field", and to be as detailed and transparent as possible about how we performed the data analysis step by step.

We would like to highlight that in our grounded theory approach, the data are not defined from a subjective point of view; Our models and the classifications of the stages of the partnership emerge from the context, thus from our repeated interactions with the informants of the study, and the use of other primary or secondary data sources such as documents and field notes of participant observation. We depart from informants' textual words and the documents available to us, and work our way towards concepts, themes and aggregations with a higher theoretical value (e.g., the three models and their main characteristics). Such process makes the grounded theory approach more flexible than many quantitative approaches to data analysis, but not for this reason more "unscientific". It actually allows to explore emergent issues without having to define them a priori, and to test data against multiple theories, renouncing to those that do not fit the data well enough. We now provide more details of the data analysis process at page 16 in the new version of the manuscript.

This being said, we agree with you that we could have given a more informed account of how we used the grounded theory, and how categories had formed during the process of coding. In the new version, we have also included the data structure of our data analysis. It gives detailed information of how we worked our way from informants' words -which are summarized in our first-order concepts- to higher levels of abstraction of the second order themes and the theoretical aggregates (see also description at pages 16-17in the manuscript).

To account for your comments and suggestions, we would like to specify that we also went back to our dataset and recoded most of our themes and categories, in order to reach a clearer understanding of the relationship between perceptions of external and internal VUCA, and how they relate to the characteristics of the models that partners chose for their partnership at given points in time.

2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: b2.1) At section 2.2 of page 8, authors try to explain that "the very turbulent environments that encourage organizations to come together are also responsible for their difficulty to manage hybrid partnerships". However, in the preceding studies, factors that are more related to collaboration organization management than to turbulent environment have been proposed, such as communication and power asymmetries and the volatile and uncertain evolution. Please stick to the section headings and discuss opportunities or threats of hybrid partnerships in a rapidly changing environment.

Thank you for pointing this out. As anticipated, we rewrote the introduction section to better emphasize the unique contribution that our paper brings to the VUCA model and to the literature on hybrid partnerships for regional innovation. We now highlight that while previous studies have focused on the role of environmental turbulence and have studied the solutions that organizations adopt against environmental turbulence, we make a distinction between perceptions of external turbulence and perceptions of internal (i.e., partnership-level) turbulence. We show that organizations may see partnerships as tools to cope with external turbulence but that, as soon as these tools are put into use, they also risk becoming impregnated with VUCA.
As far as the section 2.2. is concerned, we rewrote it almost completely (see "Hybrid partnerships in turbulent environments: Opportunities or threats?" now at page 7) to further highlight what we know about the role of environmental turbulence in the setup and evolution of partnerships. In particular, we have included new studies that talk about hybrid partnerships as solutions that organizations take up in the attempt to lower their perceptions of organizational turbulence. We thus discuss environmental turbulence as an antecedent in the decision of private and public organizations to enter collaboration agreements. In the same section, we also draw attention to the fact that, while hybrid partnerships can be seen as a viable way out of turbulence, they themselves may generate turbulence (at the partnership level), such as heterogeneous interests, volatile and uncertain evolution of common goals, complex implementation and so on. In sum, we now make the distinction between external turbulence and partnership-level turbulence and draw on studies that have dealt with each of these two aspects.

b2.2) At the 57th line of p8, the authors describe VUCA factors as "drivers and outcomes of collaborative innovation that form Hybrid Collaboration". However, it is hard to find an explanation for why VUCA factors are the outcomes of collaboration. Please discuss VUCA factors not only as the drivers but also as the outcomes of hybrid collaboration.

Thank you for this indication. As you can see in our answer at point 1b) above, we have tried to clarify this issue by making a distinction between perceptions of environmental VUCA factors (external) and perceptions of VUCA factors at the partnership level. To this purpose, we argue that hybrid partnerships could be seen as micro-environments able to recreate internally the VUCA conditions of partners' external environments. From such standpoint, we believe that hybrid partnerships for regional innovation are "systems" that can be themselves pervaded by volatility, uncertainty, complexity and ambiguity. The research question thus becomes how organizations' perceptions of turbulence in their own environments shape the solutions that they choose, and the level of turbulence that they attribute to those solutions after having adopted them. Now both our findings and the discussion section try to provide an answer to this question. Specifically, we suggest that the VUCA traps that we describe in this study can be understood as a consequence of partners' intention to resolve external VUCA threats at all costs, and to go for a collaborative solution even if not fully prepared to deal with its challenges and complexities. Underestimating the challenges of hybrid collaborations might be, in fact, a consequence of partners' focus on resolving perceived environmental turbulence threats at all costs, ignoring that the solutions they adopt may further increase perceived turbulence, instead of resolving it. In the discussion section, we also suggest that an associated trap is that of taking a big leap towards a highly structured partnership model that partners hope will help them solve the perceived turbulence, but which they may not be ready to manage (see in our case, the unexpected negative consequences of the brokering model). Reducing VUCA threats by means of trial and error, we argue, can have negative unintended consequences to which partners may pay insufficient attention.

b2.3) At section 2.3, this research explains VUCA factors as a concept embedded at hybrid collaboration structure. However, VUCA frame of Bennett & Lemoine (2014a) explains VUCA factors in terms of external environments; the volatility of commodity pricing, the uncertainty of anti-terrorism initiatives, the complexity of foreign market entry, and the ambiguity of technology transition. Please compare and discuss your ideas in line with the framework of Bennett & Lemonine (2014a).

Thank you for this suggestion. We rewrote almost completely the section "A VUCA approach to the challenges and opportunities of hybrid partnerships" (now at page 9). To account for your suggestion, we now emphasize the assumptions of the VUCA model as developed by Bennett and Lemoine in the initial conceptualization, instead of directly adopting their arguments to the level of the partnership as we had done in the previous version. Additionally, we also revised the last section of our theoretical frame called "Advancing a VUCA frame for hybrid partnership lifecycles" (now at page 11-12), as to state more clearly the research question of our study and stress the ways in which it sets our work apart from previous studies.

3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: b3.1) At p13, the authors suggest that the heterogeneity of the involved parties is a proper condition for studying the evolution of hybrid partnership. If so, the relationship between the heterogeneity of hybrid collaboration and VUCA framework of Bennett & Lemonine (2014a) should be discussed in detail.

As far as methodology is concerned, please see our answer above at point b1 in this letter, as well as the methods section in the paper (pages 13-17). Additionally, the section "Advancing a VUCA frame for hybrid partnership lifecycles" at pages 11-12 provides a brief description of why heterogeneity in hybrid partnerships can be a factor that creates vicious VUCA circles, instead of providing viable solutions out. However, research evidence about this issue has been rather limited. We suggest that the findings in our study provide a more detailed answer to this question with respect to previous literature. Specifically, we show that partnerships that have a wide and heterogeneous partner base may start off with a loose, highly

unstructured arrangement but, as problems deriving from partnership heterogeneity appear, they may feel pressured to make radical changes, such as passing to a brokering or a platform model. We thus underline that partnership heterogeneity shapes the trajectory of a partnership by conditioning partners' perceptions of VUCA threats, and prompting them to adopt certain coping solutions (which in turn leverage their VUCA perceptions and so on).

In the Findings section, we have included a new sub-section called "Collaboration as answer to an increasing level of perceived environmental VUCA" that together with the emergent model section, describe better the relationship between external VUCA threats, partnership heterogeneity and decisions taken by partners about the most appropriate functioning model for the partnership. Additionally, we elaborate on this issue in the discussion section at pages 36-37.

b3.2) At emergent model, complexity is ruled out. But it is more rational that VUCA factors exist at all phases but at different levels. This is attributed to the qualitative approach through interview context description analysis. The authors need to address this issue by quantifying VUCA factors. For example, there could be a way to score the perceived level of the VUCA factor in the context.

Upon your recommendation, we created a new table (table 1) that displays the frequencies of the themes related to VUCA perceptions in each model. Specifically, the table computes the frequencies with which our informants mentioned in the different data sources, and in relation to each stage, factors of partnership turbulence that we coded as volatility, uncertainty, complexity and ambiguity, and their respective percentages. We table is described at page 18 in the methodology section. It allows us to show more convincingly that each model had a different configuration of perceived VUCA. To support the data in the table, we also re-elaborated the tables presenting field note excepts, and included additional field notes in the text of the findings, in order to highlight the relationship between perceptions of VUCA factors in each model.
To answer your question, qualitative analysis is based of recurrent themes, so the more recurrent a theme is, the more likely it is to be part of higher aggregate dimensions. In this case, we did have informants that mentioned "complexity" as a relevant issue also at stage 3, but it was much less frequent and elaborate than the others. This can be now visualized with the help of table1.

Although we believe that a table showing the recurrence of our themes can facilitate readers' understanding of the evolution of partners' VUCA perceptions, it is only an integrative tool that does not account for all the depth and complexity of our findings (better expressed by our data structure and field notes provided in its support). The semantic interpretations of the themes gave us much more information than the frequencies with which important themes were mentioned. We hope that you will agree about the complementarity of the text in the finding section and the supporting tables included.

4. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: b4.1) The authors attempt to give a detailed description of the characteristics of the seven dimensions for each three-level model, but how the VUCA factors affect the seven dimensions in each model are not discussed in detail. Also, the authors argue that VUCA factors shape Hybrid collaboration partnership, but partners and collaboration are explained as the source of VUCA factors in the paper. This is interpreted as explaining that heterogeneity of hybrid partnership evolved the collaboration model, rather than explaining how VUCA factors evolved hybrid collaboration. This part, therefore, should be supplemented too.

Since we have longitudinal data, we were able to show how the environmental perception of VUCA was addressed through the implementation of three different models of partnership (emergent, brokering and partnership), and that each model was developed to deal with the VUCA challenges of the previous model. From this standpoint, VUCA perceptions and the solutions to face VUCA perceptions (i.e., the three adopted models) mutually shaped each other. We hope that the re-elaboration of the findings further clarifies this aspect.

Also, our previous answers at points b1, b2.1 and b2.2 above already explain how we tried to clarify the relationship between perceived turbulence, collaborative solutions, partnership organization models and perceived turbulence that derives from the latter.

b4.2) On page 34, the interpretation that the platform model reduces VUCA factors is potentially controversial because the study results show that the platform model evolved due to the influence of VUCA factors. So further research is needed to see whether the platform model decreases VUCA factors.

In relation to this point, please see our answer to the previous point b.4.2, and to points b1, b2.1 and b2.2. Not only have we tried to integrate and clarify the findings related to the idea of the platform model and its perceived VUCA configuration, but we also highlight as a future research direction that we do not take for granted that the evolution of hybrid partnerships is always based on the emergent-brokering-platform sequence, just as we do not take for granted that the platform model is the last phase in the partnership's lifecycle. For instance, we highlight that partners' concern with the complexity of the platform model might push them to look for other solutions, which, we argue, may better or worsen their perceptions of VUCA. Therefore, we suggest that future studies may investigate more closely the relationship between sequences of partnership organization and sequences of VUCA perceptions.

5. Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: There is a lack of discussion about the implications of the study results on policies and practices. Considering that the purpose of hybrid collaboration is promoting innovation, it is believed that presenting how the research results can be utilized will make this study more valuable.

We were sorry to know that our paper appeared to be providing little evidence for practice. Since this research was possible thanks to a full access to the field of study, and a constant interaction with practitioners, we are particularly motivated to make their voices heard through this paper and to speak to people that are dealing with hybrid partnerships for regional innovation as clearly and loudly as possible. For this reason, we now provide interview excerpts also in the text of the findings (and not only in tables, as it was the case with the previous version), which can help practitioners recognize more easily their experiences in our study. We also integrated and re-wrote almost completely the paper's section on implications for practice.
Specifically, we adopted a narrower focus on the common traps that organizations engaged in hybrid partnerships might fall into precisely as they try to lower VUCA threats in their environments. This allowed us to hopefully answer your invitation for a more specific discussion of practical implications.

6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the fields and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: Authors properly use the technical language of the fields.

All in all, we are grateful for the insightful comments and suggestions received. Many of them opened for us novel and stimulating perspectives, and pushed us to further improve our work. We hope that you will be convinced that we have taken your comments into the highest possible consideration, and that we worked very hard to address them thoroughly. We thus hope that you will be persuaded that our paper is now able to provide a valuable contribution to the scholarship of EJIM.

Sincerely,

The Authors