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**Essays on the discursive formation of emerging
organizational fields: The role of technology, institutional
logics, and identity**

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General abstract

The thesis aims at shedding light on the process of organizational field emergence as resulting from a collectively enacted discursive endeavor. The investigation hinges upon the perspective that the generation of institutional and organizational domains of activity is primarily driven by the encounter of multiple and potentially misaligned social constituencies who attempt to sort out their mutual incongruences by engaging in communicative-dialectical activities.

The three essays composing the thesis are to be understood as autonomous, though complementary, pieces of research, all linked by the emphasis on discursive processes. Essay 1 provides a theoretical investigation addressing one of the most critical factor spurring field emergence, i.e. technological progress. The introduction of new technologies is framed as the occasion for multiple and formerly disconnected actors to join a shared space of negotiation about the meanings carried on by those technologies. These dialectical interplays are motivated both by coordination and legitimation needs and typically regard (1) the defining features of technological artifacts, (2) the identities of actors joining the nascent field, and (3) the constitution of infrastructures that shape the actors' interactions. The paper advances our understanding on the discursive process of field emergence by providing insights on how these different issues, debated among actors with competing interests and worldviews, are indeed interrelated with one another. These interconnections represent the engine of technological field emergence.

This first theoretical essay, though providing a distinct contribution, serves also as a guideline to generalize the insights advanced in the next two papers, whose empirical setting is the emerging field of civil drones.

Essay 2 explores the role of multiple institutional logics as driver of field emergence. Institutional logics have a fundamental role in shaping cognitions and understandings that is reflected in actors' discursive actions and interactions. The field coalescing around civil drones is permeated by discursive activity on a number of issues that are framed according to regulatory, entrepreneurial, professional, and technological institutional logics. By studying how field actors debate these issues in field conferences, the paper tracks a number of discursive interaction patterns that are generative of new meanings and that draw their generative power from actors' combination of potentially conflicting logics.

Essay 3 addresses the identity formation process in nascent fields. The theoretical angle adopted here is that of interstitial emergence, denoting that new fields may spawn from the overlap of other existing fields. The civil drone field is an interstitial field because it involves organizations and cultural resources coming from aviation, photography, and topography. By performing content analysis of a sample of field's organizational mission statements and of a publication dedicated to drones, the paper highlights that: (1) the emergence of a field-specific identity is driven by symbolic-isomorphic thrust toward the most professionalized community populating the field; (2) the identity of field-specific organizations tends to be increasingly shaped by ideational issues and specialized cultural resources that indicate a tendency toward identity conceptualization. These two apparently contradictory mechanisms of identity formation, serve to provide legitimacy to the emerging field by connecting it to professional activities, while creating a distinctive field identity forged by drone-specific issues.

Overall, the thesis contributes to an ongoing conversation on meaning making as the fundamental process driving the formation of organizational fields. The emergence phase of field is, by definition, characterized by the absence of shared, taken for granted understandings and beliefs. For this reason it represent a theoretically and methodologically challenging item of research. The key insight advanced here is that the new meanings which demarcate nascent domains of socio-economic activity are generated through the intersection

between multiple constituencies that thanks to language can combine heterogeneous cultural resources and cognitive schemes.

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ESSAY 1: A framework of dialectical meaning making in emerging technological fields

Abstract

The paper advances a theoretical framework expounding the process of dialectical meaning creation in technology-driven emerging field. New technologies give rise to economic opportunities, social challenges, and futuristic imageries that spur debate among the actors primarily affected by them. The paper investigates how these discursive processes give rise to emerging organizational fields. The framework proposed here is articulated by first disentangling coordination and legitimation as core drivers of meaning making activity, and then by identifying technological artifacts, actors' identities, and field's infrastructures as the main discursive issues subject to that meaning making activity. The theorization advanced in the paper serves to shed light on the different aspect that are subject to dialectical meaning creation in emerging fields, and it further contributes to a comprehensive understanding of how technological innovation get ingrained in the institutional landscape though the emergence of fields where designs, identities, and arrangements are negotiated among actors motivated by diverging interests and worldviews.

INTRODUCTION

Institutional research is grounded on the concept of field, that is the level of analysis where social forces exert influences on organizations, shaping actions and cognitions. Initially conceptualized as the set of actors that in the aggregate constitutes a recognized area of institutional life (DiMaggio & Powell, 1983), fields are increasingly framed as “centers of debate” (Hoffman, 1999; Wooten & Hoffman, 2008). This view implies that field emergence takes place through the coalescence of different actors around a certain issue that may generate both opportunities and problems, whose significance and implications are thus discussed and negotiated. The process of field formation is often defined as “interstitial emergence” (Morrill, 2001; Zietsma, Groenewegen, Logue, & Hinings, 2017), given that new fields spawn from the overlap and encounter of different, already existing, institutional

domains; this implies that a distinctive feature of fields is their intrinsic heterogeneity which is particularly evident in the earliest stage, when field actors are still anchored to their diverse previous affiliations and institutional milieus.

Although the literature has variously addressed the mechanisms and social dynamics that underlie the emergence of fields (David, Foray, & Foray, 2013; Lawrence & Phillips, 2004; Maguire, Hardy, & Lawrence, 2004; Powell & Padgett, 2012), there is a lack of systematic accounts exploring how fields emerge as a result of the probably most important source of socio-economic change, i.e. technological progress. In particular, although it is generally accepted that the formation of institutional fields consists in a collective meaning making process (Leibel, Hallett, & Bechky, 2018; Zilber, 2008) and that technological innovation is a process of social construction (Bijker, 1995; Pinch & Bijker, 1984), the peculiarity of technology introduction as an occasion of field emergence has not yet been adequately theorized.

In a world increasingly dominated by technological advancements, making sense of how new devices, artifacts, and innovations work and produce effects on the social, natural, and physical environment is an ever-pressing challenge that stimulates a great deal of nowadays' organizational life. Technological innovation gives rise to artifacts that are supposed to serve to some specific goal and which are thereby relegated to the material, nonhuman realm. This extraneousness from the human dimension confers to technological artifacts a high degree of intrinsic ambiguity: if human action is generally ascribable to some prior intentionality, the effects emanating from technological implementation or use are, at least to some extent, unintended and unknowable a priori. Thus, technology introduction has been shown to produce unwanted modification to social structures (Barley, 1986) or to provide solutions for previously unrecognized problems (Bijker, 1995). Because of this layer of irreducible ambiguity, new technologies can catalyze volitions, apprehensions, and beliefs among actors who discursively create shared meanings that may feedback onto technology itself and shape

its form. Thus, the process through which new technologies get ingrained into the societal tissue implies the emergence of localized debate centers in which collective meaning making activities are instantiated. By shedding light on these dynamics it may be possible to single out the preludes of how technology produces social transformations.

The purpose of the present paper is to advance our understanding of how technological innovations can give rise to bounded spheres of meanings relating different actors, i.e. fields. In fact, when a new technology is introduced, besides constituting an industrial system to commercially exploit it, social actors are in first place involved in shaping the very meanings that that technology conveys; in so doing, they try to construct a more or less shared understanding of what is that technology, what is their relationship with it, and what are the relationships with other actors concerned with it. This meaning creation process is fundamentally discursive and interactive, namely enacted through communicative acts that bring social entities into being and altogether construct social reality (Phillips, Lawrence, & Hardy, 2004; Taylor, Cooren, Giroux, & Robinchaud, 1996). Thus, the theoretical framework proposed here is grounded on a process-oriented dialectical perspective (Benson, 1977; Farjoun, 2017) which is best suited to show how field emergence is grounded upon the encounter of different actors that give rise to new meanings thanks to their communicative interactions.

Through an analysis of empirical studies, the paper shall advance a theoretical framework that unpacks the core discursive nuclei and meaning making drivers leading to the emergence of technological fields. This framework is useful to bring to the fore the power dynamics among social actors involved with technological innovation. These social processes are indeed enabled by the collective creation of a shared space of mutual understandings thanks to which actors can compare their different worldviews, negotiate their agendas, and defend their interests. Thus, I eventually show how field emergence is the main social process sustaining technological innovation (Garud, Tuertscher, & Van de Ven, 2013).

The paper is structured as follows: next section is devoted to the outlining of three fundamental constructs that ground the subsequent discussion i.e. fields, emergence, and technology. Next, I propose that meaning making activity in emerging fields is generally driven by the need for legitimation, a tendency toward coordination, and by competitive pressures. Then, I proceed to analyze a number of empirical studies to expound how technological fields are specifically characterized by discursive activities on technological artifacts, participants' identities, and infrastructural elements, showing how all these elements of the proposed framework are indeed intertwined. I then bring the paper to a close by highlighting its contributions and implications to the literature on fields and on the social construction of technology.

DEFINITION OF CORE CONCEPTS AND CONSTRUCTS

This section lays down the conceptual building-blocks for all the foregoing discussion. In particular, I address three core constructs: field, emergence, and technology. Providing an exhaustive account of the literature that has previously dealt with these topics is way beyond the scope of the present paper. With the basic insights developed below I rather aim to provide a specific perspective which shall guide the subsequent theorization on emerging technological fields.

In general, the emergence of technological fields takes place when innovation processes bring about novel technologies and multiple actors, most likely already socialized in different existing fields, begin a discursive activity aiming at constructing shared meanings. New technologies typically possess unknown properties and from their use uncertain consequences may follow. The opportunities and threats that new technology entails represent a frequent occasion of discussion among diverse actors. This is when field issues start to take shape, coalitions get formed to support one or another viewpoint, collaboration and conflict animate

incipient relational networks. This turbulent meaning making activity revolving around newly introduced technologies is the core of what I mean by emerging technological field.

Research has shed light on a number of such fields as for example the nanotechnology field (Granqvist & Laurila, 2011; Grodal, 2018; Kaplan & Radin, 2011), the cochlear implant industry (Garud, 2008), the radio field (Croidieu & Kim, 2018; Leblebici, Salancik, Copay, & King, 1991), the automobile industry (Rao, 2004), the on-line database industry (Farjoun, 2002) and many others. The paper shall highlight the specificities of emerging technological fields, not much to explain how technology itself evolves or changes, but to put to the fore the regularities that characterize meaning making processes in the aftermath of technological innovation.

What's a field?

The very term “field” has been introduced in the social sciences as the metaphorical referent to physics’ fields of forces (Bourdieu & Wacquant, 1992; Martin, 2003), since it typically denotes the existence of social factors that direct the behavior and actions of sets of actors bounded in a specific domain. The earliest conceptualization of field in organization studies were grounded upon isomorphic pressures that keep organizations working in the same production of goods or services similar to one another, thus constituting recognized areas of institutional life (DiMaggio & Powell, 1983) whose members partake in a common meaning system (Scott, 1994).

More recent perspectives on fields owes much to Pierre Bourdieu’s works in which the forces characterizing a field are framed to be opposed to each other, entailing an ongoing struggle among field members to achieve dominance (Bourdieu & Wacquant, 1992). This makes the metaphor of institutional field as “fields of play” to appear indeed more appropriate than that of “field of forces” to portray such oppositions (Furnari, 2018). The modality through which these conflicts unfold is primarily driven by communication, making of fields contested

centers of debate (Hoffman, 1999; Wooten & Hoffman, 2008). According to this perspective of fields as discursive arenas, the main factor holding together many different kinds of organizations shifts from being the production of related product or service (DiMaggio & Powell, 1983), to be specific issues which field members perceive as relevant (Hoffman, 1999). This shift in the analytical focus of field research has been well highlighted in the recent literature review by Zietsma and colleagues (2017) who distinguish between exchange fields – adherent to DiMaggio and Powell’s original formulation of fields – and issue fields – related to Hoffman’s formulation of fields as debate centers revolving around specific problems.

Albeit useful for analytical and methodological purposes, this distinction is often blurred in practice. In fact, issue fields typically germinate within existing exchange field and it often happens that industry-like exchange fields experience prolonged debate on certain issues that entails modifications of the underlying meaning system. For example the issues of air pollution and noise emission have affected the interplay among actors belonging to the aviation industry (Litrico & David, 2017), and the field of tour operators in Netherland has been radically changed as a consequence of a meaning struggle between incumbents and activists on the issue of sustainability (van Wijk, Stam, Elfring, Zietsma, & den Hond, 2013).

Having clarified that, in the remainder of the paper I shall make references to fields that, according to Zietsma et al.’s (2017) definition, are in most cases to be considered exchange fields structured as industry-like systems. However, even exchange fields are interspersed with problems and questions that ingrain discursive dynamics typical of issue fields. Indeed the very elements that are needed for the functioning of the exchange relations of an industrial system can be subject to lively debate, especially during the earliest phases of field evolution.

To sum up, the idea of fields advanced in this paper considers, as in exchange field, the association to a specific activity to be the baseline factor gluing together field participant. However, field dynamics is critically brought about by the intervention of emerging issues

which trigger change by activating either collaborative (though very rarely conflict-free) or adversarial discursive activities meant to create or reconfigure a system of meanings (Furnari, 2018).

What's emergence?

Natural sciences usually deal with emergent phenomena by making reference to self-organization (Kauffman, 1993), auto-catalysis (Prigogine & Stengers, 1984), or auto-poiesis (Maturana & Varela, 1980). These concepts, while relatively distinguishable from one another on their epistemological and theoretical bases, all point toward the activation of spontaneous processes which are responsible of sorting order out of chaos. These insights from complex adaptive system theory have been variously imported into social sciences and into management and organization studies in particular (e.g. Lichtenstein, 2014). The baseline idea is that biological, chemical, and social systems as well are composed by many interrelated parts that, by interacting in non-linear ways, give rise to macro-phenomena which are unpredictable ex-ante and whose behavior cannot be reduced to the behavior of their components. Emergence is thus related to the generation of novel entities that are ostensive (i.e. directly recognizable) at the macro level, whose features are not deducible from its micro-level components, and whose components show a certain degree of coherence among them that provides a sense of identity to the whole (Goldstein, 1999).

However, the emergence process has one substantial difference whether we consider natural vis-à-vis social systems: in natural systems emergence is driven by chemical reactions or biological linkages and the whole process is duly spontaneous; on the other hand, social systems are composed by actors endowed with purpose and some degree of foresightedness. In fact, the generation of novelty in the social realm is usually associated with the intentional action of agents who undertake invention and innovation efforts (Powell & Padgett, 2012). Clearly, social action is conspicuously infused with unintended consequences (Merton, 1936),

so that even if emergence may be triggered by some purposeful agent, the features characterizing the emerging entity are likely to depart from the intentions of that individual agent.

Emergence is a time-spanning phenomenon: new entities are not created from one day to the next. Standard references to industry evolution literature adopting an evolutionary/neo-Schumpeterian approach typically identify the emergence of new industries and markets as the initial phase of the industry life-cycle (Audretsch, 1997; Klepper & Graddy, 1990). Other studies have proposed that this emergence phase is itself structured into distinct stages, similar to the stages of the industry lifecycle: emergence is thus articulated in an initial phase in which novelty is generated, a growth stage that entails the mobilization and convergence of actors and resources around that novelty, and a stabilization stage in which the new entity acquires a recognizable structure (Gustafsson, Jääskeläinen, Maula, & Uotila, 2016; Morrill, 2001; M.-D. L. Seidel & Greve, 2017)

This approach, although very useful in giving an evolutionary account of emergence, runs the risk of casting a deterministic veil on the process that leads to the creation of novel domains of human activities, suggesting that emergence has a precise endpoint (Forbes & Kirsch, 2011). As a consequence, the study of emergence risks to be confined to the analysis of how things stop to be emergent and become institutionalized, mature, and stable. The perspective adopted here instead proposes that social life is perpetually characterized by the generation of novel features and by continuous change. To be sure, it makes sense to talk about *emerging* entities only if we admit that some entities have indeed *emerged*. Therefore, even if emergence is a process with distinctive features, in the following I do not aim to characterize what drives social entities out of this emergence phase, but I rather focus on the mechanisms that trigger it and feed its flux-like and turbulent dynamics. In this sense, the phenomenon of emergence is here addressed essentially as the process of organizational genesis, and in the following I will show that this genesis is mostly driven by the encounter of diverse social

domains which gives rise to the transposition of ideas, practices, and people, to the integration of possibly contradictory forces, to the collision of powers (see Powell & Padgett, 2012)

What's technology?

The study of technology has always been a prominent topic in organization studies. Contingency theorists formulated the idea that organizations are socio-technical systems (Woodward, 1980), whose formal and informal structures are directly influenced by technology. Innovation studies instead explore how technologies are introduced and diffused, and scholars adopting an evolutionary perspective argue that dominant designs are selected through a process of variation and retention (Anderson & Tushman, 1990). These two perspective dominate the debate on technology in management and organization studies long since and, although being focused on different objects of analysis, they both tend to conceive technology itself as a black-box which affects and is affected by organizations in a deterministic fashion.

The mutual constitution of technology and social systems has been explicitly addressed by studies grounded in sociological traditions such as the social construction of technology (SCOT) approach (Bijker, 1995; Pinch & Bijker, 1984) and structuration theory (ST) approach (Barley, 1986; Orlikowski, 1992; Orlikowski & Gash, 1994). Overturning the dominant perspective on technology, these sociological approaches consider the features of technological artifacts not much determined by efficiency-enhancing pressures, but rather as emerging from a complex process of negotiations on the meanings that the very technology has for different groups. In fact, technological artifacts are characterized by *interpretative flexibility* (Orlikowski, 1992; Pinch & Bijker, 1984), namely they are open to different interpretations from the different social groups that are to any extent engaged with them. Interpretative flexibility is thus “an attribute of the relation between humans and technology and hence it is influenced by characteristics of the material artifact, ... characteristics of the

human agents, ... and characteristics of the context” (Orlikowski, 1992, p. 409). This amounts to consider technology as imbued with multiple meanings deriving from diverse spheres of social and economic life: “[technologies] embody social, political, psychological, economic, and professional commitments, skills, prejudices, possibilities, and constraints” (Bijker & Law, 1992, p. 7).

When new technologies are introduced, its proponents often exert a problematization effort (Munir & Jones, 2004) aiming at framing the technological novelty as responding to some particular issues, and thereby providing solution to specific problems. This activates a socio-political process in which diverse actors compete with one another on the definition of what technology means, which problems it brings about, and what solutions it provides. As I will clarify below, this whole process is intrinsically discursive, entailing a dialectical interplay between different groups and actors involved with the development and use of technology artifacts. The outcome of this process is that the material technological artifacts are themselves constituted as discursive products. Artifacts get in fact inscribed through social dynamics, in the sense that their actual form is shaped by a number of not only technical but also political and normative factors (Joerges & Czamiawska, 1998; Spicer, 2005).

To conclude, technological artifacts are here considered both as physically shaped by socio-political processes and as catalyzers of discursive activities that revolve around their socially constructed meanings. Under this perspective, technologies do evolve toward a dominant design which is achieved when the artifacts stops to be perceived as a problem for all the actors involved with it (Pinch & Bijker, 1984), and different technological frames have come to converge in one collective frame (Kaplan & Tripsas, 2008). However, this dominant design is not an end point of technology’s social construction inasmuch as it represents a negotiated order among different communities and actors; it is thus subject to continuous renegotiations which are enacted discursively even during the phases of so called incremental change, or during its use (Dokko, Nigam, & Rosenkopf, 2012).

MEANING MAKING IN EMERGING FIELDS

The process of field emergence, according to the above definitions, consists in an ongoing process of meaning creation enacted by different actors around a set of issues that are relevant for them. Meaning making is a fundamentally discursive endeavor that takes place through unfolding dialectical interplays. Research has long recognized the relevance of dialectics in expounding processes of organizational change and emergence within contexts characterized simultaneously by some degree of conflict and some commonality of intents among different parties (Benson, 1977; Blau, 1971). Dialectical processes are thus distinctive to all those situations in which social actors have some common and some conflicting interests (Blau, 1971, p. 176). Organizational life is rife with contrasting and often irreconcilable interests and worldviews and this comports a perpetual change process in settings where there are collective forces at play striving to find some alignment. Dialectics, in fact, is not simply about finding a compromise between two parties. The interplay between thesis and antithesis does not finish once a synthesis emerge: “the synthesis of contradictory elements becomes another thesis, calling forth a new antithesis and a new synthesis, and the process repeats itself in incessant dialectical developments” (Blau, 1971, p. 187). Hence, a dialectical view, by considering social life to be in a continuous state of becoming, is fundamentally committed to the concept of process (Benson, 1977, p. 3; Farjoun, 2017). Moreover this dialectical perspective calls for a language oriented approach to organization and organizing (Putnam, 2013; Taylor et al., 1996) according to which social reality is constituted through communication.

Research on institutional dynamics predicts that fields undergo dialectical change processes when sedimented structures and ideologies provide the resources for competing interests to challenge the pre-established order (Seo & Creed, 2002). In emerging fields, however, there are no such sedimented structures, but the actors joining them are likely to come from

disparate existing institutional domains bringing different and possibly misaligned worldviews and interests. All these different actors have to cope with the shared problems of defining a common language and knowledge base to realize joint objectives and of getting recognized as a whole by audiences who may dispense critical resources.

In the following I first show the peculiarities of dialectical meaning making taking place at the field level. Next, I present the main building blocks of this process in emerging fields: the converging interests of field actors that prompt them to engage in a dialectical exchange are in fact related to shared needs for legitimation and coordination, moreover their heterogeneity entails the presence of conflicting interests generating competitive dynamics.

New meanings creation in fields

New fields typically emerge at the interstice of already existing fields. Interstices are generated when, for some reason, the problems and opportunities of one field spill over into another (Furnari, 2014; Morrill, 2001; Rao, Morrill, & Zald, 2000; Zietsma et al., 2017). For example, the homebrew computer field, that pioneered the personal computer industry, emerged thanks to the encounter of two very different communities, i.e. engineers with a strong technical background and political activists (Furnari, 2014). An analogous overlap between different social groups as judges, lawyers, mediators on the one hand and therapists, social scientists, social workers on the other hand coming respectively from the legal and social service fields gave rise to the field of alternative dispute resolution (Morrill, 2001). All these heterogeneous constituencies of emerging fields are thus involved in a dialectical process of meaning creation. But if within organizations the generation of new meanings is fundamentally achieved through dialogical, face-to-face, interactions (Tsoukas, 2009), this cannot always be the case in fields. Clearly, also in fields there are many occasion for direct verbal exchange, typically in so-called field-configuring events, namely conferences, trade fairs, technical committee meetings, which make actors aware of one another and give them

the chance to undertake collective sense-making (Lampel & Meyer, 2008; Zilber, 2007, 2018). These events have been found to be particularly important during field emergence (Garud, 2008). However, besides these occasions for face-to-face interactions, dialectical processes in fields often take place diachronically through the production of texts such as trade publications (Hoffman, 1999), statements to the press (Litrico & David, 2017), public hearings (Suddaby & Greenwood, 2005), organizational mission statements (Navis & Glynn, 2010), regulations and regulatory acts (Gurses & Ozcan, 2015). All these documents and textual materials, together with the occasions of direct verbal interaction, constitute the overall discursive activity in a field, which amounts to a stratified process of dialectical meaning making. This stratification implies that actors' utterances get continuously translated and edited as they circulate throughout those different discursive platforms (Sahlin-Anderson, 1996), entailing further complications and sources of possible misalignment in generating new meanings.

Taking note of all these differences between the kinds of dialectics that take place in fields and within organizations, the process through which two (or more) interacting parties get engaged in a dialectical interplay and create new meanings is nonetheless rather generalizable. According to Tsoukas (2009), new distinctions are in fact generated thanks to the activation of three main mechanisms: conceptual combination, conceptual expansion, and conceptual reframing. *Combination* consists in making new concept by linking formerly unconnected linguistic elements; this process is typically enacted in emerging industry whose stakeholders strive to create a new category label (Grodal, Gotsopoulos, & Suarez, 2015). *Expansion* implies the semantic extension of a concept to include additional elements and thereby match new situations; this mechanisms is as well typically enacted during the first phases of industry evolution, for example when actors broaden the field membership criteria in order to gain potential support from wider audiences (Grodal, 2018; Jones, Maoret, Massa, & Svejnova, 2012). *Reframing* entails the shifting of semantic emphasis from a certain aspect of a concept

to another; this frame shifting often entails the distancing from “old” ways of doing things that actors wittingly enact in order to promote their own new understandings (Rao, Monin, & Durand, 2003; Weber, Heinze, & Desoucey, 2008; Werner & Cornelissen, 2014).

Not by chance these three mechanisms of meaning creation strongly resonate with Snow’s et al. (1986) typology of framing strategies that comprises frame bridging (analogous to conceptual combination), frame extension (analogous to conceptual expansion), and frame transformation (analogous to conceptual reframing). The frames and framing perspective is in fact a widely adopted approach to shed light on meaning making processes, and it well highlights the interactive and dialectical nature of such processes. In particular, Gray, Purdy, & Ansari (2015) show how fields get structured through a bottom-up process in which interacting actors may operate different framing mechanisms that shape shared meanings; to become taken-for-granted at the meso- and macro-levels, these framings are to be amplified both in space and time by broadening the network of interactants and by using certain frames in given situations with increased regularity. This process may eventually lead to the typification of meanings that through interaction rituals are invoked even without deliberate attention (Berger & Luckmann, 1967).

Meaning making drivers: legitimation, coordination, and competition

These framing and conceptualization mechanisms in emerging fields are underlain by dialectical processes in which the concurrent and shared needs for legitimation and coordination are sprinkled with competitive tensions coming from actors’ diversity of mindsets and agendas. But it is exactly because of these tensions that field actors come up with newly generated meanings that shall eventually constitute the institutionalized cultural understandings of the field. I thus propose that legitimation and coordination represents the main meaning making drivers in emerging fields, while competition the main meaning making trigger prompting actor in engaging with dialectical tensions.

Legitimation. The liability of newness of emerging fields means that field actors have to build up their legitimacy (Aldrich & Fiol, 1994). This is a typically discursive and rhetoric exercise aiming at persuading subjects who may dispense critical symbolic and economic resources (Suddaby & Greenwood, 2005; Wry, Lounsbury, & Glynn, 2011). For example, social movement literature deals with framing strategies meant to target specific audiences and stimulate the mobilization of supporters and participants needed to acquire resources and legitimacy (Benford & Snow, 2000). Legitimation is thus the meaning making process meant to acquire legitimacy (Suddaby, Bitektine, & Haack, 2017); legitimacy is not a property or asset to be transferred to someone, because the very cultural references against which something is evaluated as legitimate are part of the dialectical negotiation among the parties engaged in this meaning making process. An emerging field has to gain legitimation as a whole, and for this purpose actors are likely to rely upon rhetorical strategies that, spanning multiple institutional orders, can broaden the support needed to make the new field flourish (Harmon, Green, & Goodnight, 2015).

Thus, legitimation is the outwardly oriented endeavor for acquiring recognition and social acceptance that emerging fields need in order to secure resources from external audiences (e.g. general public, costumers, policy-makers). In the particular case of emerging technological fields, legitimation is largely demanded to address the ambiguities that a new technology present to those actors in charge of validating it.

Coordination. The lack of legitimacy is not the only problem of emerging fields. Interstitiality implies that newly formed fields are made of heterogeneous and possibly incompatible cultural resources. Despite this heterogeneity, organizations and actors convening in the new field start to develop mutual interdependences and most likely engage in joint actions meant to achieve some shared objective. But to attain any such collective goal it is necessary to

operate a sort of multivocal coordination (Furnari, 2014), namely coordination attempts grounded on the coherent combination of heterogeneous elements. This is, in other words, a cross-boundary translation exercise enacted to achieve alignment among different actors (Carlile, 2004). This coordination endeavor aims at the development of an inter-language (Collins, Evans, & Gorman, 2007), namely a vocabulary structure for defining the novel situations, objects, and issues that actors come to cope with in the emerging field (Loewenstein, Ocasio, & Jones, 2012).

These cross-boundary coordination processes have been extensively studied in technology-driven settings as essential features of new products development and innovation projects (Carlile, 2002; Lenfle & Söderlund, 2018; O'Mahony & Bechky, 2008; V. P. Seidel & O'Mahony, 2014) where the integration of multiple views is long since understood to be beneficial. However, this kind of cross-boundary coordination may also be a more distributed and less focalized process than that of catalyzing innovation output: it may regard actors and activities not strictly involved in technology development, but that nonetheless need coordination to achieve any result. More generally, in emerging technological fields coordination involves the developing of specific knowledge and language that, by addressing technological ambiguities, enable joint action.

To sum up, opposite to legitimation, coordination is an inwardly oriented collective endeavor of field actors to find an alignment in their knowledge sets and worldviews; more specifically, in technology-driven fields coordination is needed to overcome the intrinsic ambiguities of a technology that can hamper actors' mutual adjustments.

Competition. The heterogeneity of emerging fields implies that differences between actors may be hard to level out even if anyone strives for some agreement, or because actors are indeed motivated to give prominence to their difference from the others. Collective attempts to achieve some shared knowledge base or a diffused legitimacy for the new field as a whole are (latently or overtly) interspersed with actors' inclination to achieve a superior position over

the others, and thereby impose their own particular interests and viewpoints on them. This can be the typical competitive dynamics of firms in an industry that try to outperform their rivals on an economic basis, or the quest for symbolic dominance that is contended through political processes that confer power to someone at the expense of someone else. In short, competition represents the meaning making trigger in emerging fields. Competitive dynamics between firms have in fact been identified as crucial factors in the collective construction of the cognitive boundaries of organizational fields (Porac, Thomas, Wilson, Paton, & Kanfer, 1995). To be sure, by competition I do not refer solely to situations governed by a market logic but, more generally, to all those situations in which the pursuit of one's own interests is detrimental for others. Competing actors or groups populating emerging fields typically generate discursive oppositions to mark a distance between one another and claim their superiority (Mathias, Huyghe, Frid, & Galloway, 2018). Competition is the trigger of dialectical tensions when combined with concurrent needs for legitimation and coordination: competing interests activate confrontation between misaligned actors who strive for achieving common goals related with external recognition and joint actions. Competition is both outwardly and inwardly oriented, in the sense that, as well as legitimation, it is related to the securement of external resources and, as coordination, it concerns the actions and reactions that players internal to the field undertake keeping an eye on each other.

These three components of meaning making processes are strictly interrelated with one another: the achievement of field's internal consistency through coordination typically influences the external recognition needed to obtain legitimation and, vice-versa, legitimacy may provide a sense of unity that fosters coordination success; on the other hand, competitive dynamics underlie both attempts to gain legitimacy (e.g. when there are different images of the field to be projected to external audiences and there is some contestation on which is the most appropriate) and coordination efforts (e.g. when in defining a shared knowledge base some actors impose their worldview over the other to defend their interests and positions).

CORE ISSUES IN TECHNOLOGICAL FIELDS: ARTIFACTS, IDENTITIES AND INFRASTRUCTURES

The dialectical meaning making process outlined above is directed in emerging technological fields toward the definition of a few fundamental issues that embrace most part of field's discursive activities.

First, emerging fields typically undergo a conspicuous debate to create a sense of belongingness in its members and allow external actors to recognize the distinctiveness of the newly formed domain of activity. In other words, part of the discursive activity in emerging fields is devoted to the definition of a collective identity, responding to questions on *who* is going to be part of the field. Second, an emerging field, by definition, lacks established rules, conventions, and governance mechanisms that are needed to get things done. Hence, another fundamental issue debated in emerging fields regards the definition of those institutional infrastructures (Hinings, Logue, & Zietsma, 2017) that enable, sustain, or constraint any operation, activity, or transaction that field members intend to undertake, and that so responds to questions on *how* fields function.

Third, since our focus is on technological fields, probably the most important element in the discursive definition of an emerging field is represented by the material artifact(s) that characterizes it. The distinctive feature of any technological field is indeed the discursive definition of technological artifacts, which ultimately responds to questions on *what* is the field about. The meaning making process aiming at characterizing what is the technology in question, what are its potentialities, what are its dangers, and so on, is interrelated with the meaning making activity regarding the other two foundational issues, i.e. identities and infrastructures. The discursively constructed features of artifacts are in fact focal points in the definition of organizational and collective identities and, at the same time, the way in which a certain artifact is defined determines what kind of infrastructure field members can develop.

In the following I shall first address these three foundational issues in turn, showing how their definition differs according to the prevalent meaning making driver at play. I shall then sketch out the main interrelations between artifacts, identities, and infrastructures definition. These arguments are illustrated by making reference to a number of empirical studies that, though in the majority of instances adopt the institutionalist lenses, are also taken from studies grounded in other traditions such as organizational ecology, entrepreneurship and innovation, and science and technology studies (STS). These are in fact strands of research that have been particularly interested in shedding light on the cultural and social factors that underlie the emergence of new industries and technologies. They therefore offer a nice variety of empirical settings that fit well with our characterization of emerging technological fields and of theoretical angles that give more or less emphasis to one or the other foundational issues and meaning-making drivers identified above. The objective is not to compile an exhaustive review of the literature on emerging technological fields, but I am rather going to use these empirical studies to exemplify how the discursive constitution of technological fields unfolds. In particular, the analysis below allows to identify specific thematic dimensions that provide content to the meaning making process on artifacts, identities, and infrastructures.

Table 1 below summarizes these insights on the different dimensions characterizing the discursive construction of each fundamental issues of technological field, showing which empirical studies exemplify how legitimation and coordination drive these meaning making processes.

TABLE 1 ABOUT HERE

The “what?” issue. Definition of technological artifacts

Technological fields, by definition, revolve around some technological innovation. These innovations are materialized in some artifact which, according to the perspective proposed

here, is socially constructed (Pinch & Bijker, 1984) because different actors in the field are likely to see the same object differently, and therefore infuse diverse and sometime contradictory meanings on them.

Most typically, new technologies proponents work for their legitimation by discursively imbuing the very artifacts with a sense of *familiarity* that may facilitate audiences in developing understandings on them. This clearly has repercussions on the material design of these artifacts. For example, Edison in designing its electric lighting system strived to make it consistent with the existent utilities system, mimicking how the gas illumination system worked: his choice was about “lessening rather than emphasizing the gaps between the old institutions and his new innovation” (Hargadon & Douglas, 2001, p. 489). Analogously, in the early computer industry IBM gained a prominent position by depicting its products both verbally and materially as the continuation of the tabulating machines that insurance companies (i.e. early principal computer users) were well acquainted with (Kahl & Grodal, 2016). Edison’s and IBM’s discursive strategy, aiming at constructing the novel technology as a familiar object, was surely driven by legitimation purposes as well as by underlying competitive mechanisms: Edison had to gain a foothold in the utility market dominated by gas companies; IBM was confronting with its main rival, Remington Rand’s, who adopted a less effective discursive strategy that overemphasized the newness of computers.

The discursive nature of legitimation efforts is well shown in the case of the early automobile industry where manufacturers had to win strong resistance because cars were not clearly understood by the general public and were often perceived as unsafe. Legitimation was thus gained through reliability contests that, grounded on the well-known genre of bicycle races, made the car comprehensible and fostered a shared symbolic environment in which participants could develop understandings of the car (Rao, 2004, p. 368).

The framing of new technologies as familiar is driven not only by legitimation, but also by coordination purposes. In particular, the creation of a shared understanding on new

technologies is often achieved through the use of metaphors that, by linguistically anchoring different worldviews on an intelligible common ground, enable coordinated actions (Biscaro & Comacchio, 2018; V. P. Seidel & O'Mahony, 2014). This is not a smooth processes in fields because competing metaphorical references may be proposed to support the interests of one or the other party. This is well exemplified in the early radio industry whose development risked to be hindered by ambiguities surrounding the concept of air waves. At that time two competing metaphorical definitions of radio were circulating in the field: radio as “post office” (i.e. to be conceived as a public good) supported by the US Navy and other governmental agencies, and radio as a “newspaper in the air” (i.e. as a private good) supported by privately owned stations (Leblebici et al., 1991). This opposition was solved through the introduction of a third metaphor that kept into account both public and private interests, namely radio as “waterways” that consented to understand the radio spectrum as public conveyance which can be licensed to private actors, but which is subject to the government power (Leblebici et al., 1991). A similar definitional conflict underlies the field of smart cities. This field emerges at the intersection between real estate, sustainable development, and smart technology domains. Each of these factions in the field tend to advance concepts most familiar to them, creating a tension on whether the priority has to be put onto the “smart” or the “city” representations of smart-cities (Zuzul, 2018): the first representation would favor the worldviews and interest of actors involved in the development of software and hardware components, while the second would give priority to the construction of buildings.

A distinctive feature of the discursive construction of technological fields is the futuristic aura that surrounds new artifacts; this imprints meaning making activities with a “forceful sense of expectation [that] draws upon the language of breakthrough and revolutionary future potentials” (Brown & Michael, 2003, p. 10). Thus, besides familiarity, a second key dimension of the discursive construction of artifacts is *future orientation*. The most relevant

expression of this future orientation lies in the fact that, whenever a new technology is introduced in some setting, it engenders a great deal of debate on the possible positive and negative consequences deriving from its use. In other words, actors frame the new technology as either capable of providing solution or of causing problems even before these effects have been fully ascertained. The dialectical interplay between the predicted positive and negative consequences of technologies is typically driven by legitimation (or de-legitimation) intents. An exemplary case is that of DDT, which was imputed as a source of relevant health and environmental hazards, but at the same time its usage was a boost to agricultural productivity and it also helped to control malaria outbreaks (Hardy & Maguire, 2010; Maguire, 2004). Discursive coalitions have been formed to undertake dialectical meaning making around DDT resulting in a field-configuring event – the so-called Stockholm Convention – which somehow reconciled both position by prohibiting the use of DDT in agriculture with the exception of malaria zones (Hardy & Maguire, 2010).

The DDT case, however, refers to a technology which spurred the emergence of an issue field decades after its introduction, showing that the meaning of technologies may be subject to prolonged and punctuated in time discursive struggles. This kind of contested debates are however most typical in the case of new technologies. A similar framing contest, in fact, affected the introduction of diesel particulate filter technology (DPF) that, before becoming a standard feature of cars, had encountered strong discursive resistance from the automobile industry: DPF was promoted as a device that could reduce health and environmental hazards, but car manufacturers casted doubts on its efficacy, and argued it could actually amplify environmental problems by incrementing fuel consumption; interestingly DPF supporters accomplished the full introduction of this technology, not only by leveraging arguments on environmental protection, but also on the economic benefits deriving from DPF adoption, gaining broad legitimacy from diverse stakeholders (Guérard, Bode, & Gustafsson, 2013).

These cases show how the projection of new technology's possibilities is largely guided by legitimation. However, the envisioning exercise of technological potentiality may foster the creation of a common set of knowledge and understandings to facilitate coordination among field actors. On this regard, Garud (2008) documents how the definition of cochlear implants was greatly permeated with forward-looking framing attempts that induced some actor to describe them as "*the device of the future*" (Garud, 2008, p. 1070). These discursive meaning making processes took place in a series of conferences that not only proved to be a platform of confrontation between competing views on appropriate design solutions, but also enabled actors' information exchange and allowed them to develop a collective understanding of what it meant to help the profoundly deaf (Garud, 2008, p. 1081).

One empirical setting which encapsulates these multifaceted dialectical interplays between familiarity, future orientation, legitimation, and coordination is probably the nanotechnology field. Nanotechnology, at its inception, has been highly influenced by conflicting futuristic discourses that pointed out how this innovation was likely either to revolutionize the world or to put at jeopardy the very existence of life (Grodal & Granqvist, 2014; Kaplan & Radin, 2011). However, legitimation among scientific-oriented communities was achieved by diverting attention from those utopian and dystopian discourses, to give prominence to a more familiar definitional exercise based on framing nanotechnology with the known categories of molecular measurements (Granqvist & Laurila, 2011). Furthermore, by making sense of the future possibilities of nanotechnologies, field participants could define their degree of involvement in field's activities and engage in discursive activities upon which other participant could capitalize to eventually stimulate coordinated action (Grodal & Granqvist, 2014).

To sum up, the typical process imbuing meaning into new technological artifacts hinges on the fact that field members coming from different settings are likely to experience time differently and accordingly exhibit different orientation toward the past, present, and future

(Garud et al., 2013). This entails dialectical exchange in technological fields between innovators and technology promoters (who typically exhibit a positive future-orientation), and users and legitimizing audiences (who are usually anchored to their present needs and past experiences).

The “who?” issue. Definition of identities

When a number of actors start to coalesce around a new technology, at some point they interrogate themselves on questions such as “who we are” and “what we do”. The ambiguities of new technologies typically resonate in the identity work undertaken by field members. This identity definition process is thus another foundational issue which prompts discourse and meaning making activities in emerging technological fields.

In their formative stages fields are not significantly recognized, understood, or sanctioned, so that the validation by external audiences has to be gained through the exertion of cultural entrepreneurship (Wry et al., 2011). This is a discursive endeavor oriented at generating collective identity stories, namely accounts that communicate consistently and coherently the core purposes and practices of the nascent field and thus foster the creation of its symbolic boundaries (Wry et al., 2011, p. 452). The structuration of field boundaries is therefore the result of identity work enacted both collectively and individually.

In emerging fields identity work is enacted both at the collective and at the organizational level. Field members may in fact be concerned in defining both the whole new domain and their own individual identity. Clearly, the two levels are strictly intertwined (Patvardhan, Gioia, & Hamilton, 2015): on one hand, the larger is the pool of organizations claiming to belong to a new field, the greater shall be the social recognition that the field receives; on the other hand, the more coherently defined is a certain emerging field, the more likely organizations shall identify in it.

The main features of technological emerging field's identity formation process are well expounded by Grodal (2018). She investigates how central and peripheral communities shaped the boundaries of the nanotechnology field by enlarging or contracting the social and symbolic membership criteria. Her findings suggest that, in order to garner support and legitimacy from wide audiences, core communities initially expanded the symbolic boundaries by proposing looser definition of the key principles of nanotechnology; however, the entrance of peripheral actors, most interested in exploiting the commercial opportunities of fashionable items as nanotechnologies, risked to undermine field legitimation, and thus induced a subsequent contraction of those symbolic boundaries.

This case points out that identity definition in new fields implies the discursive construction of symbolic boundaries, clarifying that in technology fields the definition of such boundaries is grounded both upon the possession of a certain degree of *technical expertise* and on the *appeal to values* which characterize field's activity. In fact, nanotechnology actors' identification with the core activities of the field depended, on one hand, with their degree of technical competence (Granqvist, Grodal, & Woolley, 2013) and, on the other hand, with their adherence with the values connected to scientific research that are typically in contrast with self-oriented profit motivations (Grodal, 2018).

The above mentioned studies on nanotechnology focused specifically onto the legitimation driver, which is probably the most common angles adopted to explore the formation of identity in emerging fields. On this regard, Croidieu and Kim (2018) analyze how the early radio field emerged thanks to the community of amateur radio operators who, initially depicted by incumbents of wireless communication as responsible for annoying interferences, succeeded in becoming recognized as a professional group by building collective technical competences, engaging struggles over jurisdictional boundaries, and using the new technology to foster social transformations.

The issue of who are the subjects legitimized to claim field membership is particularly prominent in technological fields that emerge at the interstice of other existing fields. The interstitial space is in fact populated both by actors who were born there (i.e. *de novo* organizations), and by actors who come from adjacent fields (i.e. *de alio* organizations). The joint presence of *de novo* and *de alio* organizations may pose some problem to the formation of a collective identity because heterogeneity may obstacle the formation of both shared technical competences and values that are, as we have seen, the critical identity markers of emerging technological fields. In the emerging disk array industry, for example, the excessive presence of *de alio* firms impeded the formation of a set of consistent principles, beliefs, and practices constituting a collective identity code that could serve as perceptual focus of audiences conferring legitimacy (McKendrick & Carroll, 2001; McKendrick, Jaffee, Carroll, & Khessina, 2003). However, *de alio* organizations may in some cases foster this identity definition process by transferring their history-based legitimacy and reputation into the new setting. This can be the case when the technical competences of *de alio* firms well matches the technological base of the new field, as it happened in the emerging TV broadcasting industry where organizations coming from the radio field were able to provide more grounded frame of reference for the new identity than completely unknown actors (Perretti, Negro, & Lomi, 2008).

In order to favor the formation of a new collective identity, *de alio* actors not only have to fit with the technical expertise of the emerging field, but should also be coherent with the social values and beliefs that the focal technology conveys. Georgallis, Dowell, and Durand (2018), for example, found that the emergent solar photovoltaic field was perceived as less legitimate by policy-makers when populated by incumbent actors from the energy sector. In fact the incumbent energy sector, typically imputed as the main responsible for environmental problems, was not coherent with the environmentalists values that imbued with meaning the identity of the photovoltaic field. In the case of technologies that may significantly impact on

the human and natural environment, the identity legitimation process leverages high values and widely held beliefs to persuade external actors on the goodness and validity of the new field. This is exemplarily shown in the well-known case of nuclear power, a highly stigmatized technology whose employment for energy production was promoted by making appeal to the ideals of peace and progress (Gamson & Modigliani, 1989).

Clearly, not all technologies have such a critical impact on the world: in many cases, in fact, the values appealed to provide new fields with legitimate identity have a much more mundane nature. For example, technology with purely commercial purposes may have their identity legitimated by emphasizing consumerist values such as affluence, breadth of assortment, ease of use and access, and similar. This was the case of the satellite radio field, whose identity was legitimized by actors' emphasis on the superior sound quality and wider programming they were able to offer, compared to traditional radio (Navis & Glynn, 2010).

As briefly mentioned above, coordination is a much less explored meaning making driver in the definition process of fields' identity. Nonetheless, the discursive construction of field-specific technical expertise and values may generate a sense of belongingness among field participant that is crucial for aligning their different worldviews and mindsets. Thus, field members may strengthen their collective identity by establishing training programs or formalizing the knowledge base needed to work with the focal technology. This goal was pursued for example by Edison who promoted training programs for electrical engineers (Hargadon & Douglas, 2001), by industry associations in the disk arrays field to bring together a single community of system firms, system integrators, and vendors through education and training (McKendrick & Carroll, 2001), by Universities in the nanotechnology field (Granqvist & Laurila, 2011), and in many other instances; in so doing, a common language gets formed and circulate throughout the field. This process clearly can glue together field participants and thereby highly facilitates coordinated action.

A similar effect is present whenever the technology is reconstructed by field members as embodying certain value-laden cultural meanings that may serve to gather like-minded people, facilitate their interactions, and give some internal consistency to the emerging field. This is the case for example of the holography field: developed for warfare purposes, this technology became highly popular in the 1960s and 1970s amongst artists who used it for aesthetic purposes and enacted identity work to actively distance themselves from technology's military origins, adhering to a certain pacifist counter-culture (Johnston, 2005). Similarly, the microradio movement enacted an identity construction process grounded on the ideal of democratizing the production of popular culture that ultimately served to coordinate entrepreneurial efforts for enlarging the number of voices in the air (Greve, Pozner, & Rao, 2006). The appeal to social values and the development of technical expertise may often reinforce one another in the coordination-driven process of identity definition. In the holography case, for example, those art-oriented actors cooperated with scientists for the definition of the professional figure of the holographer, by establishing a school of holography and publishing a number of dedicated periodicals and handbooks which were meant to nurture a common vision of the new field (Johnston, 2005).

The “how?” issue. Definition of infrastructures

It is generally recognized that mature fields are characterized by an articulated infrastructure that ensures some degree of institutional stability (Greenwood, Raynard, Kodeih, Micelotta, & Lounsbury, 2011). The process of field emergence entails, among other things, that actors lay the groundwork for the establishment of these infrastructures. However, the very concept of “infrastructure” is rather slippery since it has been variously understood as encompassing both concrete items such as regulations, agreements, professional associations, and also theoretical constructs such as theorization, and market categories (Hinings et al., 2017).

In the following, I would adopt a more operational definition of infrastructure drawn from Hinings et al. (2017) who argue that fields' infrastructural elements are often materialized in governance mechanisms. Thus, infrastructures are made of formal and informal arrangements between field members, regulations, and centers of collective interests such as unions, industry associations, professional associations. This notion of field's infrastructure mirrors the concept of industry institutional subsystem advanced by Van de Ven and Garud (1989): in their framework of industry emergence they argue that a great deal of firms' activity occurs not only in the marketplace, but also in the political arena in order to socially construct governance structures, rules, regulations. This kind of activity is typically performed through the formation of collective bodies such as technical committees, trade associations, industry councils, and the like who approach, educate, and negotiate with other institutional actors to obtain endorsement and develop regulatory procedures (Van de Ven & Garud, 1989, p. 211).

The existing literature on the emergence of technological fields often addresses the formation process of these different but interrelated infrastructural elements, although it seldom makes explicit reference to the very construct of infrastructure. I propose here that the main dimensions of infrastructure definition are related (1) with the formulation of arrangements, conventions, regulations, i.e. with *rule-making* and (2) with the union of multiple actors with alike positions and interest in collective action centers i.e. with *community consolidation*. The two facets of infrastructure definition, as mentioned above, are highly interdependent but rather different in their development: on one hand, rule-making requires either lobbying efforts targeting regulators and policy-makers or direct negotiations between field participants; on the other hand, community consolidation is achieved through the mobilization of diverse actors around some possibly shared interests. To be sure, both processes are fundamentally discursive, entailing the enactment of meaning-making activities driven by coordination, legitimation, and animated by competitive tensions.

The peculiarity of emerging technological fields in giving rise to collective dynamics resides in the complexity of technologies that naturally spurs a certain division of labor among field participants. These actors thus get grouped in distinct, but interdependent communities, each of which perform specific activities and tasks, that may eventually form the supply-chain of field's industrial system. The process of community consolidation through which field participant get grouped according to different roles and functions clearly responds, in first place, to an internal coordination need. On this regard, van Merkerk and Robinson (2006) document the very embryonic stage of the field emerging around the so-called *lab-on-a-chip* technology (consisting in the miniaturization of laboratory analysis instrumentation), showing how the collective sense-making process addressing technology's ambiguities determined the progressive involvement of diverse scientific communities and pharmaceutical industry players. All these actors, in order to figure out how to exploit the new technology, begun to create ties among one another giving rise to collective dynamics and thus shaping the backbone of field's industrial system.

The next stage of community consolidation, for the sake of coordinating field's core activities, consists in the formation of coalitions between actors having a similar position and function with respect to the focal technology. This process is very likely to imply conflictual power dynamics between different communities. This was the case in the early film industry analyzed by Mezias and Kuperman (2001) where, at some point, a number of production companies formed a cartel to restrict the licensing of patents to its members, set production quotas, and schedule releases; in this way they aimed to increase their power with respect to exhibitors. The countermove of those companies who did not join the cartel was to establish the first central distribution organization which profoundly transformed the whole distribution function that was now also responsible of marketing activities. This exemplifies how the construction of infrastructures in emerging fields can be driven by both coordination within communities and competition between communities.

The progressive differentiation within technological fields of different tasks and functions, and the delineation of interconnections among them, is thus a fundamental step in the community consolidation dynamics that enables coordination among field participants. However, another study on the early film industry has shown how this process of tasks delineation and structuration had a positive impact also on the perceived legitimacy of the new field, even before trade associations were formed to undertake legitimization initiatives (Mezias, Lant, Mezias, & Miller, 2010).

Generally speaking, the activation of community level dynamics has a profound impact on field legitimation. In many cases, during the earliest stage of field development, the centers of collective actions that get in charge of actively pursuing legitimation are not industry associations, but social movements. This is the case, for example, of the wind power sector, where technology-focused social movement organizations have been able to raise the awareness of the general public and the favor of policy-makers (Pacheco, York, & Hargrave, 2014). In other cases, field communities represented by formal associations get engaged in conflictual power dynamics that forge the infrastructural elements of the new field. For example in the early radio field a complex framing contest was engaged between the centrally positioned Marconi company and the peripheral association of radio amateurs. These two actors had opposed interests inasmuch as the first aimed to become a monopolist in wireless communications, while the second aimed at opening the nascent industry. Both enacted discursive legitimation strategies targeting actors such as the Navy, regulators, the community of amateurs, and many radio operators with commercial interests (Kim, Croidieu, & Lippmann, 2016). This interplay shifted the power positions of those early actors of the radio industry who, in later stages, had also to cope with the generation of conventions to solve the coordination problems given by the technological ambiguities underlying the radio spectrum (Leblebici et al., 1991).

The formulation of conventions is a rule-making process mainly driven by coordination. In fact, convention are usually established through bottom-up process when field participants intend to provide their interactions with some regularity by agreeing on procedures and behaviors to be enacted under given circumstances. In other words, conventions originate as practical solutions to coordination problems that do not need to be enforced through normative or coercive mechanisms (Leblebici et al., 1991, p.342). In the early radio field in order to regulate the transactions between different actors, as for example between the financiers and the broadcasters, several conventions such as advertising and sponsorship were thus devised (Leblebici et al., 1991). The way in which field participants attempt to align their interests and worldviews through conventions, even when dictated by pure coordination needs, is not always consensual because technology's ambiguity makes it difficult to convincingly align diverse interests. For example, the definition of conventions for pricing online databases has determined a prolonged dialectical struggle from the early 1970s to the mid-1990s among libraries, scientific and business information centers, and regulators (Farjoun, 2002). This dialectic process was further complicated by the advancements in internet technology, so that the attempted coordination was frequently undermined by divergent forces that came to the fore when actors' interests were no longer reconcilable.

Rules governing field participants interactions are clearly not always negotiated among them, since they are often imposed by regulators. In many instances, in fact, regulators and government agencies are not just external actors granting their approval to new ventures: in nanotechnology, government officials were active players in meaning making processes (Grodal, 2018); in regenerative medicine, field emergence was performatively ignited thanks to a regulatory impulse from the EU that defined modes of configuring the technology basis and regulated the relationships among different actors for example by setting patients' rights (Faulkner, 2012).

The formation of a regulatory set-up is critical for new technologies to become part of the existing institutional landscape. However, the direction impressed by such intervention can be matter of debate and, in this process, a legitimation thrust typically spurs factions of field participants to promote their own understandings on possible arrangements as more valid than others. Thus the rule-making dimension in infrastructural definition is clearly driven to some considerable extent by legitimation. The way in which rules are formulated and applied is in fact highly dependent on the approval of external subjects. This is the case both when rules are devised through bottom-up processes and when they are top-down imposed on field members by regulators.

Even conventional behaviors are often motivated by legitimation, especially when there are also competitive tensions among field participants. Analyzing the evolution of the early film industry, Jones (2001) stresses the relevance of institutional rules that worked as legitimation strategies: at the earliest stage, when films were basically short exhibitions of the new technology without any plot, actors gained legitimacy by competing with one another applying to patent infringement cases; lately, when the public started to demand for longer and more elaborated stories, film companies started to legitimize themselves by strengthening the contents of their products and mimicking high culture environments such as Broadway. These cultural transformations induced changes in the roles of the workers involved in film production, establishing different careers, and thereby changing the arrangements among the parties.

Furthermore, through the enactment of certain conventionally constituted rules, actors in emerging technological fields may not only gain additional legitimacy, but also experience losses of credibility if those convention are not fine-tuned on the mindsets of external audiences. For example, Sun's sponsorship of the Java language as a standard for the internet programming environment not only was resisted by incumbents in the computer industry as Microsoft but also went through credibility crisis for its too stringent control of licenses that

disappointed communities of users (Garud, Jain, & Kumaraswamy, 2002). Thus, the need for legitimation often prompts field actors to revise their own conventions.

This case points out also another condition that makes legitimation a key meaning-making driver in rule-making. Namely, when the core activities of the new field may disturb (and even disrupt) the activities and vested interests of adjacent, already established fields. Frequently, in such situations there are opposed legitimation efforts directed toward regulators who can issue formal rules that consent or bind the operations of new fields. This is exemplarily shown in the pay TV industry whose emergence was fiercely opposed by TV industry incumbents who discursively promoted the idea that to foster public interest TV should be free; however cable TV operators, by engaging in a framing contest, managed to first garner the general public support, and then to lobby the legislator to overcome regulatory blockages (Gurses & Ozcan, 2015). It may also happen that incumbents' resistance and countermoves to the legitimation efforts of new technology proponents may actually block the emergence of new fields. This is the case of clean technology that failed to disrupt the energy sector thanks to incumbents legitimate use of the existing infrastructure to absorb the cleantech category and its associated resources (Zietsma, Ruebottom, & Slade Shantz, 2018).

Interconnections between artifacts, identities, and infrastructures

The above analysis of empirical studies has allowed to single out pairs of thematic dimensions that articulate the discursive construction of the three foundational issues, giving them a multifaceted character. Each pole of these pairs is engaged in a dialectical interplay with the other pole. This means that to deeply understand artifacts' discursive construction one must take into account that future orientation and familiarity are two sides of the same coin; technical competence and values are complementary aspects that reinforce each other in the formation process of field identities; the formation of community level dynamics is strictly connected with the formulation of rules.

More importantly, the articulation of different thematic dimensions enable us to shed light on the interrelations among the meaning making processes on artifacts, identities and infrastructures. Figure 1 below represents a model mapping these interconnections: the large boxes are the three defining issues, composed by pairs of thematic dimensions internally engaged in dialectical interplays, the solid arrows show how thematic dimensions specific to one issue aliment the meaning making process in thematic dimensions specific to other issues; the dashed arrows instead represent feed-back effects through which thematic dimensions from one issue affect meaning making on other issues.

Going in more details, the model indicates that the definition of technological artifacts as familiar gives relevance to the technical expertise component of identity formation (arrow A); this is typical for example in fields with a number of *de alio* organizations who may positively contribute to collective identity formation as long as their competences well match the technological base of the new field, as in the early TV broadcasting industry (Perretti et al., 2008) where the similarity between TV and radio made organizations from the radio industry competent and reputable enough to shape the identity of the new industry. Arrow B indicates that the framing of technology as familiar may aliment identity work based on values; for example in satellite radio industry, the definition the core technology as proximate to existing broadcasting technologies enabled actors to build their identity on the superior sound quality that the new method offered (Navis & Glynn, 2010).

As already variously discussed, one distinctive feature of emerging technological fields is the projection into the future that new technologies can inspire. This future orientation in emerging fields follows from actors' framing of technological artifact as producing both beneficial and harmful consequences which can be still unverified but simply predicted. Existing research shows how future orientation has relevant impact in the construction of both identities and infrastructures. Arrow C represents those situation in which the predicted consequences of new technologies reverberate on social values that act as field's identity

markers: this is well exemplified in all those cases related with green technologies that, by constructing artifacts as predictably harmless (or beneficial) for nature, imply environmentalism as the key identity marker of field members (e.g. Georgallis et al., 2018; Guérard et al., 2013). Arrow D represents instead the idea that whenever technologies are predicted to bring about certain consequences, a relevant part of the rule-making process is devoted to incentivize their employment, if the predicted consequences are to be positive (e.g. Pacheco et al., 2014), and discourage it, if the predicted consequences are to be negative (e.g. Maguire, 2004). This is clearly one of the most important source of contention between competing legitimation efforts, because by convincing rule makers that a new technology is good or bad the whole field may flourish or perish. Envisioning the future possibilities of a new technology is a highly relevant process in creating attention around it. This may further enlarge the pool of potentially interested stakeholders who may coalesce providing the community level infrastructural elements to the new field (arrow E): this was the case in the lab-on-a-chip (van Merkerk & Robinson, 2006) and nanotechnology (Grodal, 2018; Grodal & Granqvist, 2014) fields.

Another relevant factor in creating cohesive collectives within fields is given by the formation of a shared knowledge and competence base that in technological fields is typically instantiated in technical expertise (arrow F). As seen above, expertise is a fundamental factor shaping field's boundaries and identities which can be discursively leveraged to provide legitimacy to communities within the field. This, as shown above, is what happened in the early wireless communication field where the community of amateur radio operators, in order to promote their interests, formed an association on the base of their common position and competences (Croidieu & Kim, 2018).

The intricacies of this overall meaning making process are further complicated by some feedback effects that may act as self-reinforcing mechanisms in the unfolding process of discursive construction of emerging technological fields. These effects are indicated in figure

1 with the Greek letters α , β , γ . Arrow α is related to all those situations in which the imageries stimulated by technological artifacts are further alimented by the set of shared values that imprints the identity of field participants. For example after the interest it generated in artists, holography begun to be discursively reconstructed as the technology embodying the anti-militarist values of a certain counter-culture of the late 1960's (Johnston, 2005). Rules and regulations also have a substantial impact on the way in which artifacts are conceived and thus designed (arrow β). This can be the case, for example, whenever new technology are to become standards: the Java programming language succeeded to become a proper ISO certified standard only after field participants managed to agree on licensing rules (Garud et al., 2002).

Another highly relevant feed-back effect, represented by arrow γ , is given by the impact on field's identity work of trade associations, professional bodies, and other intermediate collective entities that compose the infrastructure of technological fields. These entities oftentimes work both to promote set of values characterizing field participants' identities, and to set educational and training initiatives that build field's identity through developing specific competences. A key example in this regard is represented by the constitution of technology-focused social movement organizations (TSMOs) in the emerging wind power sector, that were active to gather subjects and raise awareness in them on the issues of energy conservation and climate change and, at the same time, were able to disseminate their technical expertise among field members (Pacheco et al., 2014).

FIGURE 1 ABOUT HERE

DISCUSSION AND CONCLUSION

The purpose of the paper was to unpack the discursive emergence of fields that follows the introduction of a new technology. Technological novelty entails peculiar ambiguities and

opportunities that generate distributed debate and collective meaning making. The different actors that get involved in these discursive endeavors, through their interactions, may give rise to emergent fields. The core discursive nuclei around which these dialectical interactions revolve, i.e. the foundational issues of technological fields, are represented by technological artifacts, field identities, and field infrastructures. The very process of field emergence is substantiated in the infusing of meaning into these three defining issues. Legitimation and coordination have been highlighted to be the two main drivers of these meaning making processes, considering also that the diversity or misalignment of interests and worldviews create in fields competitive tensions that feed the dialectics between actors. The distinctive feature of technological fields is the presence of artifacts as one key element subject to these meaning making activities. Technology in fact is a social construction shaped by problematization processes (Munir & Jones, 2004; Pinch & Bijker, 1984), but it is also something alien from human agency whose materiality may produce an unintended impact on society (Orlikowski, 1992).

The overall process of field construction in technology-driven contexts is thus profoundly affected by how artifacts are defined and, in turn, the definition of identities and infrastructures have an impact on artifacts' definition and material design. The framework proposed here allows to see with clarity all these possible interconnections among field issues and their associated meaning making drivers. The framework thus offers the blueprint illustrating the engine of technological field emergence.

Contributions to research on fields and technology

The paper firstly contributes to institutional theory by advancing our understanding on the process of field emergence. The distinction of different issues and meaning making drivers allows to attain a comprehensive perspective of what field emergence implies. Previous studies on field emergence have mostly been focused either on the formation of field identity

(Navis & Glynn, 2010; Patvardhan et al., 2015; Wry et al., 2011), or on the building up of infrastructural elements (Farjoun, 2002; Leblebici et al., 1991), without explicitly considering the differences and interrelations between these two processes. Moreover, in the existing literature it is still lacking a detailed examination of different meaning making drivers in emerging fields: legitimation has been often indicated as the key thrust compelling actors to generate new meanings and understandings (e.g. Aldrich & Fiol, 1994; David et al., 2013), while the need for coordination has been considered relatively less frequently (Furnari, 2014; Leblebici et al., 1991). Disentangling all these elements may guide future research on field emergence in the identification of the key processes that trigger and reinforce the social construction of novel domains of socio-economic life.

Additionally, the discursive-dialectical perspective adopted here is meant to underline that any process of institutional genesis has at its core the encounter of different actors that give rise to novelty through their interactions. Field research has been recently framed as being based upon either an issue-oriented or an exchange-oriented approach (Zietsma et al., 2017). This may seem to imply that discourse and dialectics are mostly relevant for an issue-oriented perspective on fields. However, I attempted here to expound how field emergence is always grounded on communication processes amongst its constituencies (Taylor et al., 1996); therefore, even the exchange relations among actors, which are shaped through the elaboration of infrastructural elements, are themselves constructed by field members as debatable issues. Moreover, the relevance of values, beliefs, and problems in artifact and identity definitions, indicates that technological fields, although typically functioning as industry systems (i.e. as exchange fields), are permeated by possible uprising issue that may catalyze discursive activity. This helps to refine the conceptualization on the relationships between exchange- and issue-based fields: in emerging technological fields, discursive dynamics typical of issue fields are of crucial importance for the constitution of the elements

enabling exchange relations, i.e. material artifacts, actors' identities, and infrastructural arrangements.

Relatedly, the paper also sheds light on the peculiar role of institutional infrastructures during field emergence; this, as suggested by Hinings et al. (2017), allows to disentangle the power dynamics that are generated when two or more other existing fields overlap and give rise to interstitial spaces. Emerging technological fields exhibit this kind of power dynamics most vividly: technological innovations' potential disruptiveness implies that field actors often engage in framing contests through which they can performatively shape social reality, and thus gain the needed external support or manage to impose their own understandings in order to realize the infrastructural arrangements most favorable to them (Kumaraswamy, Garud, & Ansari, 2018).

In relation to the above point, the paper also contributes to studies on the social construction of technology. By bringing to the fore the field level as the arena where an assembly of different organizations, regulators, and collective bodies engage in dialectical interactions to generate new meanings, the paper responds to the call by Leonardi and Barley (2010) for an exploration of the social mechanisms that shape the diffusion of common responses to new technologies. In this regard the paper has shown that a new technology, not only triggers interactive meaning making processes around the multiple understandings that social actors have of the physical artifacts (Bijker, 1995; Pinch & Bijker, 1984), but it also spurs a great deal of discursive activity through which social actors try to understand who they are, and how their interactions can be governed in relation to the new technology. Thus, the paper suggests that a new technology may get a foothold into the existing institutional landscape if the actors gravitating around it enact a social construction process on their shared identities and on institutional infrastructures that altogether give rise to a proper field.

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TABLES AND FIGURES

Table 1: Defining issues and their thematic dimensions in emerging technological fields

DEFINING ISSUE	THEMATIC DIMENSIONS	MAIN MEANING MAKING DRIVER	EXEMPLAR STUDIES
Artifact	Familiarity	Legitimation	Hargadon & Douglas (2001) Kahl & Grodal (2016) Rao (2004)
		Coordination	Leblebici et al. (1991) Zuzul (2018)
	Future orientation	Legitimation	Granqvist & Laurilia (2011) Guerard et al. (2013)
		Coordination	Garud (2008) Grodal & Granqvist (2014)
Identity	Technical expertise	Legitimation	Croidieu & Kim (2018) Perretti et al. (2008) Granqvist et al. (2013)
		Coordination	McKendrick & Carroll (2003) Johnston (2005)
	Appeal to values	Legitimation	Georgallis et al. (2018) Navis & Glynn (2010)
		Coordination	Greve et al. (2006) Johnston (2005)
Infrastructures	Community consolidation	Legitimation	Kim et al. (2016) Pachecho et al. (2014)
		Coordination	Mezias & Kuperman (2001) van Merkerk & Robinson (2006)
	Rule-making	Legitimation	Gurses & Ozcan (2015) Jones (2001) Zietsma et al. (2018)
		Coordination	Farjoun (2002) Faulkner (2012)

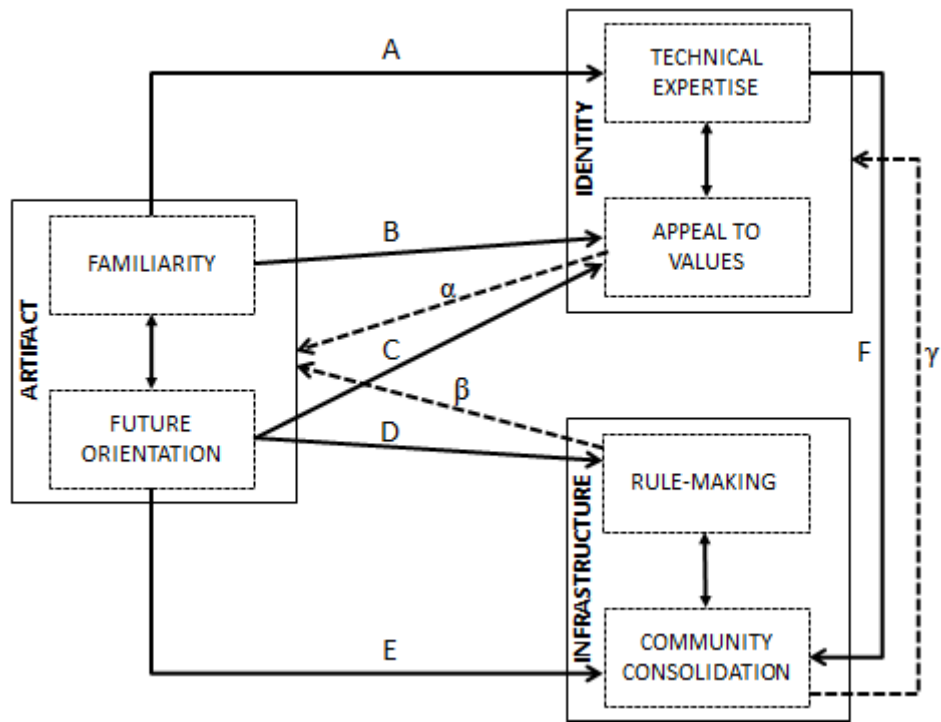


Figure 1: Interrelations between artifacts, identities, and infrastructures

ESSAY 2: The generative multiplicity of institutional logics. How discursive interactions construct an emerging field*

Abstract

This study explores the process of organizational field emergence. Field emergence is framed as the phase in which multiple actors begin to get engaged in a joint meaning-making activity. The paper explores how multiple interacting institutional logics, brought into the field by different actors and organizations, trigger and shape the overall field emergence process. This process is observed in the organizational field that is coalescing around civil drones. Methodologically, I adopt a discourse oriented approach to investigate how speeches given at important field configuring events can shape the emerging meaning system of field. The findings show that the multiplicity of institutional logics makes this meaning-making activity characterized by both cooperative and conflictual discursive structures. This amounts to an overall situation in which the nascent drone field find itself in a contradictory position of concurrent coupling and decoupling with respect to the traditional aviation domain. The paper contributes to the understanding of nascent fields by exploring in detail how multiple actors collectively engage in meaning-making not realized thanks to compromises among parties, but through discursive interactions that draw their generative power from the perpetuating tensions among multiple institutional logics.

INTRODUCTION

The process of organizational field emergence is an ever intriguing research topic inasmuch as organizational fields are defined as recognized areas of institutional life. Therefore, there is an intrinsic ambiguity in the concept of “emerging field” because not yet fully emerged fields lack that level of institutionalization which allows to clearly identify them.

* Previous versions of this paper have been presented at PROS symposium 2017, EGOS 2017, EGOS pdw 2018.

The earliest conceptualization of fields defines them as sets of organizations partaking in a common meaning system (DiMaggio & Powell, 1983; Scott, 1994). The focus was on the homogenizing institutional pressures exerted by fields on its constituting organizations which were, thereby, supposed to mildly conform to that shared meaning system. More recent developments instead look at fields as center of debate, characterized by an intrinsic multivocality that entails ongoing struggles among field members aiming to impose their own worldviews and defend their specific interests (Leibel, Hallett, & Bechky, 2018; Wooten & Hoffman, 2008). This makes the construction of a shared meaning system in fields a potentially contested process carried on through negotiation and conflict among actors. Field emergence, in this regard, may be conceived as the very initial phase when, before any settlement on membership criteria or rules of conduct is achieved (Fligstein & McAdam, 2012), a set of actors and organizations start to coalesce around a certain activity or issue, triggering a collective process of meaning-making. Such primordial soup from which, eventually, an entirely new field may spawn is likely to be characterized by a relevant degree of institutional complexity because newly emerged domains of human activity have the potential to attract and/or affect a heterogeneous set of actors. In other words, emerging fields are characterized by a highly fragmented institutional infrastructure and, as a consequence, by a multiplicity of institutional logics none of which is in a clear position of dominance (Zietsma, Groenewegen, Logue, & Hinings, 2017).

The present paper aims specifically at exploring the process by which such multiplicity of institutional logics animates meaning making in emerging fields. Research has so far devoted much attention to the process by which mature fields may experience major institutional change when two or more conflicting logics compete for dominance (Dunn & Jones, 2010; Suddaby & Greenwood, 2005; Thornton & Ocasio, 1999; van Gestel & Hillebrand, 2011). On the other hand, the process by which multiple logics interact in emerging fields is still rather neglected (for one exception see Purdy & Gray, 2009). This is unfortunate because, as

mentioned above, field emergence is strictly connected with the creation of an entirely new meaning system, and meaning-making (which is at the core of any institutional innovation process) is typically carried on through a dialectical process stimulated by actors' diversity (Gray, Purdy, & Ansari, 2015; Hargrave & Van de Ven, 2006). Therefore, given that meanings arise from the interplay between different and often competing worldviews (Baxter & Braithwaite, 2016), logic multiplicity appears to be a fundamental condition underlying the formation process of emerging fields.

Although research has already acknowledged how dialectical processes shape emerging fields (Farjoun, 2002), applying the institutional logic lens to this phenomenon may help to further our understanding on field emergence because logics, being institutionalized schemata of interpretation that actors can wittingly deploy (Friedland & Alford, 1991), are well suited to connect macro-level processes with micro-level interactions. In other words, the institutional logics perspective can bridge situated meaning-making exerted by interacting field members with broadly taken-for-granted beliefs and interpretative frames (Thornton, Ocasio, & Lounsbury, 2012). This shall allow to get a deep and multifaceted account of how new organizational fields emerge. For these reasons, the specific research question addressed in the paper is: *How does the interplay among multiple institutional logics shape the discursive construction process of emerging fields?*

These interactions among multiple logics are studied in the emerging field of civil drones. These technological objects are becoming largely diffused as flying cameras and, beside their usefulness for video and photo making, they are often employed for professional applications such as surveying, technical inspections, and others. An actual organizational field is coalescing around this technology mostly because civil aviation authorities from all around the world are concerned about a possibly disordered invasion of the airspace engendered by drones' spread, which may entail safety, privacy, and security issues. As a consequence, a still ongoing debate has been generated between aviation authorities and industrial actors on

relevant matters concerning the use of these objects. By focusing on the Italian national context, the focal data used here are the speeches given by relevant actors at seven field-level conferences, complemented by a number of archival and documental data. Data are relative to a 3-year timespan (February 2014 – February 2017) that allows to have a rich understanding of how actors discuss with each other and construct meaning during the very early phase of field emergence.

Data are analyzed through a discourse analytical approach (Phillips & Hardy, 2002) which is grounded on a strong constructivist epistemology coherent with Berger and Luckmann's (1967, p. 82) idea that institutions are “built upon language”. Discursive activities in fact construct institutional phenomena thanks to their meaning-making function (see Meyer [2008] on the relation between discourse analysis and Berger and Luckmann’s sociology of knowledge). In particular, I appraise how different institutional logics provide the discursive resources to actors for engaging in an emergent meaning-making process aimed at defining and making sense of fundamental issues characterizing the field. The findings thus show that the emerging field is getting built through a discursive process driven by multiple logics: actors embedded in different institutional logics interact with each other leveraging different, and sometime contrasting, arguments in order to imbue meaning on central themes of the field. The main result is that in emerging fields, a context which typically strive to be filled up with new meanings and understandings, logic multiplicity does not simply involve competition between alternative worldviews, but different logics may actually interact in more complex and generative ways.

THEORETICAL BACKGROUND

Field emergence

Research on emerging fields has often focused on the legitimation process through which nascent industries and societal sectors may turn into established and accepted domains of

human activity (Aldrich & Fiol, 1994; David, Sine, & Haveman, 2013; Wry, Lounsbury, & Glynn, 2011). This has led many scholars to address field emergence through longitudinal studies showing the full passage from an initially under-institutionalized situation to a settled state in which collective identity, rules, and norms have been fully formed (Croidieu & Kim, 2018; Grodal, 2018; Leblebici, Salancik, Copay, & King, 1991; Navis & Glynn, 2010). This long-term perspective, although productive of extremely valuable contribution on legitimation processes, risks to conceal the very initial phase in which actors begin negotiations on those very meanings which, once generated, may pave the way for field institutionalization. In short, current research lacks a thorough account of the ignition process of organizational fields because long-term, bird-eye views on already emerged field may not be very informative on what ultimately field emergence is about.

One of the fundamental mechanisms underlying field emergence that research has often identified is institutional entrepreneurship (David et al., 2013; Lawrence & Phillips, 2004; Maguire, Hardy, & Lawrence, 2004; Santos & Eisenhardt, 2009). The concept of institutional entrepreneur is usually associated with powerful actors endowed with enough resources and skills to purposefully modify the institutional environment at their will. Recently, however, institutional entrepreneurship is also associated to a more distributed, collective endeavor (Zilber, 2007). This latter perspective is adopted in the present study, in fact, although there may be significant differences in the possibilities of individual actors to affect field evolution, the social construction process of nascent fields is collectively enacted, so that everyone may potentially participate to it. By considering fields as centers of debate revolving around certain issues (Hoffman, 1999; Wooten & Hoffman, 2008), this distributed institutional entrepreneurship is principally exerted through discursive activities or, more generally, through symbolically-laden actions and interactions.

Institutional logics multiplicity

Different groups of actors can frame field's core issues according to a variety of interpretation schemes (Litrico & David, 2017). Institutional logics, defined as “the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality” (Thornton & Ocasio, 1999, p. 804), represent the institutionalized cognitive priors on which those interpretation schemes hinge. Research on institutional logics typically conceives logic multiplicity as a source of institutional contradictions which, once leveraged through an agentic endeavor, may open up the possibility for inducing societal change (Friedland & Alford, 1991; Thornton & Ocasio, 2008). Purdy and Gray (2009) study how logic multiplicity got entrenched in a nascent field showing that bureaucratic and democratic logics succeeded to coexist in the emerging field of alternative dispute resolution. However, their retrospective use of long term longitudinal data amounts to consider field emergence as a given. What I aim to do here goes instead in an opposite direction: to shed light on the very process of field emergence, I explore how the multiplicity of institutional logics brings a nascent field into life.

The institutional logics perspective has been recently criticized for privileging a top-down approach to meaning-making which avoids the dialectics of interpretation by taking logics as “given, unified, and thoroughly stable” entities (Purdy, Ansari, & Gray, 2017; Zilber, 2016). This is particularly evident in field-level studies in which multiple logics are mostly framed as a given source of contention and complexity which has to be somehow managed or dealt with (Dunn & Jones, 2010; Reay & Hinings, 2005, 2009). Other studies using a more fine-grained level of analysis instead show how organizations and individuals can reconcile different logics whose contradictions may even determine a beneficial creative friction (Jay, 2013; Mcpherson & Sauder, 2013; Pache & Santos, 2013; Smets, Jarzabkowski, Burke, & Spee, 2015). This latter set of contributions is more effective in exploring logics “on the ground”

(Zilber, 2016), by giving empirical accounts of the complex interactions among the actors that inhabit institutions (Hallett & Ventresca, 2006); in fact, “logics are not purely top-down: real people, in real contexts, with consequential past experiences of their own, play with them, question them, combine them with institutional logics from other domains, take what they can use from them, and make them fit their needs” (Binder, 2007, p. 568).

Discursive interactions

Since field emergence involves political struggles among different parties over meanings which are not yet taken-for-granted (Lounsbury, Ventresca, & Hirsch, 2003), it can be fruitfully explored through an interactional focus which depicts meanings as tethered understanding of broader institutional logics that “develops through social interaction that are partly reflective of the fields to which they are linked but also generative of those very fields” (Leibel et al., 2018, p. 165).

Thus, field emergence is conceived here as a collective process of meaning construction animated by interacting field actors. In particular, this meaning-making process, from which a nascent field may eventually coalesce, does not take place in a vacuum (see also Benford & Snow, 2000; Lawrence & Phillips, 2004). Rather, actors joining the emerging field have their own background and priors which are thereby brought into it. Different institutional logics might in this way come to interact with one another and accordingly shape the emerging field. Research on organizational diversity has long since acknowledged that, although being a possible source of instability, group heterogeneity has beneficial effects on creativity and innovation (Milliken & Martins, 1996). In particular, Fiol (1994) proposes that the multi-dimensionality of meaning entails a sort of simultaneous agreement and disagreement over issue interpretation among diverse group members which may lead to effective innovative effort of the whole organization. At a higher level of analysis, the contradictions between different interpretations of field issues fuel a dialectical and dialogical process which is open-

ended and ongoing and whose perpetuating tensions have a generative force (Bakhtin, 1981; Baxter & Braithwaite, 2016; Hargrave & Van de Ven, 2006; Putnam, 2013). I contend that institutional logic multiplicity in the setting of an emerging field, creating tension and possible contradiction between actors' interpretations, represents the fundamental condition which put in motion such generative process.

To give a careful account of this meaning-making process triggered by logic multiplicity I adopt a perspective akin to symbolic interactionism (Blumer, 1969). The central tenet of this perspective is that meaning is socially constructed through interactions among actors. Symbolic interactions imply processes of *interpretation*, by which actors ascertain the meanings of the actions and remarks of the other person, and *definition*, by which an actor conveys indications to the other person on how he is to act (Blumer, 1969, p. 66).

However, in order to effectively bridge micro processes of meaning construction with macro cognitive structures represented by institutional logics, in the following, I do not specifically focus on face-to-face verbal exchanges, as usual in the symbolic interactionism tradition, but on what is here defined as *discursive interactions*, namely the interplay between individual actor's utterances with broadly recognized (though not always shared) ideas and interpretations. Then, through their speeches and writings, actors can enact a dialogue between the different stances which circulate in the field. Discursive interactions, therefore, may represent a balance point between Foucauldian abstract discourse and Goffman's person-to-person interactionism (Hacking, 2004). Methodologically, the ideal setting where to observe in-vivo discursive interactions giving shape to an emerging field is the context of so-called field-configuring events (FCEs henceforth, see Lampel & Meyer, 2008). In particular, conferences have already been explored in previous studies as venues in which emerging fields are constituted through non-linear interactions among actors with multiple and often conflicting frames (Garud, 2008). In fact, conferences are "discursive spaces" that work as catalysts of change in which actors advance different narratives for imposing their definitions

of what the main issues are and how they should be addressed (Hardy & Maguire, 2010). Generally speaking, “FCEs reflect in complex ways field-level multiplicity—with a variety of discourses, actors, and interests played out in them. At the same time, they also reconstruct this very multiplicity.” (Zilber, 2011, p. 1541). Conferences are not just sites where to observe interactions among field members, but, more importantly, are part of the ongoing stream of texts that constitute the discourses upon which a field is built (Zilber, 2007, 2011). These discourses, in turn, are the communicative processes that reproduce and change institutional logics (Ocasio, Loewenstein, & Nigam, 2015). However, field emergence is studied here not as the institutionalization process of a certain dominant logic in a new field, but as what happens prior to that moment. The paper thus sheds light on the primordial soup in which multiple logics come to interact with each other through actors’ discursive activities. Thanks to these interactions actors strive to find a joint alignment in their interpretations and definitions of the relevant issues characterizing the emerging field, which is a fundamental precondition for any institutionalization of the field to eventually take place.

EMPIRICAL SETTING

Drones are pilotless aerial vehicles infamous for their employment in warfare since the late ‘90s. More recently, a smaller and unarmed version of drones has been developed for civil purposes. The earliest stage of this technology was imprinted by the so-called “maker movement” (Anderson, 2012). Hobbyists, programmers, aero-modeling enthusiasts started to build small flying vehicles following the Do-It-Yourself ethos and sharing their advancements through open-source communities. The onset of this pioneering phase dates back to 2006-2007 when Chris Anderson (former chief editor of Wired Magazine) built his first drone and launched DIYDrones.com, the first on-line community for drone makers (Anderson, 2012; Stuart & Anderson, 2015). The main difference between drones and traditional model aircrafts is that the former are endowed with a set of electronic components (GPS,

accelerometers, gyroscopes) that ensure great stability to the flight, but also make these machines quite complex software-driven devices.

Drones' ease of control and capability to automatically fly on preplanned routes make them commercially exploitable for a number of purposes (e.g. aerial photography, mapping, surveying). The increased availability of low-cost components needed to build drones' CPUs, in addition to the convenience and high quality of aerial data collected through them, have caused a surprising surge in the diffusion of this technology (see *The Economist*, Sep 26, 2015). Consequently, the number of drones occupying the air space has raised the concerns of aviation authorities because of the safety, security, and privacy issues posed by these objects. In 2011, the International Civil Aviation Organization (ICAO) has, therefore, issued a circular setting general principles to regulate the utilization of civil drones. Importantly, this circular defines drones as "aircrafts" (i.e. UAS, Unmanned Aircraft System, or RPAS, Remotely Piloted Aircraft System), assimilating the drone industry into the institutional domain of civil aviation. However, the novelty of this technology makes such integration quite tricky: "Unmanned aircraft systems (UAS) are a new component of the aviation system, one which ICAO, States and the aerospace industry are working to *understand, define* and ultimately *integrate*" (ICAO, 2011, p. iii, emphasis added). Additionally, drone operators are in many cases firms or individuals coming from the fields of photography, geology, topography who have no aeronautic competences whatsoever. This leads to frequent lacks of mutual understanding between aviation organizations and other field actors.

It is currently missing an international or European regulation¹, therefore national aviation authorities are entitled to design specific regulations (based on ICAO circular). Italian civil aviation authority (ENAC) has started a regulatory path at the end of 2013, and which is still ongoing since several modifications have been done to the existing rules. The publication of this regulation can be thought as the time zero of the Italian drone field. In fact, although

¹ An European level regulation is planned to become effective in 2020.

regulatory acts are usually considered in the literature as the proof of an already attained socio-political legitimacy, in the present empirical setting this is not the case because when the regulation was issued drone users were a rather disconnected community of practice, without clear understanding of the fact that drones' employment may be somehow problematic. The intervention of the aviation authority has then sparked a debate on drone's issues and opportunities, on rules' content and sense, and on many connected topics. In short the regulation has determined that community of practice to morph into a proper field characterized by debate on specific issues.

Additionally, four industry associations have been formed to give voice to industrial players (which are in most cases very small enterprises) and to offer them an array of services. The regulation, among other things, requires professional drone users to get registered as certified operators, this allow us to gauge the magnitude of the emergence process by tracking in time the number of these operators. Figure 1 below shows the growth of the field during the period considered in this study.

FIGURE 1 ABOUT HERE

The choice of Italian drone industry is largely motivated by the fact that, compared to other national industries, there is a greater involvement of industry actors in the definition of rules, not without episodes of attrition between industry and regulator, suggesting, in other words, the presence of vivid meaning negotiation processes. Furthermore, Italian drone industry currently is in the midst of its emergence phase, being relatively underdeveloped and lacking incumbent players. Finally, the abundance of FCEs where stakeholders and regulators confront with each other and the articulated composition of these stakeholders, make the Italian context an ideal setting to observe the discursive interplay among multiple institutional logics constructing a nascent field.

METHODS

Discourse and institutional logics

The methodological perspective adopted here is a discourse oriented approach grounded on the epistemological position that reality is socially constructed through language and communication (P. L. Berger & Luckmann, 1967; Phillips, Lawrence, & Hardy, 2004). Discourse analysis thus considers language as something that constructs social reality, rather than simply reveal it (Phillips & Hardy, 2002); in other words, this approach sees communication as a transformative process, and not as a merely informative one (Phillips & Brown, 1993). Discourse is defined as a set of interrelated texts, where texts can be both writings and talks. Texts are the discursive units and, through their production, dissemination and consumption, social actors bring about material manifestations of discourse. These texts are not meaningful when taken individually, but acquire meaningfulness only through their interconnection. In particular, the way in which discursive activities shape social reality is ascertained by focusing on intertextuality, namely the interface between discourse, texts and the broader institutional context (Putnam & Fairhurst, 2001).

Since institutional logics are systems of values and meanings that shape assumptions and beliefs, they affect discursive activities by forging the taken-for-granted premises that more or less implicitly ingrain actors' utterances. To discursively investigate how multiple logics are involved in a collective meaning making endeavor, I rely on an analytical procedure akin to argumentation analysis which specifically aims at unpacking how statements are structured within discursive texts (Liakopoulos, 2000). This kind of analysis is indeed well suited to uncover the underlying working logics in social actors' discourses (Toulmin, 2003). Institutional *logics* do represent a kind of working logic which prompts actions and influences the way in which actors deploy discursive arguments, shaping their patterns of reasoning apt

to detect cause-effect relationships, predict consequences, justify actions, provide definitions, and set targets.

In the context of mature fields, institutional logics determine the circulation among field participants of a number of taken-for-granted discursive arguments whose validity is seldom questioned and thus represent “persistent features of discourse which transcend individual texts, speakers or authors, situational contexts and communicative actions, and pervade bodies of communicative action as a whole” (Heracleous & Hendry, 2000, p. 1266). In emerging fields, instead, there is a pressing urge to generate new shared meanings in absence of shared taken-for-granted understandings. Therefore, actors embedded in different logics who deploy different arguments to advance their interests and viewpoints are somehow induced to get mutually engaged in an alignment effort. In so doing, the different discursive structures sustained by the different logics happen to intersect with one another, and thus materialize actors’ discursive interactions that may eventually give rise to new meanings. In the following I show how arguments circulating in the field to imbue relevant issues with specific meanings are differently patterned according to the different institutional logics in which actors are embedded.

Following Thornton & Ocasio (2008), institutional logics are intended here as ideal-typical meaning and practice systems that do not, by definition, precisely conform to reality, but help the researcher to interpret that reality. On the other hand, discourse represents the concrete way in which field actors enact and change those meaning systems identifiable with different institutional logics. For this reason, individual actors, although they are likely to be predominantly influenced by one logic, are conceived to be able to navigate the multiplicity of logics through discourse and, as a consequence, to make these logics interact with each other. Thanks to this link between logics and discursive structures it is possible to avoid the reification of institutional logics while preserving the theoretical rigor of this perspective.

Data collection

Field-configuring events are venues that catalyze evolution and emergence processes of organizational fields: “FCEs can enhance, reorient, or even undermine existing technologies, industries, or markets; or alternately, they can become crucibles from which new technologies, industries, and markets emerge” (Lampel & Meyer, 2008, p. 1026). In particular, literature has highlighted that FCEs represents discursive spaces (Hardy & Maguire, 2010), namely sites where through the production, distribution and consumption of texts, different field actors and interest groups seek to impose their definition of what are the most important issues and how they should be addressed. For these reasons, it is appropriate to focus on the speeches given at these event as focal data to explore the research question through discourse analysis.

The Italian drone field is characterized by frequent trade fair, conferences, workshops in which main actors and stakeholders meet to discuss hot topics, to present their products, to propose their solutions. These FCEs take place throughout the entire national territory, however it is quite clear that they do not all have the same resonance, since they do not gather always comparable audiences, and do not always have equally relevant speakers. In other words, some of these FCEs are more configuring than others. In particular, the Italian drone field presents two major events which are organized on an annual basis, namely, Dronitaly and Roma Drone (both have had three editions from 2014 to 2016). Analysis is centered upon these two events (although some other minor events have been attended by the author) because of their prominence. Dronitaly has the format of a typical trade fair with an exposition area where firms show their products and services to potential clients and interested people, and a workshop area dedicated to in-depth presentations of what these companies offer. In the past three year Dronitaly has gathered on average 48 expositors per year. However, beside the trade fair (one of which has been attended by the author), Dronitaly organized also other relevant FCEs. In particular, in February 2014 it organized a conference

announcing the up-coming trade fair (that have taken place in September). The relevance of this particular event resides in the fact that it took place in the period in which Italian Civil Aviation Authority (ENAC) was preparing the first regulation, and in that occasion one ENAC officer presented the forthcoming rules and answered to doubts and questions. Another relevant event hosted by Dronitaly was the Permanent Forum of Associations (FPA, March, 2015) in which for the first time all the four industry associations met with the regulator to give voice to their concerns and make sense of some normative evolutions that were taking place in those days. These two conference have been video-recorded and uploaded online and thus they are retrievable from the WWW.

Roma Drone is a more articulated event: it includes too an annual trade fair (gathering on average 52 expositors in the last three years); but, in addition to that, it organized two cycles of conferences (2014/2015 and 2015/2016) on specific topics and applications (e.g. precision farming, drones and journalism, topography). But the final conferences of the solar year (usually held in December²) had more general purpose, addressing broad issues and trying to assess what had been the evolutionary trajectory of the field. This second kind of conferences is the most relevant one because they typically gather different stakeholders (always including also the regulator) and well represent moments in which meanings and definitions are debated. Thus, the discursive construction of the field is particularly salient in these occasions. Accordingly, I focus on these general purpose conferences and on a few other that have taken place in coincidence with relevant events. Also the video-recording of these conferences hosted by Roma Drone are retrievable from the WWW, and I have conducted non-participant observation in one of them (the one held in February 2017). The final dataset comprehends video-records of 7 events taking place in a 3-year span (from February 2014 to February 2017). The duration of these recordings varies between 1 to almost 6 hours; they have all been verbatim transcribed yielding a total of 460 double-lined pages of text.

² In 2016 there was not this final year conference, but it has been postponed to February 2017, because Roma Drone changed its format, into Roma Drone Campus, an event more specifically devoted to educational workshops and less to exposition.

The participants to such conferences well represent the world of civil drones. In particular there are always officers of the civil aviation authority, ENAC, responsible for regulating the field, and from other important aviation organization: ENAV (provider of air traffic management services), Aeronautica Militare (Italian air force) and ANSV (investigative agency for flight safety). Additionally, these FCEs are regularly attended by representatives of the four industry associations (namely, ASSORPAS, FIAPR, AIDRONI, UASIT) and of the drone pilot association (EDPA); other speakers are founders or affiliates of Italian companies involved in the drone industry (typically manufacturers and service providers). There are also representatives of research centers and, less frequently, representatives of the Italian Government and of other state organizations (i.e. State Police and Firemen Department). Overall, in the 7 conferences analyzed below there have been 80 different speakers.

In addition to the speeches given at FCEs, the present study is built on a number of supplementary data, such as: documental data produced by the regulator (ENAC) and by the major industry associations (ASSORPAS and FIAPR); documents produced by other international and supra national organizations whose activity impacts field evolution (specifically ICAO and European Commission); two specialized online magazines that helped to reconstruct a chronology of relevant events; non-participant observations of some FCEs, and a few exploratory interviews and informal conversations with drone players that guided the early research work. Thematic analysis (see below) has been solely performed on the focal data, namely speeches at conferences, but these supplementary data have been fundamental for triangulating the emerging findings and placing focal data in their context. Following Khaire and Wadhvani (2010), it is possible to divide the dataset in focal texts and contextual sources, which are summarized in Table 1 below.

TABLE 1 ABOUT HERE

Data analysis

The process of discourse analysis consisted of four phases. First, I created a discursive event history database (Maguire, 2004) which serves to put all the texts in chronological order and to capture “who said what and when”. This phase helped to reconstruct a narrative account of the evolution of the field, and to make sense of the connection among different texts, in order to take into account the inter-textual dimension of discourse analysis.

The second phase of analysis has been devoted to the unpacking of focal data into its basic arguments. For this purpose, it was at first performed a thematic analysis meant to identify the main issues discussed in field configuring events (see Vaara & Tienari, 2004; Vaara et al., 2006). This implied systematic coding those segments of text which present some degree of constructiveness, namely sentences representing actors’ intention to give, reproduce or change the meaning of concepts and ideas. Following a 2-cycle coding procedure (Miles, Huberman, & Saldaña, 2014) a list of 42 first-order descriptive codes has been condensed into six themes.

TABLE 2 ABOUT HERE

These six themes, explicitly addressed by field actors in their speeches, enucleate broad issues around which discursive activities hinge. Although clearly distinguishable from each other, these themes are not orthogonal but interrelated. Finally, thanks to a further cycle of sub-coding, themes’ internal structure has been refined into a number of arguments. Arguments are intended here as claims with which actors’ discursively construct causes, consequences, definitions, justifications, and objectives in relation to the six themes. These 18 arguments listed in Table 2 above have been derived inductively from the focal texts, based on their recurrence. Main purpose of this stage is to discern how actors create meanings by deploying specific discursive structures, i.e. the linkages between a certain problem (represented by the above themes) and the argument(s) that provide a possible answer to it.

The third phase of analysis therefore aims to single out the different institutional logics embodied in these discursive activities. This has been done through an abductive process which combines pattern matching and pattern inducing (Reay & Jones, 2016). In other words, the identification of institutional logics has been performed through an iterative procedure in which ideal-types proposed in the literature (most notably by Thornton et al., 2012), were compared with segments of text suggesting the reference to some belief system that shapes cognition of individual actors. This process allowed to identify four different institutional logics: 1) regulatory logic; 2) entrepreneurial logic; 3) professional logic; 4) technological logic.

Regulatory logic is typically advocated by officers of the national aviation authority and it is embedded within the broader institutional order of State logic (for an analogous definition of regulatory logic see Lounsbury, 2002). As a matter of fact, references to this logic typically reveal the intention to pursue collective benefits, manifested in manifold mentions to concepts such as public good, public interest, citizens' safeguard. These goals are to be attained through the definition of formal rules whose main objective is to ensure safety. Legitimacy for this logic is derived from the legal system, which confers formal authority to set rules specific for the drone field. *Entrepreneurial logic* is akin to the Market logic for its emphasis on economic and business related topics such as competition, revenues, investments and similar. Differently from the pure market logic, the entrepreneurial one is primarily concerned in creating and exploiting new business opportunities. Its main proponents are entrepreneurs who founded a drone related company, and who find in associative organizations a way to gain voice and consequently legitimize their activities. Additionally, through these associations entrepreneurs attempt to give shape to the field and make it as much remunerable as possible. *Professional logic*, largely documented in the literature (e.g. Jones & Livne-Tarandach, 2008; Suddaby & Greenwood, 2005; Thornton et al., 2012), presents expertise as the main source of legitimacy and its main mission revolves around the strengthening of

reputation. In the drone field, the most salient proponents of this logic are those professionals coming from the field of surveying and topography (surveyors are indeed organized as a profession) involved in the drone industry. References to this institutional logic are further evidenced by a highly specialized vocabulary and the emphasis on the issue of professional education. *Technological logic* has some slight resemblance with the Community logic (Thornton et al., 2012), and with the science logic identified by Dunn and Jones (2010). It proposes technological progress as main mission and scientific research as the proper way to achieve it. Having part of its root in the maker culture, this logic stresses the sense of belonging to a community as the major legitimizing force.

Table 3 below summarizes the main features of these multiple institutional logics, reporting some exemplary quotes from conference speeches which provide evidence of such multiplicity. In some cases these logics are not enacted by actors in an exclusive way, that is, actors can make reference to more than one logic. Nonetheless, for the sake of analysis, I assigned each speaker to one main home logic on the basis of her identity, position, and references to the features listed in table 3 below. However, some admixtures are present between entrepreneurial, professional, and technological logics (e.g. professionals who started a company related to drones). Regulatory logic, being the home logic of aviation authorities officers, does not present such contaminations. However, ENAV, the organization managing and controlling airspace traffic, is a private company and, as such, it seeks for profits. Thus, it is a hybrid organization (Pache & Santos, 2012) that makes extensive reference to regulatory logic, typically uses an aeronautic language, but it is also embedded in a market-oriented logic.

TABLE 3 ABOUT HERE

In the fourth and final stage of analysis I traced the discursive interplay among these four logics. This has been done by assembling what obtained in the three previous phases. In particular, to gauge the prevalent discursive structures underlying each logic, I tracked how speakers embedded in each logic make reference to the themes and arguments pinpointed in phase 2 (e.g. regulatory logic advocates prevalently address the theme on drones' definition by deploying the argument "drones are aircrafts"). In this way it is possible to see how logics contribute to the discursive construction of themes' meaning, and to detect in what cases and under what conditions there are overlaps or disconnections between different logics' discursive structures. By so doing, it is possible to explore how multiple institutional logics interact with each other through discourse. These interactions appear to be multifaceted ranging from full mutual support to contrast and opposition. The findings are presented in next two sections³ first by presenting how meaning construction in each themes entails generative interactions among multiple logics; then by enriching the contextual understanding of this interplay with a detailed chronological account of the main events that prompted discursive activities in the field.

THE GENERATIVE INTERACTIONS AMONG MULTIPLE LOGICS

This section presents in detail each one of the six themes identified through data analysis. In particular the themes are introduced in subsections with question-mark titles to express the fact that these discursive nuclei are unsettled and therefore meaning-making activity is highly salient. I shall show how each of these themes is differently framed by different institutional logics through the discursive deployment of specific arguments and how, in this way, these multiple logics are to interact with one another.

³ Excerpts of speeches and documents reported in following sections have been translated from Italian by the author.

Theme 1. What are drones?

Maybe the most foundational theme that emerges from data analysis regards the definition of what drones are. The identification of a set of defining features of drones clearly represents the baseline meaning-making discursive activity which is undertaken by field actors.

Before detailing how these definitions have been variously contextually framed by field conference participants, it is appropriate to specify what are the most used definitions of drones, and why such defining issues are far from being settled. One common acronym to indicate drones is UAV which stands for Unmanned Aerial Vehicles; this definition is probably the broadest one because it encompasses basically any flying vehicle that do not carry people on board. The International Civil Aviation Organization (ICAO) in 2007 has decided to adopt a different term, namely UAS, which stands for Unmanned Aircraft System. The emphasis here is on the aircraft idea: everything that is an aircraft (not just an aerial vehicle) is subject to some aeronautic regulation. This definition implies a formal distinction from model aircrafts, which are used for recreational purposes: regular aircrafts have commercial or operational purposes. However, the ICAO circular issued in 2011 introduced an even more specific definition, namely Remotely Piloted Aircraft System (RPAS). The difference here is represented by the explicit reference to a remote pilot, in fact UAS includes also drones that can fly autonomously, with no one controlling its flight from a ground station. Therefore the two most critical features regarding the definition of what is a drone regard its purpose of use, which distinguishes drones from recreational RC planes, and the presence of a remote pilot, which distinguishes RPAS from fully autonomous flying vehicles. Data analysis shows that aviation authority officers put forward the definition of drones as aircraft. In particular, references to such definition are mostly made in the regulatory logic in order to justify aviation authority's intervention in the drone field. In fact, according to Italian Navigation Code, ENAC is entitled to regulate the use of any aircraft, and remotely piloted aerial vehicles have to be considered as aircrafts. This definition of drones as aircraft is

therefore supported by reference to two different legal sources: ICAO and Navigation Code. ENAC officers make use of both references as sources of its legitimacy as rule-maker for the whole field: “Technically [drone] is defined by ICAO as aircraft, and as an aircraft it is subject to our discipline” (ENAC Officer, Roma Drone 12/2014).

Another widespread definition emerging from data is “drone as a tool”. This definition of course is not a formalized one, but clearly makes reference to the fact that drones are used for some specialized (i.e. non recreational) purpose. Accordingly, the “drone as a tool” argument is mostly advanced in the professional logic. This definition is proposed to highlight the fact that drones are objects that allow to perform usual tasks in an efficient way. In some occasions, drones are almost denigrated as “lifter for sensors” or as “flying fans”. It is stressed that aerial photogrammetry is a science which existed long before the diffusion of drones, so that to perform it there are many possible instruments (e.g. satellites, airplanes, balloons) and drones are just one among them: “This is for us simply one more tool to be used” (Professional, Roma Drone, 01/2016). This definition therefore serves to emphasize the fact that, in order to deliver specialized services, the skill needed to make a drone fly is not enough, but what matters is the professional expertise: “RPA can’t make coffee, and can’t be a topographer: it doesn’t provide anyone with a profession ... without a state qualification” (Professional, Roma Drone, 01/2016).

Drones are also defined as technological systems, in first place, in the technological logic. In particular, drones are seen as something “more general” than RPASs. In fact, people doing research on drones are typically involved in refining the modalities of autonomous flight. For example the member of a research center stated: “Actually, RPAS and vehicles of this kind are not simply aeronautic objects, but they are technological objects, and they are increasingly becoming so” (Roma Drone, 02/2017).

Although the acronym RPAS is broadly adopted by everyone this idea that drones are something not fully comparable to aircrafts is leveraged in the entrepreneurial logic in order

to provide support to the claim that drones deserve tailored rules different from what prescribed in traditional aviation. For example one association representative stated: “I see that there is a difference between RPAS and aircraft, however I still do not see this difference reflected in the sanctioning regime” (Roma Drone, 02/2017). This is, in other word, the modality through which one logic (the entrepreneurial), by *leveraging* an argument typically employed in another logic (the technological), *get in contrast* with a third one (the regulatory logic). Lastly, the idea that drones can be considered as tools that perform specific tasks appears to be unquestionably supported in the entrepreneurial logic, given that the task performing capability of drones is ultimately what opens up business opportunities.

Theme 2. What is the impact of drones?

Three buzzwords are usually repeated during almost any conference, seminar and meeting about drones: privacy, safety and security. Clearly, these words regard possible problems caused by malicious or irresponsible employment of drones. The possibility that drones may, intentionally or not, bring some harm to things and people is the main reason why aviation authorities are concerned about regulating this field. Safety is the main problem that ENAC regulation directly addresses based on the premise that, because of a still imperfect (and not homologated) technology, drones may go out of control and fall down potentially causing damages. Another risk regards possible collisions with other aircrafts. Generally speaking, the argument that drones may have some negative impact, because of their dangerousness, is leveraged in the regulatory logic to justify and expound the content of particular rules that restrict the boundaries of operations performed by drone users. Talking about the restriction on the maximum altitude for drone operations, one ENAC officer stated: “Even if it is a small object, if it collides with a flying airplane it may cause a catastrophe: a 7 kilograms object that gets inside the jet engine may determines serious damages, so we are working on this” (Roma Drone, 12/2015)

Although the riskiness argument is generally not contested by drone users, there is a counter-argument which is mostly opposed to it in the entrepreneurial logic, namely, the idea that drones reduce risks. Drones are in fact employed in a number of applications which may entail some risk for human operators, such as the monitoring of hardly accessible plants or areas. As an industry association representative remarked: “It’s true, we are introducing new systems and new risks, but we are also allowing to remove other [risks], and this has to be highlighted” (Dronitaly, 02/2014). This argument has gained further strength because of the increasing employment of drones in emergency situations. One Firemen department officer, invited to present how its division uses drones, declared: “Drone has allowed us to remarkably reduce the risks of people and the risks of firemen. Nowadays we can avoid to do some things that we used to do with high risk exposure” (Roma Drone, 02/2017). The reference to this kind of argument is often made to mitigate the assertion that drones create problems. It can be thought as a *re-focusing* interaction between entrepreneurial and regulatory logics whereby the entrepreneurial logic proponents, without openly contending that drones may be dangerous, shift the focus on the social problems that can be addressed thanks to drones, in such a way to diminish the emphasis on drones’ potential dangerousness. Drones are framed to be able to provide solutions, not only to social, but also to economic problems. This problem-solving property of drones is acknowledged and remarked in the entrepreneurial, technological and professional logics. For example, the founder of one of the most important drone manufacturing companies in Italy, declared: “This new technology, with respect to traditional technologies, allows to provides a higher quality, in quicker time, and to solve complex problems, that used to take much time to be solved, in simple and effective ways” (Roma Drone, 01/2016). Thanks to these properties drones are deemed to have an impact on the economic system by generating business and occupational opportunities. The argument that drones provide business opportunities is a transversal one, being advanced almost by anyone. The entrepreneurial logic is very sharp in this regards

thanks to the appeal to an economic vocabulary; as a representative of one important drone manufacturing company stated: “Our mission is to offer a competitive advantage, which is basically the main objective of these devices” (Roma Drone, 12/2015). This argument is embraced also by regulators. The second regulation has been introduced by a foreword which states in its very first lines: “Among the major novelties of the aviation sector in the last few years, remotely piloted aircraft have a highly worth noting position, both because of the diffusion of their employment and because of the value that they may have on the development of new and innovative economic activities” (ENAC, 2015). This reference is a clear instance of a *supporting* interaction among different logics: by acknowledging the economic value that can be produced thanks to drones, regulators somehow endorse the industry and at the same time search for endorsement from it. In other words, this means that references to the business potentiality of drones may signal the fact that regulators and industry players are on the same page, they all want to develop this potentiality. However, it is worth noting that whenever there is some reference to business and economic potentiality of drones in the regulatory logic’s discursive structure, this is usually done by keeping the argument at a high level of abstraction, stressing the positive economic impact that the drone industry may have for society at large. This element recalls that regulatory logic is embedded in the State institutional order whose main objective is to increase the good of the whole community (Thornton et al., 2012).

Theme 3. Is the drone industry part of the aviation sector?

A pivotal theme that characterizes discursive activities in the drone field regards its relationship with the traditional aviation sector. Although it is generally recognized that drones, being objects that occupy the airspace, have some strong connection with the aviation domain, it is not yet settled whether this industry is to be considered just as a segment of the aircraft industry, or if it has some distinguishing features that makes it a novel and different

sector. Therefore, this theme has relevant implications for the identity construction process of the industry as a whole. Relatedly, this theme is directly linked to the first theme on the definition of what a drones is, although in this case the focus is not on the artifact, but on the whole field. In particular there are two different, and apparently contradictory arguments, that permeate this theme that can be summarized as: 1) the drone industry is included in the aviation sector; 2) the drone industry is different from the aviation sector.

This theme is mostly debated among advocates of the regulatory and of the entrepreneurial logics. Interestingly, advocates of the two logics make reference to both arguments (inclusion and difference), although for different purposes. Regulators legitimize their intervention in the field not only by defining the objects drones as aircrafts, but also by framing the whole field as part of the aviation domain. For example, one ENAC officer explaining why some restrictions on operations apply also to indoor flight, even if indoor space, technically, is not airspace, declared: “It’s not about airspace. It is about the fact that specialized [drone] operators are our operators, they are aeronautic operators and they have to behave according to safety rules” (FPA, 3/2015). The definition of specialized operators is actualized by one of the central pillar of ENAC regulation, which disposes a registration procedure needed to be allowed to use drones for professional and commercial purposes. This inclusion argument therefore is cognitively grounded on this definition of drone operators as aeronautic subjects, and it is reinforced by the material practice of the registration procedure. The same inclusion argument is in some cases proposed in the entrepreneurial logic. For example, an industry association representative in one occasion has quoted U.S. transportation secretary that in early 2016, when FAA (U.S. aviation authority) introduced the obligation of registration for drones, declared “Make no mistake: unmanned aircraft enthusiast are aviators, and with that title comes a great deal of responsibility” (Roma Drone, 01/2016). This apparent overlap between the entrepreneurial and regulatory logics actually hides some subtleties. In fact, references to the inclusion argument made by entrepreneurs appear as a way to find

legitimation for their business activities, both in front of the regulator (who almost always attends these FCEs) and, more importantly, in front of potential clients that may sit among the audience of these events. As a manufacturing firm representative declared: “Since our clients want certifiable and reliable products, we have recently obtained the standard aeronautic quality certification EN9100” (Roma Drone, 12/2015).

The difference argument is often advanced by advocates of the regulatory logic. This is done in many cases to justify inadequacies lamented by drone operators. For example, in order to justify the lack of rule enforcement, one ENAC officer stressed that: “In traditional aviation sector, operators are circumscribed by an airport and therefore they are under our direct control... different story when the great majority of [drone] operators operate outside airport’s jurisdiction, in countryside or in urban environments where ENAC has no power to enforce this kind of control” (Roma Drone, 12/2015). The difference argument is instead advanced by entrepreneurial logic advocates in order to provide support to their claim for softer and more proportionate rules. For example one industry association representative during a conference, in response to the speeches of two ENAC officers, stated: “The things that have been told so far are linked to a rather classic view of RPAs, derived from the military and the aviation perspectives. However, nowadays there is a [huge] market made by hobbyists, but more frequently by professionals, who want to use these objects as flying cameras, therefore there is a normative approach which is undoubtedly disconnected from what the industry wants to do” (Roma Drone, 12/2014).

To sum up, the inclusion and difference arguments, being both advanced by proponent of entrepreneurial and regulatory logics, are not univocal expressions of two contrasting logics. However, the two arguments are addressed differently and for different purposes in these two logics. This reveals a further interaction among logics which I label *discrepant alignment*, meaning that multiple logics can go along with one another, although the underlying motivations are different. It may well happen that actors embedded in different logics find

themselves with fitting definitions on some specific issues. However, digging a little deeper, it would be possible to uncover the fact that these overlapping definitions are based on quite different interpretations. Discrepant alignment, therefore, implies convergence on the deployment of specific arguments to infuse meaning about a certain issue (definition). At the same time it implies that, given the different missions and attention foci of actors embedded in different institutional logics, the deep reasons why these argument are deployed (the interpretations) diverge.

Theme 4. What are rules for?

Another crucial issue that imbues large part of the meaning construction process in the drone field regards the role of rules. The importance of rules is clearly stated by one ENAC officer during one conference that have taken place few days after the publication of the first regulation: “Rule-making is an unrewarding task, it is not pleasant. But rules are needed. Airspace belongs to everyone, safety belongs to everyone. Without this regulation the whole sector would operate unlawfully” (Roma Drone, 05/2014). This statement contains an explicit reference to one first reason for having rules: ensuring safety. However the statement makes less explicit reference to another reason: without rules the whole sector would be illegal. Thus, regulation is to be conceived as an enabler for the industry not as a constraint. This claim is supported by reference to the Navigation Code which states that any aeronautic operator is allowed to occupy the airspace only if authorized by aviation authority. Before the publication of the regulation, when there was no registration procedure for drone operators, anyone who used drones for professional and commercial purposes was breaching that provision of the Navigation Code. Accordingly, a widespread argument is that rules actually enable the development of the industry by making aerial work with drones possible. In short, the regulatory logic frames the importance of rules along these two arguments: ensuring safety and enabling industrial development. Interestingly, the two arguments are oftentimes

proposed together (as the above excerpt shows). This is done because the safety argument implies that rules impose restrictions on the operability of drones, therefore to mitigate the idea that rules act as constraint, regulators stress the fact that without rules no operation is allowed at all.

On the other hand, the entrepreneurial logic appears to be aligned with the theme on the importance of rules as framed by regulators. For example one industry association representative once stated: “We need to ensure safety because safety enables the market to develop and to gain public acceptance which is what shall allow the market to take-off” (Dronitaly, 02/2014). Although there is no explicit reference to rules, the need to ensure safety is directly connected here with the development of the industry. However this statement introduces one further element which is oftentimes repeated by entrepreneurs and industry players: making the business safe can be beneficial because of a reputational mechanism. Conceptually speaking, therefore, it is not safety per se that matters but its legitimacy enhancing effects. This, therefore, appears to be another instantiation of discrepant alignment.

The second argument about rules as enabler of industrial development is in several occasions evoked by industry representatives: “In this moment in Italy there is a 350 million euros business, thanks to the activity of the regulator, who has allowed RPASs to fly in our country” (Roma Drone, 12/2015). Generally speaking, there is an apparent widespread agreement on the importance of having some rules. However, the entrepreneurial logic proponents often highlight also that rules, if they are too complex and uncertain, may harm business instead of fostering it. As highlighted by one industry association member: “The market is a little bit stuck on the normative aspects. I see many operators or potential operators who would be highly interested in using these objects and that today, because of the regulation, don’t go beyond this initial interest and make no investments” (Roma Drone, 12/2015). This appears to be another instantiation of re-focusing interaction between logics in which the entrepreneurial

logic, while sharing with the regulatory logic the argument that rules are needed to enable the industry, tends to shift the attention on the counter-argument according to which rules may actually hamper business activities in the field.

In the professional logic, instead, rules appear to be unquestionably accepted. This attitude derives from the fact that professional logic is characterized by strong ethical commitment (see for example Suddaby & Greenwood, 2005) and accordingly shows a great deal of obedience to formal rules. As a professional who started a drone manufacturing firm stated: “We want to have rule and we have to comply with rules. We don’t complain like ‘Let’s find some agreement on rules’. We respect rules, because we care about everyone’s safety ... and thanks God there are rules and these are implemented” (Roma Drone 01/2016). This statement suggests an overlap between the professional and the regulatory logics for what regards the importance of rule. However, this apparent acquiescence to rules is probably directed at building reputation. Also in the entrepreneurial logic the safety-ensuring impact of rules is framed as important not because of safety per se, but for a reputational factor, but differently from it, the professional logic does not aim at accruing the legitimacy of the field as a whole, but at garnishing professional image. The same person who made the above statement, contextually reported episodes in which a few clients asked for performing operations in unpermitted areas, namely breaching the rules, and his answer was: “not with my hallmark”.

The technological logic is relatively less involved in the meaning making activity regarding the impact of rules. The ideal-typical technological logics clearly lacks the kind of normative commitment of the professional logic, and as well it is not primarily concerned with the economic impact that regulations may comport. One member of a research center, illustrating their experimentations over an industrial site, highlighted: “In that case we had some problems with our friends from ENAC, because they naturally made us notice that there are

some rules to be respected” (Roma Drone, 02/2017). Rules are therefore perceived as something that may hamper the research activity on drones.

Theme 5. Why to form relationships among field members?

As DiMaggio and Powell (1983) argue, the emergence phase of organizational field is characterized by a structuration process in which organizations increase their level of interaction and of mutual awareness. The drone field makes no exception and FCEs are important venues in which these interactions takes place and where actors can develop mutual awareness. However, FCEs are also venues where the sense for creating connections among field actors is debated. Therefore, what is of interest here is not the formation of relations among field actors per se, but the discursive construction of the reasons why according to field actors it is worthwhile to form these relations.

Since most of the conferences address, to some variable extent, the content of rules, one of the most debated reason for forming relations regards the definition of shared rules. This is the most salient exemplification of an explicit supporting interaction between regulatory and entrepreneurial logics. Both the regulatory and entrepreneurial logics, in fact, extensively advance the argument that the definition of better rules is made possible thanks to the formation of relationships among field actors. The regulator frequently highlights that the rule-making process implies confrontation with all the interested stakeholders. Furthermore, it is stressed that this is the normal procedure for regulating the traditional aviation sector: “The regulator does not just make the rules and that’s it. Before publishing the final regulation, the regulator listens to the demands, issues a draft, receives comments, analyzes them, adjusts the draft. This is an osmosis process among the parties which is fundamental for us ... And this continuous osmosis between the world of drones and the regulator has the purpose of giving a direction to the market, giving certainty to the market” (ENAC Officer, Roma Drone, 02/2017). Entrepreneurial logic advocates propose to create relationships with the regulator

for this same purpose. This kind of relationship has been discussed and exemplified in the first meeting of the Permanent Forum of Associations, which has been launched with the initiative of ASSORPAS specifically for creating a space for confrontation with the regulator, as declared by the association president in that occasion: “The idea is to achieve a shared position, because the market is one, and we want to represent such common position, we want to establish a dialogue with the authority in order to reach a common objective for everyone” (FPA 03/2015). In the same event the representative of another industry association (FIAPR) similarly stated: “We need to meet at a common table, that I would like to form from tomorrow morning, together with the other associations and ENAC ... in order to build together these rules and define all the details which shall allow this national market to grow” (FPA, 03/2015). The discursive interaction between the regulatory and the entrepreneurial logics on this particular argument is one of *full support*, because both logics perfectly overlap on the idea that the formation of relationships may improve the regulation. Although the regulatory and entrepreneurial logics hold partially different perspectives on the impact of rules (see above, theme 4), this rule-improvement process, empowered thanks to the establishment of these relations, appears to be motivated in both logics by the idea that rules are industry enabler. In short, we have an interaction of full support among different logics whenever there is overlap not only on the discursive deployment of arguments, but also on the underlying motivations.

The professional logic instead does not focus much on the importance of engaging a relationship with the regulator to redefine the rules. This descends from its highly accommodating posture with respect to rules and rule-making. Nonetheless, also in this case the importance of forming relationships among field actors is evidenced, but the main purpose is the integration of differentiated competences. As already stressed, the professional logic emphasizes expertise, and the drone field conveys different kinds of expertise. For example one professional who runs a drone-related business declared: “I am a topographer, I could

never be an expert in aeronautic norms, I am an expert in geomatics. Therefore, as a firm, we have decided to open up our gates to let aeronautic experts in” (Roma Drone, 01/2016). Even more explicitly, another professional who runs a service providing company stated: “In our DNA we have the partnership gene, because we need to create an ecosystem of competences in order to deliver a [high-quality] service. Because no one can be an all-around expert” (Roma Drone, 01/2016).

Another reason why to create relationship in the field is strongly proposed in the technological logic: interactions with partners are needed to innovate drone’s technology. This attitude, which is widespread among a number of actors in the field, has its roots in the maker movement culture, which imprinted the whole field. In fact, drone makers rely on the support of online communities in order to develop their products. This suggests the existence of an open and collaborative innovation system which is more similar to a scientific community than R&D divisions of high-tech corporations. One industry representative with a maker background stated: “Given the relevant resource limitations of SMEs, the strength to realize technologies, which were once unimaginable for SMEs, has been found thanks to the open-source and a collaborative mindset” (Roma Drone, 12/2014). Understandably, this kind of collaborative innovation model suits well with the entrepreneurial logic too, in fact the open-source system is what enabled many entrepreneurs to start up their own company with very low entry costs. Entrepreneurial logic makes the case for creating partnerships among industry player at a more abstract level. Given the still fragmented structure of the field, composed in major part by small and very small enterprises, some entrepreneurs stress the importance of generating a critical mass, by fostering connections among these small players both for sharing their knowledge to innovate more effectively and for pooling their varied competences. This is well exemplified in this speech by one representative of an important drone manufacturing firm: “We need to activate virtuous mechanisms of strong interconnection among industry players, from producers to operators... By doing so we will

be able, not only to develop technology, but to export it and compete at international level... But we need to activate these synergies which bring the small and big players closer, together with the regulator and other industrial entities. In this way we will get an overall growth of the sector and of the entire value-chain” (Roma Drone, 12/2015).

Therefore, the entrepreneurial logic highlights the economic relevance of creating partnerships among field members, by making reference to the two arguments preeminently deployed respectively in the professional and the technological logics, that is, integration of diversified competences and technological development. In other words, this is an instantiation of another interaction among institutional logics that takes place through a process of *bundling*, whereby actors advocating a certain logic assembles compatible arguments usually deployed in two (or more) other logics. Importantly, this interaction implies that a certain logic contributes to the meaning making process of the emerging field with an explicit reference to its focus of attention (creation of favorable business environment), by combining arguments which, individually taken, would promote elements typically embedded in other institutional logics (creation of competences, development of technology).

Theme 6. How to make the field more mature?

While the creation of relations among actors is related with the material basis of institutionalization, the cognitive basis of institutionalization regards instead those processes by virtue of which the specific activities carried on in the emerging field acquire some degree of taken-for-grantedness. Although the drone field is still far from being fully institutionalized and taken-for-granted, large part of debates taking place in the conferences addresses this cognitive aspects of institutionalization. Field actors explicitly talk about making the field more mature, and in this regard they suggest a number of possible strategies and solutions to

foster the cognitive entrenchment of drone related activities among stakeholders and the general public.

The main problem envisioned in this regard is the diffusion of irregular and irresponsible operations which are deemed to create a reputational damage to the whole field. Although many of such irregular activities are performed by unaware recreational users who fly their drones in unsafe areas (e.g. crowded gigs, nearby airports), there is, especially in Italy, also the proliferation of commercial activities carried on disregarding any rule. Oftentimes, in speeches given at conferences this kind of activities is symbolically represented by the wedding photographer who use drones as a camera to film and take photos from above. This use is forbidden because in no circumstances drones are allowed to fly in crowded scenarios as weddings usually are. Devising ways to inhibit these unlawful activities is transversally perceived as a crucial factor to foster field's maturity.

The first and utmost way to make the field more mature, and therefore reduce the impact of unlawful activities, is the diffusion of aeronautic culture. This remedy is clearly proposed in first place by regulators: "We need first of all to undergo a cultural operation in order to solve many doubts and misunderstandings and grow" (ENAC Officer, Roma Drone 05/2014). In the regulatory logic's discursive structures there are many such references on the need for a cultural development of the field which can be effectuated through the infusion of aeronautic concepts and practices among field member: "We are trying to make the system evolve toward a more mature configuration, a more aeronautic one, therefore we have introduced many concept, typical of the aeronautic world, which we are already regulating, adapting them to this particular system" (ENAC Officer, FPA 03/2015). This argument shows strong connections with the theme 3 outlined above, on the relationship between the drone field with the aviation sector. In fact, one fundamental factor needed to diffuse this aeronautic culture is the imposition of training and educational duties for drone pilots and operators based on aeronautic programs. These training programs are deemed essential to professionalize the role

of pilots: “We need to consider the pilot as a professional, a person with an identity based on what he is able to do. For this reason we have introduced the concept of license... which shall be attained through an educational path that will end up with a formal assessment made by an examiner qualified by ENAC” (ENAC Officer, FPA 03/2015). Importantly, the regulatory logic always stresses the importance of ensuring safety, so that the diffusion of aeronautic culture and the qualification of pilots is motivated by this factor: “By introducing this pilot license we have acknowledged the importance of this role as a fundamental component of safety” (ENAC Officer, Roma Drone 12/2015).

This argument is supported in the entrepreneurial logic: “We are firmly convinced that this market, born out of technological opportunity, must necessarily go toward a professionalizing evolution and the pilot license goes definitely in this direction” (Industry association representative, FPA 03/2015). However, the entrepreneurial logic, in order to block or limit the expansion of unprofessional or even illegal operations, highlights as a more fundamental factor the accrual of public awareness on what is possible to do with drones and what is not. This problem has been well highlighted by one industry association member who noticed how the efforts made by field actors to establish and enforce rules are hindered by the fact that the national TV broadcasters frequently transmit images taken through drones in potentially dangerous areas: “Even if both the institutions and the associations push toward legality, then a kid switches on the TV and can see drones flying in the nighttime, above people, above roads, and he thinks ‘Evidently I can do that too’” (Rome Drone 01/2016). Beside the general public, many concerns regard the level of awareness of potential clients: “Someone still thinks that these vehicles can do everything, to work as vacuum cleaner, or to go on the moon. So there are even large Italian companies that ask us to do anything, and this is not possible, it is important to make them understand that. This means that there is still no such culture among our potential clients regarding the possibilities of this industry” (Industry association representative, Roma Drone 12/2015).

The professional logic is as well highly sensible on the need to make the field more mature. Also in this case the emphasis is on promoting training and educational measures, supporting what deemed necessary in the regulatory logic. However, what emerges distinctively in in this case is that the attention is not only on developing aeronautic culture, but also on fostering competences among drone users for what regards specialized applications. As stated by the representative of a firm specialized in topographic instruments and applications: “Who uses our services has to operate according to what prescribed by the regulation, therefore the avionic education is fundamental... And then education also in another regard, namely in data processing: we don’t want that those who buy our vehicles just take some nice picture or videos, but we want them to use the RPA, and most importantly the sensor, to perform surveying, that is, to use it as a tool” (Roma Drone 01/2016). This quotation has a salient reference to the definition of drone as a tool, which is typical of the professional logic; additionally, it highlights the attention on building expertise and competences through education.

In this theme both the entrepreneurial and the professional logics, therefore, have a supportive stance toward the idea purported in the regulatory logic that, to make the field more mature, it is necessary to foster the diffusion of aeronautic culture. However, both the entrepreneurial and the professional logics add something to this argument. The entrepreneurial logic stresses the importance of promoting awareness campaigns among the general public and potential clients; the professional logic instead stresses that the field can become more mature by developing not only aeronautic competences, but also the specialized knowledge needed to perform technical applications. This means that these two logics interact with the regulatory one by *complementing* it with other arguments. Differently from the re-focusing interaction, that implies initial agreement on one argument which is afterward counterbalanced by shifting the attention on an opposite or contradictory argument, a complementing interaction implies attention shifting toward compatible arguments which do not create any contrast.

The technological logic appears to be rather detached from these discussions on education and awareness. Probably, this is a consequence of the fact that this logic is not primarily concerned with the social and professional implications of drones, but rather frame drones as objects that embody technological progress. Accordingly, the main argument purported in this logic about field maturation does not regard cultural factors, but it is all about empowering the technology to its full potential. This is strictly related to the definition of drone as robot and, therefore, to its capability to perform missions autonomously. As the founder of a high-tech start-up declared: “There are some problems that still impede drones from fully entering in the family of robot... So we want to include them into the family of robots solving these problems by making them completely autonomous thanks to an artificial intelligence system ... Nowadays drones are still operated by humans, with all the consequent limitations. The kind of drone that we envisage instead shall collect an impressive amount of data, thanks to their autonomous 24/7 working time” (Roma Drone 02/2017). This viewpoint appears to be in stark contrast with the regulatory logic argument which stresses the importance of pilots’ education as factor fostering field maturation. Drone pilots are instead superfluous according to the technological logic proponents. Interestingly, this view of autonomous drones is extensively reported by officers of ENAV, the company that provides air traffic management services. As already argued, this company is a hybrid organization embedded both in a Market and State logics. In fact, as a listed company it needs to attract investors, but it manages the airspace which is a public good par excellence and, in fact, it used to be a state-owned company until recently. Its interest in the drone field regards the possibility to accomplish airspace integration between traditional manned aircraft and unmanned drones. This scenario is still to come because nowadays regulation mostly forbids to make drone fly autonomously, beyond line of sight, and above a certain altitude, therefore drone operators are not currently required to interact with ENAV when they occupy the airspace. But ENAV envisions a scenario very close to what envisioned in the technological logic: “One of the

most serious limitation to the development of the drone market is the flight within line of sight constraint. This means that we aren't yet talking about drones, but we are talking about remotely piloted vehicles, RPAs, but drones are a wider category that encompasses also vehicles capable to perform missions autonomously... But in order to perform these missions safely, so we are talking about operative safety, it is necessary to create an infrastructure that may ensure the separation between drones and other aircrafts, analogously to what happens with air traffic management system" (ENAV Officer, Roma Drone 12/2015). This passage highlights how ENAV facilitates a difficult interaction between the regulatory and the technological logics. In fact, it deploys the same argument proposed in the technological logic, but with special attention to the safety aspects that are of the highest concern for the regulatory logic. This can be defined as a *mediated* interaction among logics, catalyzed by a hybrid actor as ENAV which reconciles otherwise discordant arguments. This interaction reminds the bundling interaction identified above, with the main difference that the arguments assembled together are potentially incongruent. It is noteworthy that such interaction is fostered by an hybrid organization which, by its own nature, reconciles contrasting institutional demands (Jay, 2013; Pache & Santos, 2013). ENAV is thus advancing a hybrid discursive structure, which is not associated to one single institutional logic, but which comes from the combination of more logics. In this sense, at a higher level of abstraction, this mediated interactions among different institutional logics can be thought to be effectuated thanks to the intervention of a hybrid discourse.

Summary

The main result of the foregoing analysis is that emerging fields are arenas where multiple logics get engaged in a complex discursive interplay. Differently from more mature fields (e.g. Greenwood & Suddaby, 2006) where logics multiplicity is typically characterized by conflict and competition for dominance, an emerging field is one in which a shared meaning

system is to be created. For this reason, the multiple logics that permeate the field strive to find some alignment. Evidently, this is not a smooth process insofar as actors advocating different logics may well have diverging goals, and may frame the same situation very differently, creating the potential for misunderstandings and contrasts. Accordingly, the analysis has shown that multiple logics interact with each other across a broad spectrum of possible interaction patterns. These generative interactions are summarized in Table 4 below. This list is clearly not intended to be exhaustive; on the contrary, it aims to show how multiple logics can interact through discourse in very variegated ways, oftentimes entangling elements of cooperation and conflict. Consistently with Blumer's symbolic interactionism (1969), the above analysis points out that the construction of meaning is a complex process in which the mutual fitting of definitions and interpretations among different actors does not take place following preordained routes, but it is largely dependent on contextual features. Table 4 below provides a more detailed description of these generative interactions, however it is worth signaling that, even if there are clear instances of full support among diverse logics, equally evident examples of full, unresolved opposition are lacking. This is not because interaction flows smoothly and frictionless, but because potential contrasts among logics are played down either with the intervention of a third logic (as in *mediated* and *leveraging and opposing* interactions), or by dissimulating possible disagreements (as in *re-focusing* interactions). This confirms the idea that emerging fields, how contentious they may be, need first of all the definition of a shared meaning system, so that contrasts among actors and frictions among logics are likely to be counterbalanced through the effectuation of these interactional patterns that combine cooperative and conflictual elements.

TABLE 4 ABOUT HERE

PLACING TEXT IN CONTEXT: GENERATIVE INTERACTIONS IN TIME

The above analysis has enucleated the main discursive elements which underlie the interaction among multiple logics in the emerging field of civil drones. However, the analysis has been kept so far to the textual dimension, focusing mostly on the focal texts (speeches at FCEs) and with no or scant references to the wider context in which these texts have been produced, disseminated and consumed by field actors. Discourse analysis implies placing texts in their context (see Barry, Carroll, & Hansen, 2006; Leitch & Palmer, 2010; Phillips & Hardy, 2002) in order to appraise how social reality is discursively constructed. For this reason, this section reports a chronological account of the main events that have characterized the field, highlighting the connections among these events and the discursive activity of field members outlined above. The temporal dimension is thus the context in which to place the analyzed texts (Leitch & Palmer, 2010). Figure 2 below shows a timeline in which the conferences analyzed above are placed in the flow of events that have characterized the field.

The kick-starting event, at the worldwide level, regarding the discursive construction of the drone field has been the publication of the ICAO circular in March 2011. This document, by imposing the fundamental definition of drones as aircrafts, spurred national aviation authorities to undertake a regulatory process. Italy has been the third country in Europe to start this process (after France and England): in 2013 (from January to March) ENAC has organized three workshops, directed to all the potential stakeholder of the field, in which it revealed its intention to regulate the use of civil drones and illustrated the general outline of the forthcoming rules. The first draft of the first regulation has been published in December 2013 and then entered into full force the 30th of April 2014. The principles inspiring this regulation, according to what stated by ENAC officers, were derived from rather traditional aeronautic concepts. In particular the first regulation tried to ensure an adequate level of safety by focusing on a certification procedure meant to assess the reliability of the vehicles. This procedure mimicked the homologation process of regular aircrafts by requiring drone

operators to complete a careful testing activity needed to attain the certification. That regulation also required drone pilots to receive a general training on the rules of the air in any approved training organization (ATO) and to receive practical training by drone manufacturers.

This first regulation has been supplanted by a second regulation whose preliminary draft was published the 19th of March 2015 and its final version has been issued in July 2015. This regulation was partially inspired by a discussion on drones that was having place at the continental level: the 6th and 7th of March 2015 the European Commission, national aviation authorities, and industrial stakeholders met in Riga to “establish principles to guide the regulatory framework in Europe” (Riga declaration). The 2-days event (entitled “Framing the future of aviation”) produced a declaration proposing five guiding principles, the first of which states: “drones need to be treated as new types of aircraft with proportionate rules based on the risk of each operation” (ibid.). This principle has been adopted in the second edition of Italian regulation by enhancing the safety requirements on the basis of the operation performed and not any longer on the basis of the vehicle employed (specifically by relaxing the testing activity requirements, and imposing different levels of safety requirements based on operative scenarios). This second regulation and the Riga declaration have greatly influenced the discursive activity of the field revolving around theme 3 identified above (relationship with the aviation sector), pointing to the recognition that the drone field is something different from traditional aviation sector being not fully amenable to standard aeronautic concepts. Another novelty of the second regulation, not directly inspired by the Riga declaration, regards the formation of drone pilots. The new regulation introduced theoretical and practical training programs tailored for drone pilots, to be received in dedicated qualified training centers or flight schools and that release a formal license. As seen above, the establishment of this pilot licensing process is related with theme 6 on the diffusion of aeronautic culture among field members. In particular it is thanks to the formation of

dedicated flight schools for drone pilots that aeronautic concepts have started to get ingrained in the field: “Thanks to flight schools a new ... movement is born, directed at diffusing aeronautic culture among operators” (ENAC Officer, Roma Drone 02/2017).

The issuance of this second regulation testifies also the enactment of one of the most discussed topics in FCEs, namely the formation of a relation between the regulator and the industry aiming to define shared rules (see theme 5 above). As a matter of fact, the day after the publication of the draft of this second version, the regulator and the four industry association met in the Permanent Forum of Associations (this concurrence of events was a mere coincidence). One major consequence of this event was that the two largest industry associations, ASSORPAS and FIAPR, produced a joint document commenting the proposed regulatory change and suggesting a number of modifications to the draft. The list of 39 suggested modifications is preceded by a short introduction explaining that adjustments are needed in order to make the regulation practically applicable, because otherwise: “This would bring about a loss of credibility to the regulator and to the regulation and, as a consequence, a loss of *economic opportunities* for ALL industry actors and, as a result, for our country” (ASSORPAS-FIAPR proposal, original emphasis and capital letters). This statement encapsulates the main concerns of the entrepreneurial logic pinpointed above. The specific comments regard definitional and operational issues which needed refinements or rephrasing according to the associations. These suggestions have been in most part included in the final draft of the second regulation (as personally confirmed to the author by representatives of both associations). Therefore, the regulator and the industry in this occasion proactively enacted a generative interaction of full support. However, this collaborative process between the industry and the regulator has not always flown so smoothly. A moment of relevant attrition between the two parties has occurred at the end of 2015 when, the 21st of December, ENAC issued an amendment to the second regulation without any previous consultation with industry associations. Among other things, this amendment reduced again the maximum

altitude limit which was previously increased after the associations commented the initial draft. But, beside the specific content of the amendment, this event was perceived by many industry actors as worrisome, because the possibility that rules may change at any moment without the involvement of the industry creates detrimental uncertainties for business: “There is great uncertainty among people. I agree that regulation can be modified, it is unimaginable that a regulation remains static. But I just appraise that in this drone world; because of regulatory changes some people have lost all the money they invested, firms are failing, and there is an alarming situation” (Industry association representative, Roma Drone 01/2016). This shows how even the most salient example of a supporting interaction among actors embedded in different logics is actually characterized by potential attritions and misunderstandings.

Another relevant exogenous event, incidentally concomitant with the publication of the amendment, was the Madonna di Campiglio crash. The 22nd of December 2015, during the world ski championship, held in an Italian location, a drone that was filming the event plummeted and almost hit a racing athlete. This accident was transmitted live in many countries and had great resonance, with the main consequence that the International Ski Federation banned the use of drones during races. It had special resonance in Italy because the operator responsible of the accident was an Italian video-making company that, although regularly certified as drone operator, was operating well beyond the limits of its authorization. In particular, the event took place in the nighttime, and in a crowded area, conditions that exceed the operational limits imposed by the regulation. This event immediately spurred discourse around the lack of professionalism and of aeronautic culture that affects the field (i.e. around theme 6). For instance, the day after the accident one of the industry associations released a communication directed to ENAC to remark the severity of the event, claiming sanctions to be enforced and highlighting “the need to undertake an awareness campaign on legality aiming at defining precise procedures to ensure citizens’ safety” (ASSORPAS, 23

Dec 2015). Ways to inhibit illegal activities and enforce sanctions are extensively debated at the FCEs. It is, however, worth noting that in the most recent conference analyzed here (February 2017) one ENAC officer remarked that: “A few years ago the drone community and the regulator were two worlds apart, speaking two different languages. But I am pleased to notice that now we have a common linguistic basis, several typically aeronautic concepts have been transferred into this sector... This makes us happy because we are succeeding, together with the healthy part of this sector, to develop an aeronautic culture and to meet on a common ground” (Roma Drone 02/2017). This testifies that, although it is probably still premature to argue that drone field has completely adopted an aeronautic language, aeronautic culture is getting diffused among field actors.

This tendency appears to contradict that, as argued above, the drone field is progressively getting disengaged from the traditional aviation sector. However, the fact that the emergence process of the drone field implies both a process of differentiation from traditional aviation domain and the accrual of aeronautic culture can be thought as the main effect of the generative interactions among multiple institutional logics. As shown above, these interactions imply mutual support, opposition and a number of intermediate possibilities. In any case, some portion of the emerging meaning system of the field comes into being out of these interactions, that is, any of these interactions potentially has some generative power. Therefore, field emergence can be shaped by a process of discursive construction characterized by contradictions that are somehow coherently held together.

This concomitant differentiation and assimilation of the drone field to the aviation domain has been further advanced thanks to the intervention of ENAV which, as shown above, catalyzes a mediated interaction between different logics. ENAV has always been an interested observer of the drone field, however it has become an active stakeholder from July 2016. In that moment, in fact, ENAC and ENAV joined in a partnership to launch the online platform D-flight which simplified and automatized the registration procedure to become certified drone

operators. Until that moment, drone operators had to compile the paperwork manually and use regular mail service to send the documentation to ENAC. Thanks to such online portal this process has been considerably sped-up. This portal constitutes, according to ENAV, the first building block of the so-called Unmanned Traffic Management (UTM) system. This UTM system is a yet to be implemented infrastructure that, in future, will allow the complete integration of drones and regular aircrafts in the airspace. This system has been ideated and will be realized thanks to the SESAR program, an European research project of which ENAV is partner. Among the challenges to be overcome in order to realize such system, there is the design of electronic identification mechanisms. At the times of this study, this identification is provisionally actualized with the registration to the D-flight portal that provides operators with a QR-code to be attached on drones. Once such UTM system will be realized, ENAV (as well as the other air traffic service providers involved in the SESAR project) will considerably expand its activity. This explains the emphasis put by ENAV representatives in envisioning the future technological possibilities of the field and in resolutely adopting the definition of drones as autonomous robots. On the D-flight website it is possible to read: *“Our Vision is a world where drones are usual commodities, fully accepted in the daily life, even in urban environments, where they are used to provide to the citizens added value services, in a safe, efficient, innovative, economical and environmentally sustainable manner. To this end, we will support and accelerate, in collaboration with the national authorities, the development and the provision of any combination of technologies, infrastructures and services enabling fully autonomous flight of drones in any allowed operational environment, in a fully safe and efficient manner.”* (www.d-flight.it, original emphasis). We can see here that the distinctiveness of drones with respect to traditional aircrafts goes along with the idea that drones shall be integrated in the airspace by disposing air traffic management system analogous to the one already existing. In other words, also in this case the interaction among different logics, catalyzed by ENAV, results in a seemingly

contradictory process by which the emergence process of the field is characterized both by disconnection from and assimilation to the traditional aviation domain.

FIGURE 2 ABOUT HERE

To sum up, this chronological overview highlights one fundamental tension that permeates the overall discursive construction of the field, namely the simultaneous coupling and decoupling between the drone field and the aviation domain. As shown above, this tension is something that actors, to some extent, recognize and discuss and, for this reason, it represents a relatively autonomous discursive nucleus (theme 3). This tension indeed appears to be the pivotal theme of the overall emergence process of the field, insofar as it is more or less implicitly present across different themes and throughout time. As an exemplification of that, the debate around the definition of what a drone is and what is its social impact (themes 1 and 2) revolves around the question whether a drone is an aeronautic object, or rather it is something completely new that opens up unexplored opportunities. Similarly, the debate around rule formation (theme 4) is built around the fact that drones, although have to be regulated by aviation authorities, need tailored rules that take into account their peculiarities. Finally, field maturation (theme 6) is framed as something that demands both a growth in the aeronautic awareness of field members and in the reliance on autonomous flying systems that do not require human intervention. In this regard, institutional logics multiplicity is what ensure the maintenance of this tension. As evident from the above analysis, the two most prominent logics in field formation are the regulatory and entrepreneurial ones. In particular, these two logics directly address the degree of decoupling from traditional aviation domain (theme 3) and, differently from what one may intuitively guess, both discursive structures make use of both difference and inclusion arguments, meaning that this fundamental tension is directly enacted by the most relevant institutional logics.

The textual analysis performed above has allowed to identify a number of variegated interaction patterns among institutional logics which discursively combine conflict and cooperation. In particular, interaction patterns such as *discrepant alignment*, *mediation* and *re-focusing* have a direct effect in constructing meanings that, notwithstanding their potential contradiction, are fitted together. In this sense it can be noticed how and why these interactions among multiple and potentially conflicting logics can be legitimately labeled as *generative interactions*.

DISCUSSION AND CONCLUSIONS

The objective of this study was to unpack the process of discursive meaning making giving rise to new organizational fields. This investigation is grounded on a conception of fields as “[relational] spaces where organizations involve themselves with one another in an effort to develop collective understandings regarding matters that are consequential for organizational and field-level activities” (Wooten & Hoffman, 2008, p. 138). In this regard, field emergence process is ignited when the early attempts to develop such collective understandings start to take place. The main contribution of the paper is the insight that the multiplicity of institutional logics is a fundamental factor in generating organizational fields. Fields do not emerge from nothing: actors and organizations that start to coalesce in a new field are likely to have already been socialized in diverse fields and institutional domains, being therefore linked to different logics. This feature is particularly salient in the present empirical context which gathers aviation authorities, entrepreneurs, professionals, research centers and other subjects each of which is likely to convey a diverse institutional logic. However, the presence of diverse kinds of organizations has always been indicated as a fundamental defining feature of fields since DiMaggio and Powell’s (1983) seminal paper. But the paper particularly contends that this diversity of logics is what prompts a mere set of organizations to morph

into a proper field: when diverse institutional logics happen to interface with one another, the formation of meaning-making interactions among actors follows quite naturally.

This consideration puts to the fore the role of discursive activities aiming at meaning construction as the engine of field emergence. Accordingly, by exploring these interactions through a discourse analytical methodology, the paper has shown how articulated the interplay among multiple logics can be in emerging fields. In particular, a broad spectrum of possible interactions has been detected, encompassing both mutual support and opposition. This result is consistent with Blumer's (1969) remark that symbolic interactions may take on different forms and styles: the social construction of fields goes through conflict, cooperation, and many nuanced patterns in between. Contrary to what found in previous studies exploring the multiplicity of logics in mature field (e.g. Greenwood & Suddaby, 2006; Meyer & Höllerer, 2010; Reay & Hinings, 2009), emerging field are not characterized just by rivalry or competition for dominance among alternative logics. In fact, these multiple logics are oftentimes engaged in an ongoing effort to develop a common viewpoint and to work out some alignment, even when the missions of the logics are different (as in the case of discrepant alignment), or even if convergence on specific points is somehow leveraged to raise other more problematic points (as in re-focusing interaction). In this regard, there is some similarity between the above findings and Benford and Snow's (2000) well-known theory of social movement framing process: framing is defined as the meaning construction activity triggered by social movement organizations, which is a discursive and interactive process undertaken collectively. Although the relevance of this theoretical framework for shedding light on field emergence has also been evidenced elsewhere (Lounsbury et al., 2003), in the present empirical setting there was no mobilization of social movements organizations. In general, the process of field emergence is likely to be the unintended outcome of multiple and diverse intentionalities that happen to interact with one another

without any centralized orchestration. Compared to the social movement literature, this amounts to a decreased emphasis on the strategic aspect of meaning-making activity.

In any case, it is certainly true that meaning construction entails the alignment of different frames, and that emerging fields necessitate the creation of new meanings. This is the reason why in this context it is highly probable to observe actors engaged not only in competitive struggles, but also in cooperative efforts of mutual fitting. Research has recently started to highlight the relevance of interactions among “conflicting-yet-complementary” logics (Smets et al., 2015; see also Jay, 2013; Smets & Jarzabkowski, 2013). However, in these studies contradictory logics coexist thanks to the capability of individuals to reconcile conflicting institutional demands and “use” different logics according to the circumstances. It is thus assumed a cognitive flexibility which is somehow at odd with the constraining force of institutions (Fan & Zietsma, 2017), but which helps to re-conceptualize logic multiplicity as a potentially beneficial condition and not only as a source of conflict. The paper contributes to this perspective on logic multiplicity as a generative and potentially beneficial factor, but without assuming that actors can instantiate different logic as they can change their dresses. In fact the above analysis shows that through discursive interactions field members, without changing hats at will, try to advance their specific interests by acknowledging the existence of beliefs, values, and rationales which may differ from their own, and thereby they all contribute to generate a meaning system that accounts for such multivocality of the emerging drone field.

Alignment is therefore realized thanks to such mutual recognitions. Logics multiplicity does not always imply compartmentalization (Kraatz & Block, 2008) of the different constituencies of a field; in fact, though having different worldviews, field actors in emerging fields must develop mutual awareness (DiMaggio & Powell, 1983), take each other into account, and dialectically work out ways to deal with their differences. Of course, logic multiplicity is always a remarkable source of tensions among actors, as evidenced above. But this joint

presence of support and conflict enacted through discursive interactions is consequential to the emergence process of the field. In fact, the complexity of multiple interacting logics may give rise to creative frictions (Stark, 2009; see also Jay, 2013): thanks to the contradictory result of these interactions, the drone field is getting characterized as strictly related to the aviation sector, and also as very different from it. This is a distinctive feature of the drone field thanks to which field members may gain a sense of unity and common purpose and eventually accomplish field institutionalization by developing specific field level logics and identities, based on the meaning-making activity that characterizes this emergence phase. In short, the above results show that logics multiplicity is not to be “resolved” through compromise (Oliver, 1991), bricolage (Højgaard Christiansen & Lounsbury, 2013), selective coupling (Pache & Santos, 2013) or other tactics, since its perpetuating tensions are essential for the formation of new fields, being generative of new meanings and understandings.

From an empirical standpoint, the present study explores field emergence in the making. Previous studies investigating field emergence tend to use longitudinal data spanning several decades, thus illustrating field’s evolutionary trajectory from its inception to its full institutionalization (e.g. Hoffman, 1999; Leblebici, Salancik, Copay, & King, 1991; Purdy & Gray, 2009). This long-term perspective allows to gain an overarching understanding on institutional processes that accompany field evolution, but it risks to miss what happens during the very process of field emergence. The drone field offers the opportunity to observe and study an organizational field still in the midst of its emergence phase. Though, the detailed account of field emergence that can be obtained in this way comes at a cost. In particular, notwithstanding the focus on social interactions and meaning construction processes, the present reconstruction of field emergence brings institutional logics into the overall picture as cognitive and normative structures that influence actors’ interpretations and definitions, but which are not themselves amenable of being modified by these interactions. I fully agree with recent calls to avoid institutional logic reification (Zilber, 2016), and

although the short term perspective that adopted here allows to observe some evolution in the field emergence process, it is probably too short to capture how the institutional logics undergo change in the drone field. In a future stage of research it would be highly interesting to see whether and how, out of these generative interaction, multiple logics will blend, morph, and clash to create one (or more) specific field level logic(s) that would be distinguished, though derived, from the entrepreneurial, regulatory, professional, and technological logics. By doing so, it would be possible to further advance the theoretical contribution on the relevance that logic multiplicity has for field emergence: interactions among diverse logics, can therefore be thought not only as something that trigger debate in a field, but also as the conditions that enable the field to develop its own distinctive institutional logic.

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TABLES AND FIGURES

Table 1: Data sources

Focal texts: FCEs speeches	1. Dronitaly 5/02/2014	3h 6m
	2. Roma Drone 22/05/2014	57m
	3. Roma Drone 19/12/2014	1h 45m
	4. Permanent Forum of Associations (FPA) @ Dronitaly 20/3/2015	2h 49m
	5. Roma Drone 2/12/2015	5h 20m
	6. Roma Drone 20/01/2016	5h 40m
	7. Roma Drone 21/02/2017	3h 30m
Contextual sources	ENAC documents	130 pp.
	Industry associations documents	56 pp.
	International organizations documents:	
	1. ICAO circular	54 pp.
	2. European Commission declaration (Riga declaration)	15 pp.
Specialized online magazines		
1. quadricotteronews.it		
2. dronezine.it		
	Interviews, conversations, non-participant observations	

Table 2: Themes and arguments

Themes	Arguments
What are drones?	<ul style="list-style-type: none"> • Drones are aircrafts • Drones are tools • Drones are technological systems (or drones are robots)
What is the impact of drones?	<ul style="list-style-type: none"> • Drones create risks • Drones reduce risks • Drones create business opportunities
Is the drone industry part of the aviation sector?	<ul style="list-style-type: none"> • It is included in it • It is different from it
What are rules for?	<ul style="list-style-type: none"> • Preventing risk (and ensuring safety) • Fostering industry development • Hampering drone operations
Why to form relations among field members?	<ul style="list-style-type: none"> • To define shared and better rules • To integrate various competences • To create new technology
How to make the field more mature?	<ul style="list-style-type: none"> • Diffusing aeronautic culture • Promoting public awareness • Developing professional competences • Envisioning technological developments

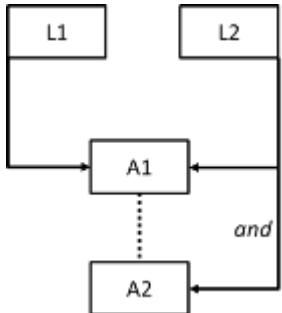
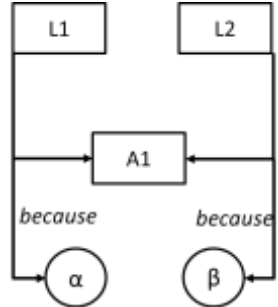
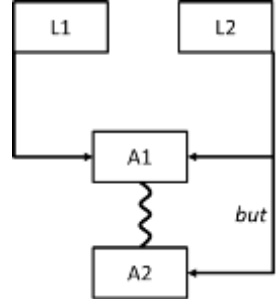
Table 3: Institutional logics

	Regulatory	Entrepreneurial	Professional	Technological
<i>Mission</i>	<p>Fostering community good</p> <ul style="list-style-type: none"> – We have a twofold function: first, we provide safety to Italian citizens; second, we provide common rules to the market to create a fair play-ground. – The regulation is needed to give guarantees to all those who stay in this sector. 	<p>Opening market and business opportunities</p> <ul style="list-style-type: none"> – The regulation should not limit the growth of a free market and the possibility to perform aerial work for anyone who wants to enter in this sector. – In this market there is space for anyone, micro-firms and large firms, and this multifaceted feature should be preserved. 	<p>Consolidation of reputation</p> <ul style="list-style-type: none"> – I want to recall something which is absolutely fundamental, that is: everyone should respect the rules of the air in order to foster the seriousness of the sector. – For us certification is very important because our clients, anyone who uses our products, must operate under the law. 	<p>Pushing technological progress</p> <ul style="list-style-type: none"> – Our product allows to pilot drones and flocks of drones through 4G network, so we can virtually move drones that are on the other side of the world. – Drones are connected with key enabling technologies such as new materials, artificial intelligence, new energy sources which can bring about a global diffusion of this technology.
<i>Source of legitimacy</i>	<p>Legal system</p> <ul style="list-style-type: none"> – The navigation code, which is the national framework, states that any flying object falls under the regulator’s discipline, which is ENAC. – Maybe someone forgets that there are rules of the air which do not come from ENAC, but from European regulation and ICAO. 	<p>Industry associations</p> <ul style="list-style-type: none"> – ASSORPAS was born to represent the interests of this industry, this new market. – The critical challenge that UASIT, the first Italian association in the world of drones, is to make everyone respect the rules. 	<p>Personal expertise</p> <ul style="list-style-type: none"> – Drone users cannot substitute a professional who studied 30 years or a surveyor who studied 5 years plus 2 years of internship, plus the state exam and all what he did in his professional life. – We have a specific competence in sensoristics which derives from years of experience and professional courses in software for sensors deployment. 	<p>Community belonging</p> <ul style="list-style-type: none"> – Today there are nearly 61000 people that at an international level grouped in the Dronecode foundation which develops the core of our RPA systems. – Our RPA is based on the APM Plane platform, since we participate to the APM project through the online community organized by 3DRobotics, one of the partners of Dronecode foundation

<i>Focus of attention</i>	<p>Preserving citizens' safety</p> <ul style="list-style-type: none"> – When there is high risk exposure you need to be authorized by ENAC in order to operate. – If there are rules it is because rules are necessary for anyone's safety. 	<p>Creation of favorable business environment</p> <ul style="list-style-type: none"> – In Europe there are both manufacturers and operators, but the lack of a harmonized regulation on the long run may create many problems. – We believe it is crucial to block illegal operations which damage a lot the whole sector. 	<p>Professional Education</p> <ul style="list-style-type: none"> – We want to stop illegal activities through education, to make drone users understand that this way of using RPASs is wrong. – Professional education, under a deontological viewpoint, should be more a pleasure than an obligation for all of us. 	<p>Projection into the future</p> <ul style="list-style-type: none"> – Most likely, in a future scenario we expect to have thousands, dozens of thousands of drones roaming in the airspace. – We are destined to employ the autopilot as an intelligent system that performs processing of data as it unfolds, before to send it to the ground.
<i>Basis of strategy</i>	<p>Definition of formal rules</p> <ul style="list-style-type: none"> – Our main intention is always to provide a high-level regulation. – Another task we tackled was the modification of certification rules since we realized they needed to be enhanced. 	<p>Revenue increase</p> <ul style="list-style-type: none"> – According to some sources, the RPA market will grow exponentially in the next 10 years, someone say around 10 billion dollars, but we hope even more. – At the end of the day, firms are meant to make revenues, to develop products, and sell them. 	<p>Delivery of high-quality services</p> <ul style="list-style-type: none"> – We are trying to push forward the concept of quality in RPA services: professionalism and quality are fundamental in this world. – The laser scanner is a different, more expansive, system because it takes measure directly, without software post-processing of photogrammetric data. 	<p>Research process</p> <ul style="list-style-type: none"> – We try to produce knowledge through research ... The objective of any researcher is to see his research's output inside a product which can be used by anyone. – We have developed very new concepts which are now adopted by national and international labs, such as swarms of drones with a collective intelligence.
<i>Vocabulary</i>	Aeronautic	Economic	Specialized	Scientific

Table 4: Discursive interactions among institutional logics

Interaction pattern	Description	Visual representation	Example
<i>Full support</i>	Two different logics make reference to the same argument, with the same underlying motivation		<p>L1: Regulatory; L2: Entrepreneurial; A1: Create relations to define better rules; α: to foster industry development</p> <p>Regulatory: <i>[There is] an osmosis process among the parties which is fundamental for us ... And this continuous osmosis between the world of drones and the regulator has the purpose of giving a direction to the market, giving certainty to the market.</i></p> <p>Entrepreneurial: <i>We need to meet ... together with the other industry associations and ENAC ... in order to build together these rules and define all the details which shall allow this national market to grow</i></p>
<i>Bundling</i>	One logic bundles together two (or more) compatible arguments proposed by two different logics		<p>L1: Professional; L2: Technological; L3: Entrepreneurial; A1: Create relationship to integrate competences; A2: Create relationships to push innovation</p> <p>Professional: <i>We need to create an ecosystem of competences in order to deliver a service. Because no one can be an all-around expert</i></p> <p>Technological: <i>The strength to realize technologies which were once unimaginable for SMEs has been found thanks to the open-source and a collaborative mindset</i></p> <p>Entrepreneurial: <i>We need to activate virtuous mechanisms of strong interconnection among industry players, from producers to operators... By doing so we will be able, not only to develop technology, but to export it and compete at international level... But we need to activate these synergies which bring the small and big players closer, together with the regulator and other industrial entities. In this way we will get an overall growth of the sector and of the entire value-chain</i></p>

<p><i>Complementing</i></p>	<p>One logic shares with a second logic one particular argument, and adds one further compatible argument to highlight additional worth remarking issues</p>		<p>L1: Regulatory; L2: Professional; A1: make the field more mature by developing aeronautic culture; A2: make the field more mature by fostering professional education.</p> <p>Regulatory: <i>We are trying to make the system evolve toward a more mature configuration, a more aeronautic one, therefore we have introduced many concept, typical of the aeronautic world which we are already regulating</i></p> <p>Professional: <i>Who uses our services has to operate according to what prescribed by the regulation, therefore the avionic education is fundamental... And then education also in another regard, namely in data processing: we don't want that those who buy our vehicles just take some nice picture or videos, but we want them ... to perform surveying, that is, to use [RPAs] as a tool</i></p>
<p><i>Discrepant Alignment</i></p>	<p>Two different logics make reference to the same argument, but with different underlying motivations</p>		<p>L1: Regulatory; L2: Entrepreneurial; A1: Rules are needed to ensure safety; α: Safety is a public good; β: Safety creates reputational effect</p> <p>Regulatory: <i>Rules are needed. Airspace belongs to everyone, safety belongs to everyone</i></p> <p>Entrepreneurial: <i>We need to ensure safety because safety is what enable the market to develop and to gain public acceptance</i></p>
<p><i>Re-focusing</i></p>	<p>One logic shares with another logic one particular argument, but adds a second contradictory argument that twist the focus of attention in order to weaken the first argument.</p>		<p>L1: Regulatory; L2: Entrepreneurial; A1: Drones generate risks; A2: Drones reduce risks.</p> <p>Regulatory: <i>Even if it is a small object, if it collides with a flying airplane it may cause a catastrophe: a 7 kilograms object that gets inside the jet engine may determine serious damages</i></p> <p>Entrepreneurial: <i>It's true, we are introducing new systems and new risks, but we are also allowing to remove other [risks], and this has to be highlighted</i></p>

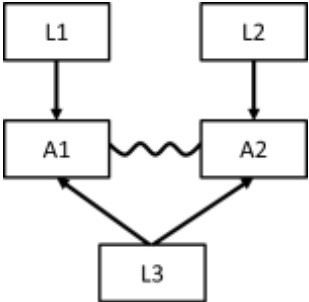
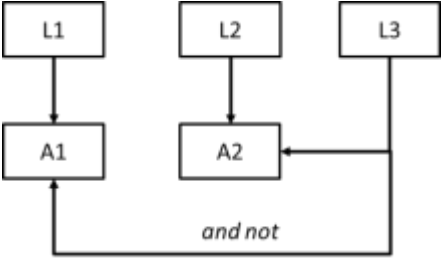
<p><i>Mediated</i></p>	<p>One logic (most likely a hybrid one) reconciles two (or more) contradictory arguments proposed by two other logics.</p>		<p>L1: Regulatory; L2: Technological; L3: ENAV (hybrid discourse); A1: Field maturation through diffusion of aeronautic competences (among pilots); A2: Field maturation through full exploitation of technologies</p> <p>Regulatory: <i>We need to consider the pilot as a professional, a person with an identity based on what he is able to do. For this reason we have introduced the concept of license By introducing this pilot license we have acknowledged the importance of this role as a fundamental component of safety</i></p> <p>Technological: <i>Nowadays drones are still operated by humans, with all the consequent limitations. The kind of drone that we envisage instead shall collect an impressive amount of data, thanks to their autonomous 24/7 working time</i></p> <p>ENAV <i>One of the most serious limitation to the development of the drone market is the flight within line of sight constraint. This means that we aren't yet talking about drones, but we are talking about remotely piloted vehicles, RPAs, but drones are a wider category that encompasses also vehicles capable to perform missions autonomously... But in order to perform these missions safely, so we are talking about operative safety, it is necessary to create an infrastructure that may ensure the separation between drones and other aircrafts, analogously to what happens with air traffic management system</i></p>
<p><i>Leveraging and opposing</i></p>	<p>One logic leverages an argument proposed by a second logic in order to create an opposition to the argument proposed by a third logic.</p>		<p>L1: Regulatory; L2: Technological; L3: Entrepreneurial; A1: Drones are aircraft; A2: Drones are technological objects (not simply aircrafts)</p> <p>Regulatory: <i>Technically [a drone] is defined by ICAO as aircraft, and as an aircraft it is subject to our discipline</i></p> <p>Technological: <i>Actually, RPAS and vehicles of this kind are not simply aeronautic objects, but they are technological objects</i></p> <p>Entrepreneurial: <i>I see that there is a difference between RPAS and aircraft, however I still do not see this difference reflected in the sanctioning regime</i></p>
<p>Legend: L_i: Institutional logics; A_i: arguments; α,β: motivations; arrows → : discursive deployment of arguments; dotted lines ■■■ : connection between compatible arguments; curly lines ~ : connection between contradictory arguments.</p>			

Figure 1: certified drone operators in Italy (up to February 2017)

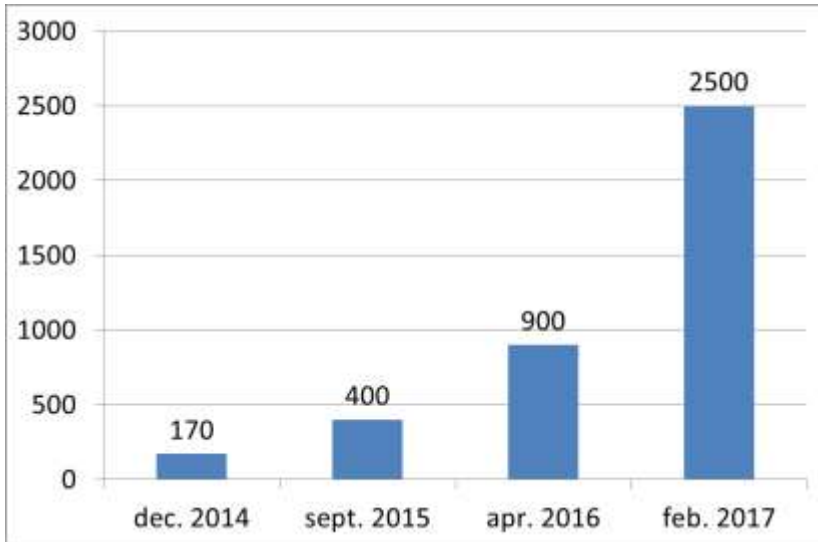
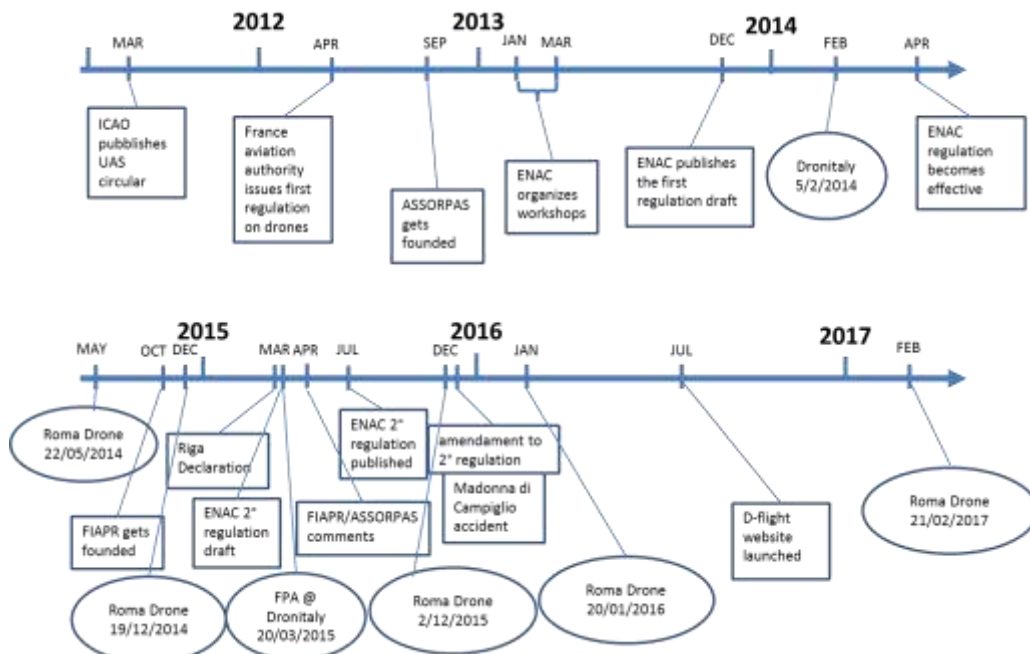


Figure 2: Timeline of events in Italian drone field (boxes: contextual events; balloons: FCEs analyzed at textual level)



ESSAY 3: Mapping identity construction in interstitial fields.

The case of the nascent Italian civil drone industry

Abstract

The paper explores the process of identity formation in emerging interstitial fields. Interstices are generated when already existing fields happen to overlap, and out of this intersection entirely new fields may spawn. The fragmented and heterogeneous structure of these interstitial fields may pose relevant challenges in the formation of a shared field identity which provides field members with legitimacy. By exploring the role that field level discourse plays in the identity construction process enacted by the organizations populating the field, the paper shows that interstices may be characterized by different thrusts such as symbolic isomorphism and boundary demarcation. The civil drone industry provides adequate empirical materials for exploring these processes, and in particular it allows to shed light on the increasing relevance of professionalism and on the creation of field-specific meanings as crucial mechanisms to the formation of field identity.

INTRODUCTION

Technological progress is always associated with concerns and debate on the positive and negative potential effects that innovations may bring about. The introduction of technological novelties is in fact likely to spur the emergence of new organizational fields, namely sets of organizations which partake in a common meaning system and whose activities revolve around some specific issue (Hoffman, 1999; Scott, 1994; Wooten & Hoffman, 2008). Typically, the emergence of new fields entails the intersection of disparate social worlds whose interests and main activities happen to, at least partially, overlap. Research in fact converges around the idea that fields often emerge at the interstice between other,

already existing, fields (Fligstein & McAdam, 2012; Furnari, 2014; Morrill, 2001; Zietsma, Groenewegen, Logue, & Hinings, 2017).

The main purpose of the present paper is to shed light on some puzzling factors underlying interstitial emergence. Interstitial emergence is defined here as the process through which new fields may spawn out of windows of social and symbolic interactions originated between two (or more) institutional fields. Thus, in interstitial spaces (Furnari, 2014) a multiplicity of actors, organizational forms and worldviews may blend and eventually coalesce in a more or less coherent whole. However, because of such multiplicity, a newly formed interstitial field has some major challenge to cope with in order to become an established domain of human activity. Most importantly, new fields need to gain legitimacy (Aldrich & Fiol, 1994), and for this purpose the formation of field-level and organizational identities is key (Clegg, Rhodes, & Kornberger, 2007; Navis & Glynn, 2010). Research, in fact, suggests that organizational and collective identities evolve in tandem during the earliest stage of field emergence (Patvardhan, Gioia, & Hamilton, 2015), and this identity work has a crucial role in enabling the new field to be created and exploited (Clegg et al., 2007). In particular, if in mature fields individual organizations strive for distinctiveness, in emerging fields the identity work enacted by organizations aims to consolidate the new category to which they belong (Navis & Glynn, 2010), so that their identities may gain legitimacy thanks to their reciprocal proximity which gives coherence to the whole field. This process is particularly problematic when the field emerges from the intersection of existing fields, which are already characterized by well-defined identities. Interstitial emergence therefore may entail rather complex tensions between the need to create a shared identity which gives legitimacy to the new field and the multiple institutional domains which may provide different and even contrasting cultural resources for the definition of such identity.

This puzzling process is here explored in the emerging field of civil drones, a novel technology which gather many different actors and which has thereby generated an interstice between already existing

fields. By employing content analytical methods to textual data taken from organizational mission statements and from a specialized publication, the paper shows how a field specific identity is formed both through symbolic isomorphism molded on the highly professionalized field of topography and through the discursive deployment of ideational issues that are peculiarly relevant for drones.

INTERSTITIAL EMERGENCE, IDENTITY AND DISCOURSE

New organizational fields often emerge out of interstices between already existing fields. These interstices are generated when the activities, interests and problems of one field spill over into another (Morrill, 2001). The interstitial space so created is a crucible where diverse actors meet and interact with the purpose of establishing practices to deal with their common issues; eventually, once such practices have been negotiated and experimented, an entirely new field may emerge (Furnari, 2014). In short, interstitial fields revolve around newly emerged problems or opportunities concerning an heterogeneous set of actors. Such heterogeneity is a potential source of contention in the ongoing process of defining shared meanings and understandings. Thus, interstitial fields present a fragmented institutional infrastructure, characterized by multiple logics and weak isomorphic forces (Zietsma et al., 2017). In fact, organizations and other actors joining a nascent field will bring into it the logics, practices and meaning systems of rather disparate institutional domains. It is therefore likely that these constituencies compose, within the emerging interstitial field, distinct groups or organizational communities, each of which is engaged in particular issues and activities. Although such complexity may thwart field coalescence, these organizational communities populating interstitial fields have access to multiple cultural resources which can be recombined, integrated or differentiated in the construction of one amalgamated discourse (Korff, Oberg, & Powell, 2015, 2017; Oberg, Korff, & Powell, 2017).

One central challenge that emerging fields face is the lack of a legitimate and socially accepted identity. Research has put much emphasis on the effort of institutional entrepreneurs and social movements in building one coherent collective identity which acts as a catalyzer of field emergence, and to which organizations joining the field are likely to adhere (Lounsbury, Ventresca, & Hirsch, 2003; Weber, Heinze, & Desoucey, 2008; Wry, Lounsbury, & Glynn, 2011). Alternatively, market categories and organizational forms may emerge more organically from a bottom-up process and represent the focal points for organizations joining a new field to anchor their self-representations, i.e. their claims on “who are we” and “what we do”, to social codes and rules defining the features they are expected to possess (Hsu & Hannan, 2005; Navis & Glynn, 2010).

This means that organizational identities, though aiming to attain some degree of distinctiveness, may be subject to a certain level of symbolic isomorphism (Glynn & Abzug, 2002) exerted through those institutional meanings which “provide the raw material from which organizational identities are constructed” (Glynn, 2008, p.420). Organizational fields are the arenas where these raw materials are produced through actors’ mutual engagement. Organizational identities are in fact defined in relation to others: through continuous narrations meant to self-present, organizations construct their identities “through comparisons with, references to, and imitation of others” (Sahlin-Anderson, 1996, p.73). However, as explained above, interstitial fields are characterized by rather disconnected or loosely coupled organizational communities which are likely to leverage cultural resources coming from different institutional realms in their identity construction process. This entails an important complication for the formation of a more or less unitary and coherent market category or organizational form that may shape organizational identities. In such case it may happen that, while some organizations construct their identities by strictly adhering to the institutionalized understandings of other established fields, other organizations try to intermingle these heterogeneous elements. In short, before any organizational form and identity is institutionalized, the embryo of a field is constituted by

“amorphously bounded” communities of practice, that just in a subsequent phase may become a recognized similarity cluster (Fiol & Romanelli, 2012). But in the case of interstitial field, there may be contrasting thrusts to identity construction that hamper the formation of one homogenous similarity cluster. Accordingly, the first research question addressed in the present study is: *How do organizations belonging to different communities relate to one another in the construction of their identities during interstitial field emergence?*

Although processes of symbolic isomorphism may be at play, so that organizations may tend to craft their identities to be more or less similar to other actors in the field, organizational fields are not uniquely composed by constituting members (i.e. the organizational population), but also by the discourse which these actors enact. Interstitial fields, because of their emerging nature, have been considered issue fields (Zietsma et al., 2017) or centers of debate (Hoffman, 1999; Wooten & Hoffman, 2008). In fact, the emerging problems and opportunities that characterize them draw different members to interact and take each other into account, resulting in ongoing negotiations and in the unfolding of a broader field discourse. Such discursive activities represent the primary source of cultural resources to be deployed, recombined or opposed to one another in order to construct a meaning system of the interstitial field. The role of language, storytelling and the co-creation of an overall discourse (a story world) have therefore been recognized as primary factors in the construction process of organizational identities in emerging fields (Fiol & Romanelli, 2012). In Bourdieusian terms, the accumulation of symbolic capital determined by such production, dissemination, and consumption of field discourse is crucial for defining the vocabularies of motive needed to construct organizational identities (Oakes, Townley, & Cooper, 1998). Discourse in interstitial fields, being the expression of a varied set of interests and concerns, may be constituted by a number of different issues. Each different kind of actors populating the interstice may be relatively more engaged with some of these issues and accordingly be more influenced by them for the construction of their identities. A thorough exploration of identity

construction in interstitial fields must therefore take into account these multifaceted aspects of discourse. The second research question addressed here is therefore: *How do the issues composing field discourse affect the organizational identities construction process during interstitial emergence?*

DATA & METHODS

Empirical Setting

Civil drones are small pilotless flying vehicles usually equipped with a camera and employed to collect aerial data in a cost-efficient way. This technology has experienced an upsurge in recent years thanks to the increased availability of low-cost sophisticated electronic component. The pioneering phase of this technology was led by hobbyists and aero-modeling enthusiasts who started to assemble these devices, sharing their advancement through open-source communities, and who typically define themselves as *makers* (Anderson, 2012). The commercial exploitability of these objects has subsequently caused a rapid increment in the number of individuals and firms producing or employing drones. Importantly, because of their intrinsic versatility, drones attract a highly heterogeneous set of potential users ranging from video-makers and photographers to surveyors, farmers and construction companies. At some point, the diffusion of this technology has raised the concern of aviation authorities because these small aircrafts started to occupy the airspace in unprecedented ways, entailing non-negligible safety, security, and privacy issues. In 2011, the International Civil Aviation Organization (ICAO) has therefore issued a document which defined civil drones as proper *aircrafts* and delegated national aviation authorities to design specific regulations regarding their employment; the Italian aviation authority (ENAC) has started this regulatory path in 2013. The introduction of these rules (issued in 2014), written with an aeronautic language, has flared a rather contentious discursive activity among all the stakeholders connected with the drone industry who are, for the most part, subjects that never had to interact with the aviation domain. Subsequently, the field has evolved through the formation of industry associations

whose aim is to mediate between industrial players and the aviation authority; additionally, specific training programs and flight schools for drone pilots have been formed with the purpose of professionalizing the field and diffusing aeronautic competences.

The origin of the field among communities of hobbyists, the presence of very disparate users coming from already existing fields (e.g. photography and topography), and the heterogeneity of languages and meaning systems which permeate field's discourse, are all straightforward signs of the interstitial nature of the drone field (Furnari, 2014), that give confidence in the appropriateness of this empirical setting for addressing the research questions.

Data collection

In order to reconstruct the identity formation process of the emerging drone field, two different data sources are employed. First, the identities projected by actors working in the field have been retrieved from mission statements and self-presentations contained in the official websites of these entities (typically in the homepage, in “about us” and “what we do / our services” sections). Second, field level discourse has been reconstructed by using the articles posted in one of the most renown and influential Italian blog on civil drones, Dronezine.it, which plays the role of a trade publication. This blog, since June 2013, publishes on a daily basis articles on any news concerning the drone world, with special attention to the Italian context, interviews to field actors, and editorials on hot topics.

In detail, 420 identity claims from organizations websites have been collected. This collection have been performed by sampling the ENAC drone operators database⁴ that lists all those organizations which underwent a registration procedure, and are thereby entitled to perform aerial work through drones. The operators database also indicates the exact moment in time when each organization has registered to it, allowing to track with precision the compositional changes of the field through time. A

⁴ Freely retrievable from: http://moduliweb.enac.gov.it/applicazioni/SAPR/APR_ReportOperatori.asp

large portion of these registered operators are individuals, or very small companies and a number of them have no website, so the sample is biased toward those organizations that strive for external visibility through the internet. But this does not affect the substance of the analysis because the study specifically focuses on the identity work enacted by field participant; thus, subjects who do not use the web for describing who they are, most likely, are not involved in any identity work. Additionally, 32 of the 420 collected identity claims have been dropped because not written in Italian or because of the paucity of textual parts, yielding an usable sample of 388 organizational identity claims⁵. Since in October 2017 (the last data collection period) the full database counted approximately 3500 operators, the sample used in this study represents a rough 10% of the whole population (figure 1 below compares population and sample growth on the basis of registration time).

The Dronezine.it blog, up to October 2017, counted about 2900 articles of which 1515 have been retrieved for the purpose of this study. This selection has been performed by discarding posts about recreational or military drones (because this study is concerned with civil drones for professional application), posts about extra-national events (if no implications for the Italian context were devised), and reviews of drone models (constituting a dedicated section of the blog) that do not relate with potentially problematic issues characterizing the field.

FIGURE 1 ABOUT HERE

Data analysis

The overall analytical approach adopted in the present study is based on a vocabulary analysis (Loewenstein, Ocasio, & Jones, 2012). Vocabularies in fact, through the occurrence and co-occurrence of keywords, signal the adherence of certain textual materials to the meaning systems underlying

⁵ Average number of words per claim=336 (min=32; max=3085)

institutions. Concretely, vocabulary analysis may illuminate how, in the construction of their own identities, organizational actors deploy certain sets of symbolic resources revealing the extent to which identity claims refer to certain logics and issue frames; mission statements, in this regards, have already been used as particularly apt data to capture the interrelation between organizational identities and broader societal and institutional discourses (Jha & Beckman, 2017; Ran & Duimering, 2007; Stallworth Williams, 2008; Swales & Rogers, 1995). Specifically, the analysis of textual data performed here combines a qualitative coding phase with quantitative content analysis. Content analysis, in turn, has been conducted into two distinct phases, which are respectively guided by the two different research questions animating this study.

Stage 1. Qualitative data coding. First, each identity claim has been coded in order to classify organizations in the field according to their core business and activities. This analysis allowed to distinguish three main groups of organizations populating the drone field: 1) *topography* organizations, comprising all those firms and professional service companies whose main activities are related with surveying, mapping, geographic and geomatic applications; 2) *video/photo* organizations (e.g. photographers, video-makers, cinema service companies etc.), which are primarily concerned with the use of drones as flying cameras for filming and taking pictures from above; 3) *drone-specific* organizations whose identity claims show a clear primary concern in defining themselves as involved in the drone business (e.g. drone makers and/or companies providing all-around drone-based services). Table 1 below exemplifies how this coding has been performed. A fourth residual group of organizations (coded as “other”) comprises all those other subject which do not clearly belong to any of the above mentioned groups, such as firms working in web-marketing, agriculture, constructions, aviation, housing etc. Figure 2 below shows how the composition of the sample changed through time: the residual category appears to get larger year by year, signaling that interstitiality persists as a defining feature of the drone field.

TABLE 1 ABOUT HERE

FIGURE 2 ABOUT HERE

Second, a qualitative coding of the blog posts has been performed in order to identify the most relevant issues debated in the field which can somehow provide cultural resources for identity construction to organizations. For this purpose, I performed a preliminary open coding of a sample (20%) of the collected articles, aimed at labeling segments of text with purely descriptive codes (Saldaña, 2009). A list of 89 codes has been in such way derived and, through a second-cycle coding (Miles, Huberman, & Saldaña, 2014), has then been condensed into 7 broader thematic categories, representing the most debated issues in the field. Then, all the 1515 articles have been carefully read and coded with one of those 7 thematic categories in order to detect what particular issue each of them addresses. Articles with none or ambiguous reference to those issues were dropped for the subsequent analysis. The final selection so obtained counts 1088 unambiguously coded articles. Table 2 below reports examples of the titles of articles coded with those 7 issues and figure 3 shows how the relative prominence of these issues changed through time⁶. Furthermore, this qualitative and thorough reading of the textual materials has been essential to reconstruct a narrative account of all the events underlying the evolution of the emerging drone field.

TABLE 2 ABOUT HERE

⁶ For the sake of data analysis, blog posts relative to the year 2013 have been grouped together with the 2014 posts, both because the former are relatively few in number (59) and also because in this way the entire data corpus (identity claims + blog posts) spans a 4-year time period (2014-2017).

FIGURE 3 ABOUT HERE

Stage 2. Multidimensional Scaling. The above described qualitative procedure mainly served the purpose of organizing the textual data by identifying the main organizational communities populating the interstitial drone field and the most relevant issues debated therein. In order to gauge to what extent organizational identities are built upon the cultural categories produced through field discourse, I follow the procedure developed by Jones and Livne-Tarandach (2008). More precisely, this procedure consists first in identifying the most frequently used words co-occurring within individual texts, then in measuring the relative proximity of the meaning systems conveyed through these keywords thanks to multi-dimensional scaling (see also Mohr, 1998). This procedure has been applied to the individually taken organizational identity claims by using the word frequencies extraction function from MaxQDA18, which yields the relative frequencies of every word occurring in a text unit (i.e. the ratio between the number of times a word appears divided the total number of words⁷). The comparison has been made across individual identity claims on the basis of the relative frequencies of the top most used 50 words in the whole textual material collected from organizational websites. The resulting MDS map allows to visualize the extent to which the organizational identities of the different communities in the drone field are semantically overlapping or distinct with respect to each other. This procedure is similar to what done by Korff et al. (2015), but instead of imposing keywords upfront, this method elicits the vocabularies from the data.

⁷ This analysis has been done by excluding from the computation of word frequencies the most commonly used words in Italian (corresponding to words such as *and, the, that* etc.). Moreover MaxQDA18 can lemmatize different languages so that verbs or nouns are considered in all their declinations (e.g. *performing* is counted as being the same as *perform*, and *dogs* as the same as *dog*)

Stage 3. Correspondence analysis. The second research question pertains to the role that broad discourse has in shaping the field identities. For this purpose, correspondence analysis is an appropriate methodological tool to map the interrelations between actors populating a field and the discursive elements of the same field (Meyer & Höllerer, 2010). The particular correspondence analysis implemented here is inspired by a vocabulary approach, according to which the reference to given keywords, and the co-occurrence of these keywords in a certain textual unit, can be considered as a proxy to the deployment of specific cultural resources aiming, in this case, to the projection of organizational identity. For this purpose, I first run the MaxQDA18 word-frequency function on the Dronezine articles, differentiated by issue, in order to pinpoint sets of keywords (dictionaries) that allow to bridge the words used by organizations to describe themselves with those issues debated at the field level. Clearly, the degree of overlap between the most used words across issues is very high, for this reason, following a procedure similar to the one adopted by Guérard, Bode, & Gustafsson (2013), I defined dictionaries specific to single issues by selecting, among the top 100 most used words in each issue, the keywords that are unambiguously associated with the same topic (e.g. the word “electronic” is most typically related with technology). In cases where a keyword recurs and is significant for two or more topics (e.g. “develop” is consistent both with Business and Technology issues), the choice was to assign the keyword to the topic in which it shows a higher relative frequency (e.g. “develop” has 0.44% relative frequency in Technology articles and 0.19% in Business articles, thence it is assigned to the Technology dictionary). This procedure yielded lists of keywords (between 11 and 19), or dictionaries, that relate to the issues uncovered through the qualitative coding (see table 3 below). All these keywords were subsequently searched throughout the companies’ identity claims, and by applying the autocode function of MaxQDA18 (using the paragraph as unit of coding) it has been possible to count the number of times each identity claim makes reference to specific issues. The contingency tables (see Appendix 1) used for implementing correspondence analysis have been created by grouping the

identity claims according to the three main organizational communities populating the drone field (i.e. Drone-specific, Topography and Photography) and plotting them against the issues debated at the field level⁸. In short, if the MDS procedure sketched above take into account the similarities in the vocabularies, i.e. lists of keywords, used by different groups of organizations, correspondence analysis allows to associate those keywords with specific meanings that organizations try to convey through their identity claims.

In order to grasp how the identity formation process proceeded through time the above analysis has been performed year by year. More precisely, I assumed that field's discourse and organizational composition evolve cumulatively. Practically, this means that the data used to depict the situation at time t is the sum of data relative to times $t+t-1+\dots+t_0$. This working assumption allows to take into account the fact that, as time goes by, the field grows both in the number of organizations and in the amount of discursive activity enacted.

TABLE 3 ABOUT HERE

FINDINGS

The interstitial nature of the drone field entails, as shown above, the co-existence of distinct organizational communities. Though distinct in their main activities and identities, these different organizational groups are all, to some variable degree, concerned with drones. In many cases they just use the drone as a working tool among the many they already have, so that it does not always represent a central identification item. However, since all these organizations have been registered as drone operators, they had to become acquainted with certain meanings and understandings that specifically

⁸ Since the “Problems” issue occurs much more rarely than any other issue in the identity claims, I decided to drop it from the analysis (see appendix 1 for details).

regards the implications of using and making drones fly in the airspace. Drones in this sense can be considered as a sort of boundary object (Star & Griesemer, 1989) that connect otherwise distant social actors. To be sure, the findings reported here shall take as focal actors those organizations belonging to the Drone-specific community. This is our focal community because its identity is in most part anchored on the object drone, and it indeed has to construct such identity from scratch, given the novelty of this object. Drone-specific organizations are therefore likely to be subject to the influences of other already institutionalized identities in the definition of their own identity. I will first present the findings related to the first research question, which may shed light on possible group dynamics in the construction of individual identities; the second part of findings addresses instead the role of discourse in the construction of field-level identity.

Mapping organizational identities against each other

Figure 4 shows the temporal evolution of the individual organizational identities differentiated by group (the color of each point indicates the community to which that organization belongs). These MDS maps allow to visually explore the extent to which the main organizational communities use similar words to describe themselves: the closer two points are on the map, the more similar are the relative frequencies of the most used words by the two corresponding organizations. This procedure does not give any hint on the meaning that single words convey: by pragmatically assuming a structuralist perspective on language by virtue of which there is a fix correspondence between sign and signifier, the MDS maps so built can give an overall grasp of the semantic proximities among organizational identity claims. Moreover, it is also possible to appraise the growth of the field in terms of increasing number of organizations.

In the first time period, we can notice the prominence of organizations belonging to the “drone-specific” group. This comes as no surprise, since the first entrants in the field were those organizations

whose core activities were strictly related to drones, and the paucity of data from other organizational groups makes difficult a clear interpretation of the way in which these different groups' identity claims were somehow influencing each other. In the subsequent year a much more substantial number of organizations coming from other fields joined the drone industry. The year 2015 was in fact a crucial year in the industry, because there had been relevant simplifications in the rules for becoming regular registered drone operators. The horizontally oriented lines in Figure 4 are to be considered as a visual help to understand the direction along which different organizational groups, on average, tend to be distributed. From that we can see how, notwithstanding a certain overlap between all these groups, in year 2015 the drone-specific identities tend to be positioned somewhat in between the topography and photography identities. This is given by the fact that many companies and firms who started a drone-related business were prone to offer a wide-ranging set of services which typically included video/photo shooting and also more technical mapping and geomatic applications:

D-sight offers professional aerial shooting services from drones. We are specialized in aerial filming for cinema, TV commercials, building inspections, photogrammetry and 3D reconstruction, precision farming, security and environmental surveys. (Drone-specific identity claim, 1/2015)

This kind of all-inclusive claims is very typical among the drone-specific organizations that, especially in the initial period of field emergence, were still somehow belonging to an under-defined category. This “in-between” positioning is clearly a reflection of drones' versatility and it confirms once again the interstitial nature of this field. However it is important to highlight that the two other communities, i.e. Topography and Photography are quite distant from one another because, except for the fact that their main activities in both cases may take advantage of images taken from above (through a drone for example), the skills and know-how underlying the use of these images is very different. On one hand, photographers and video-makers emphasize the artistic aspect of their work, intended to deliver

emotionally engaging products: “Thanks to our last generation drones we can take highly spectacular and emotional videos” (Video/Photo identity claim, 2015). On the other hand this kind of claims are substantially absent in topography identities which instead emphasize the technicalities and professional competences underlying their activity: “Our everyday work is informed by solid scientific, safety, and engineering principles” (Topography identity claim, 2015). In general, people working in topography are required to go through several years of education meant to acquire the necessary competences to perform topographic surveys, and indeed surveyors are organized as a profession. The identity construction of those organizations belonging to the topography group is therefore sharply characterized by the emphasis on the specialized knowledge that they possess.

In the third part of figure 4, relative to the period 2016-2017⁹, it is easy to observe a sharp alignment of drone-specific identities with topography, and a resulting distancing from the photography ones. According to what stated above, it is possible to interpret this movement as an increased attention to professionalism and specialized competences in the definition of drone-specific identities. This can be illustrated comparing the following three claims of organizations belonging to the three different groups:

The precision of our equipment, the qualifications and know-how of our staff allowed us to specialize in the realization of quick and accurate results and to offer commercial solutions which fully satisfy the client. We can offer tailored solution for inspection service with drones, GIS [Geographic Information System] service, aerial thermographic images, and much more (Drone-specific identity claim, 11/2016)

Professionalism, projects' quality, an ongoing thrust to improvement, and synergy with technological innovation: these are the strengths of our activity. The quality policy consists in

⁹ In this and in the following analysis I decided to group together the results relative to the years 2016 and 2017 because the visual differences between the two years are not substantial.

providing our clients with professional services that perfectly match the required standards and which are perfectly apt to satisfy their needs. (Topography identity claim, 5/2016)

Our mission consists in supporting the client with passion, professionalism and value through the realization of videos and photographic services with high emotional impact. (Video/photo identity claim, 10/2017)

These three claims are all similar along the theme of client satisfaction (to be expected in mission statement meant to attract potential customers [see Ran & Duimering, 2007]), but the video/photo one, though indulging with professionalism, emphasizes also emotional factors. This is absent in the other two claims that instead revolves around precision, quality, competence. Evidently, drone-specific organizations increasingly adopted a vocabulary to identify themselves as technology-laden and highly specialized subjects. This tendency may presumably be explained as an attempt to counterbalance the amateurish origin of drones, which could be associated with lack of professionalism and safety. To sum up the foregoing analysis has uncovered a potentially important mechanisms that underlies the identity formation of interstitial emerging fields, namely what can be named as *alignment to professionalized community*.

FIGURE 4 ABOUT HERE

Mapping field identities against discourse issues

Figure 5 shows the temporal evolution of the relations between field identities and discursive issues. These maps have been produced through correspondence analysis which allows to compare on a two dimensional plane the relationship between categorical variables which may take on many different values. In our case the variables are field identities and issues, and the entries of the two way tables

(see appendix 1) represent the number of times a certain issue is present in the identity claims of each organizational group. Some particular caution is needed in the interpretation of correspondence analysis maps. Differently from the MDS maps shown above, in correspondence analysis the relative proximity between two points is not per se a correct criterion to infer an association. In fact, what matter in this case is the scalar product of the vectors connecting the two points with the origin of the x and y axes. In other words, two points are more strongly related the acuter is the angle between the lines connecting them with the center of the map and the greater is the distance of the points from the center (Greenacre, 2007). Additionally the meaning of the two axes has to be derived from an understanding of the positions of the points plotted onto the map. In this regard two features are consistently apparent in all the three plots: first, the left-hand side of the map is always occupied by the issues “Definition”, “Rules” and “Training”, while on the right-hand side there are “Solution”, “Technology” and “Business” (although the latter gets positioned roughly in the middle in the last period). Second, the photography identity is always positioned in the lower part of the map, while the topography identity is always in the upper part. These two elements may provide some valid guidance for interpreting the x and y axes and, as a result, the whole correspondence analysis output.

In particular the three issues consistently positioned on the left-hand side of the map are all related with the intervention of the aeronautic authority in the drone field. Drones are in fact technically defined as Remotely Piloted Aircraft Systems (RPAS), and this definition alone entitles the aviation authority to regulate the drone field, since anything which is considered as an aircraft has to be subject to aviation rules. However, the definition of what a drone is was not settled yet in the period of the study: different acronyms are meant to indicate the same object and, informally speaking, drones are often referred to as flying robots or even toys. Accordingly, these varied understandings of what a drone is make the Rules issue a very much debated topic, and the specifications on compliance with the aviation authority regulation appears very often in the identity claims of drone-related companies. Among these rules, it is

required for drone pilots and operators to undergo a specific training on the rules of the air. But more generally the training issue regards also the implementation of educational programs aiming at developing a body of knowledge specific to drone-based activities. These three issues therefore, though being originally spurred by the intervention of the aviation authority, pertain to a rather ideational realm. On the other hand, the remaining issues (i.e. Solutions, Technology and Business) clearly have a more pragmatic grounding. Therefore it seems reasonable to conceive the horizontal dimension (dimension 1) of the maps as capturing the distinction between *ideational* vs. *pragmatic* cultural resources for identity construction.

The vertical dimension is instead characterized by the differentiation between topography and photography. As explained above, topography is an activity which relies on much specialized notions and know-how, while photography is associated with more mundane ingredients as emotions and, generally speaking, it is a much less professionalized job than topography. This is conducive to label the vertical dimension going along the y-axis as *specialized* vs. *mundane*. To sum up, the degree of pragmatic drift (gauged by the x-axis) and the degree of specialization (on the y-axis) are the two fundamental dimensions¹⁰ which capture the kind of cultural resources employed by the organizational communities populating the drone field to define themselves.

Inspecting the time variation of the maps, it is worth-noting a positive and increasingly strong association between drone-specific identity and the three ideational issues. This informs us on an important trend of identity formation process of the drone field: those issues emanating from the aviation authority, and oriented at creating a body of knowledge specific to the new field, are the most important ones in crafting a field-specific identity. This is well exemplified in the following excerpts of

¹⁰ The percentages displayed next to the labels of the two dimensions, report data variation (inertia) is captured by these dimensions. In this case the horizontal dimension has a greater contribution to data variation, but what matters is that the two dimension always capture the 100% of total inertia, which means that the two dimensional reduction is optimal.

two drone-specific identity claims (bold words are the ones coded through dictionary analysis and in square bracket it is specified to which issue they pertain):

*Dorit has pilots that obtained the **license** [TRAINING] for **RPAS** [DEFINITIONS], by passing both **theoretical** and **practical** [TRAINING] examinations, as demanded by the **ENAC regulation** [RULES]. (Drone-specific identity claims, 2017).*

*I am a pilot in possession of the **license** [TRAINING], demanded by **ENAC** [RULES] to pilot **RPAs** (remotely piloted **aircrafts**) [DEFINITION], and all our drones are **certified** by **ENAC** [RULES]. (Drone-specific, 2016).*

This increased association between drone-specific identity and these ideational issues denotes the internalization of aviation cultural resources into field own self-representation. Furthermore, it is interesting to compare this result with the other associations between identities and issues. In particular the topography identity appears to be consistently associated with solution and technology issues:

*Our activities revolves around cultural heritage, with **interventions** [SOLUTIONS] connected to large public infrastructural works, archeological excavations, monuments and valorization **projects** [TECHNOLOGY]. (Topography identity claim, 2017).*

*We **effectuate** [SOLUTION] topographic surveys that allow to obtain precise maps on which to apply a **project** [TECHNOLOGY], and plant inspections in order to realize a piping on which other **companies** [BUSINESS] may work. (Topography identity claim, 2017)*

Photography identity is instead closely associated to business:

*Viba Video Productions is an Italian **company** [BUSINESS] with an international mindset that takes advantage of its own experience as a the fundamental pillar to put on stage original contents. (Photography, 2017)*

*Corporate video is a fundamental instrument to promote your products and identity and compete with the present **market** [BUSINESS] conditions. (Photography, 2017)*

This means that the *non*-field-specific identities (i.e. Topography and Photography), although distinct in the degree of specialization of their main activities, are both mostly engaged with the pragmatic realm in the construction of their identities. This amounts to say that in interstitial fields identity construction is driven by opposite factors in relation to the fact that organizations are specific to the new field or not. In particular, the prominence of ideational elements in field-specific identity construction is most likely due to the need of demarcating cognitive boundaries of the emerging field, which are needed to provide the new field with legitimacy (Grodal, 2018).

Another relevant temporal pattern that is visible in figure 5 is the progressive alignment along the vertical dimension of drone-specific and topography identities: initially the drone-specific identity was located in the lower part of the map (i.e. in the “mundane” zone), but it ended up in 2017 in the upper part of the graph, well aligned with topography identity. This is perfectly consistent with the group dynamics previously depicted in which drone-specific organizations were observed to increasingly adopt a vocabulary proximate to topography organizations. The overall result of this process is that drone-specific identity and the issues which provides the cultural resources to its construction move through time toward the upper-left quadrant of the map. This points out to an increasing attention for the deployment of specialized and ideational cultural repertoires in the construction of field-specific identities. This mechanism can be named *identity conceptualization* by virtue of which field-specific organizations belonging to an interstitial field gain some level of distinctiveness from the other communities populating the field by using increasingly specialized and notional cultural resources in their self-presentation. By so doing, the field-specific community can delineate its cognitive and symbolic boundaries.

FIGURE 5 ABOUT HERE

DISCUSSION AND CONCLUSIONS

The idea that innovations come from novel combination of already existing elements is well established since Schumpeter's seminal works. Analogously, institutional and social innovations derive from the encounter of diverse constituencies which get mutually engaged in a dialectical process that gives rise to novel meanings and beliefs (Hargrave & Van de Ven, 2006). Interstitial field emergence is a rather neglected, but theoretically generative research area (Hinings, Logue, & Zietsma, 2017) which sheds light on the process through which new organizational field are generated at the intersection of already existing fields. Organizational identity construction plays a crucial role in the legitimation of emerging fields (Clegg et al., 2007; Navis & Glynn, 2010; Patvardhan et al., 2015), but the heterogeneity of interstitial spaces surely represents a puzzling factor affecting this process. The present study therefore tried to further our understanding of interstitial emergence, by emphasizing the role of field discourse as the source of cultural resources that different actors may deploy in forging and projecting their identities.

This process of identity construction appears to be driven by two fundamental mechanisms: aligning to professionalism and identity conceptualization. These two tendencies regards the use of language that organizations make in crafting their identities: on one hand drone specific organizations are observed to increasingly adopt a linguistic register proximate to topography organizations, on the other hand they also make use of keywords that resonate with those discursive nuclei that are connected with more specialized and conceptual themes. The joint work of these two mechanisms outlines a complex interstitial emergence process through which field-specific organizations in their identity construction are influenced by already existing field (i.e. topography) but they also strive for gaining some distinctiveness from these already existing fields, by leveraging cultural resources which are meant to create a field-specific body of knowledge. This is not a problem of optimal distinctiveness though, first because such process takes place at the field level, not a the organizational one; second, because

organizations belonging to an emerging interstitial field do not really have a well-formed category of reference the conformity to which may somehow counterbalance their need for uniqueness. In such situation, in fact, those very meanings that define the category are still largely to be institutionalized. In this sense the identity construction process of organizations populating an interstitial field is driven both by symbolic isomorphism (Glynn & Abzug, 2002) and by a more agentic process of discursive meaning-making.

These considerations may help to further shed light on a puzzle concerning emerging fields. It is generally accepted that in emerging fields isomorphic pressures are weak (Zietsma et al., 2017). However, it is also the case that the identity dynamics in emerging fields aims primarily at building some critical mass to create consensus around the new organizational form and provide legitimacy to the whole field. This implies that even in early stages of field development there may be an overall tendency to conform to one another. Research has recently shown in fact how isomorphism can be a highly relevant factor in emerging fields and industries that need to gain some minimal level of consensus to flourish (Mezias & Schloderer, 2017). The results of the paper seem to provide some more clarification on this process thanks to the particular focus on the interstitial nature of emerging fields. Interstitial fields are in fact populated by organizational communities coming from already existing fields (e.g. Topography and photography), which have well-formed identities and institutional meanings that organizations specific to the new field may glean, imitate or recombine to construct their own identity. Therefore it may well be the case that a certain level of symbolic isomorphism acts to forge field-specific identities that somehow resemble, in the linguistic register adopted, the identities of the other fields whose interests and activities overlap in the interstice. The results of the paper (which are surely affected by the specificity of the empirical setting) suggest that the strongest isomorphic influence is exerted by those communities characterized by a higher degree of professionalism.

The second set of results instead points to a different process. Shifting the attention from the linguistic register to the meaning of the keywords used to project organizational identities, it appears that the communities populating the interstitial field act quite differently from one another. In particular the drone-specific group has an unique, and increasing through time, tendency to make reference to keyword associated to ideational themes that are related to the creation of a field-specific body of knowledge and to the demarcation of symbolic boundaries. On the other hand, communities belonging to other existing fields, who have therefore well-formed symbolic boundaries and field-specific knowledge, build their identities by leveraging more pragmatic and mundane discursive nuclei. This process, which has been named conceptualizing identities is very different from the former mechanism of isomorphic alignment to a professionalized community. In this case in fact the construction of identity is driven by the discourse ongoing at the field level. Thanks to this discourse, field-specific meanings are generated and these meanings are then incorporated into field-specific identity. Although the results are aggregate and can give just a sense of the broad processes involved, the important conclusion that can be drawn from them is that interstitial emergence implies the construction of field identities which are both strongly affected by other existing field (and their already existing identities), and also by meanings generated *de-novo* through discourse, which are conveyed in identity claims.

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TABLES AND FIGURES

Table 1: Coding of organizational identities

Organizational identity	Coding description	Examples
Drone-specific	Claims and mission statements explicitly reporting as first, or central, features of the company activities primarily related with drones manufacturing or use.	<ul style="list-style-type: none"> – <i>DonEngineering designs and produces UAV (unmanned aerial veichle) and ROV (remotely operated veichle) systems for data acquisition in aerial, marine, sub-marine, and terrestrial environments. Our vehicles can be equipped with photogrammetric, multispectral, thermographic sensors and with cameras for professional video-shooting</i> – <i>Droteg Group operates all-around in the field of drones. The group, born out of the passion for technology, is composed by an heterogeneous mix of experts in engineering, agronomy and architecture sectors.</i>
Topography	Claims and mission statements explicitly reporting as first, or central, features of the company topography, geology, mapping and related activities	<ul style="list-style-type: none"> – <i>Trevor is one of the leading firm in Europe for photogrammetry software design, 3D imaging, mapping from drone, digital cartography and connected activities</i> – <i>We have been performing application in topography and aerophotogrammetry for over a decade [...] Since 2015 we are certified ENAC operators, a necessary requirement for performing so-called “specialized operations”, namely professional applications employing drones.</i>
Video/Photo	Claims and mission statements explicitly reporting as first, or central, features of the company activities connected with photography, video-making, cinema service, television, etc.	<ul style="list-style-type: none"> – <i>Vidis is a team of passionate, competent people specialized in corporate video production for companies who want to engage clients in a different way, through emotion and the fascination of a video</i> – <i>Velis is a team of professionals that, thanks to their drones (radio-controlled helicopters), make professional aerial video shooting, aerial photos, and aerial virtual tours. Our new-generation drones for aerial filming ensure extremely stable and clear shoots from viewpoints not accessible through traditional helicopters.</i>

Table 2: Coding of the issues composing field discourse

Issue	Coding description	Examples (articles' headlines)
Definition	Articles primarily dealing with formal and informal definition of what a drone is	<ul style="list-style-type: none"> – <i>If I equip my aircraft model with a camera, does it become a drone? (2014)</i> – <i>Is a drone tethered to the ground an aircraft? (2015)</i> – <i>Drones: Aircrafts, aero-models or toys? (2017)</i>
Rules	Articles addressing regulatory issues such as: rules definition and interpretation, rule-making, regulatory events	<ul style="list-style-type: none"> – <i>ENAC Regulation, doubts and ambiguities (2014)</i> – <i>With the new regulation ENAC acknowledges the importance of drones (2015)</i> – <i>New standard scenarios forthcoming: Performing specialized critical operations will be easier and faster (2016)</i>
Training	Articles primarily addressing issues connected with drone pilot training and reporting news about courses and educational initiatives	<ul style="list-style-type: none"> – <i>Capannori, the first training course for RPAS pilots has been completed, the next one in June (2014)</i> – <i>Drones and precision farming, a summer school in Rome (2015)</i> – <i>How to use drones in cartography, a course for surveyors in Terni (2017)</i> – <i>Catanzaro, finally a school for professional drone pilots in Calabria! (2017)</i>
Technology	Articles about technological advancements, new drone models, software and hardware components, and similar issues	<ul style="list-style-type: none"> – <i>Inertial systems to substitute GPS, invented in Italy (2014)</i> – <i>Exelis ready to release a system for driving drones beyond operator's line of sight (2015)</i> – <i>BeeCopter, a light inoffensive drone for aero-photogrammetry (2016)</i>
Business	Articles reporting news, events or editorials on economic issues regarding individual ventures or the whole field	<ul style="list-style-type: none"> – <i>Italeaf invests in the sector of civil drones and remotely piloted systems (2014)</i> – <i>Analysis of Italian drone market's development. A conference in Rome (2015)</i> – <i>Drones with a plus sign: Growing firms, growing jobs, growing revenues (2016)</i>
Solutions	Articles on how drones may provide support and solutions to social, environmental, and other questions	<ul style="list-style-type: none"> – <i>You can't swim? No worries, the lifeguard drone is coming! (2014)</i> – <i>Can drones foresee earthquakes? An Italian research (2014)</i> – <i>Drones to fight off marine pollution in Cosenza (2015)</i> – <i>Drones save a human life per week (2017)</i>
Problems	Articles reporting accidents or any other problem created by drones	<ul style="list-style-type: none"> – <i>The prosecutor investigates on a drone fallen on a crowd (2014)</i> – <i>It could be a tragedy in Madonna di Campiglio: a drone nearly misses Marcel Hirscher (2015)</i> – <i>Palermo, groom hit full-face by photographer's drone (2016)</i> – <i>In 2015 18 drones interfered with airplanes. The collaboration of mayors is needed (2016)</i>

Table 3 Dictionaries of keywords related to issues (translated from Italian)

RULES	TRAINING	DEFINITIONS	BUSINESS	TECHNOLOGY	SOLUTIONS	PROBLEMS
aeronautic	approved	aero-model	business	automatic	effectuate	accident
authorize	club	aircraft	client	battery	emergency	fall
aviation	conversion	autonomous	commercial	deploy	environmental	risk
certification	course	define	dollar	develop	intervention	fly-over
code	education	person	company	electronic	monitor	police
critic	instructor	recreational	growth	gimbal	protection	cause
declaration	license	robot	increase	gram	rescue	collision
enac	practical	rpas	industry	machine	research	abuse
law	practice	sportive	invest	parrot	safeguard	illegal
limitation	program	toy	market	phantom	save	hit
mandatory	released	uas	offer	project	solve	problem
manual	school	uav	produce	small		illicit
norm	technique		professional	software		interfere
operator	theoretical		sale	technology		
provision	training		sector	version		
recognized			service	weight		
regulation						
rule						
safety						

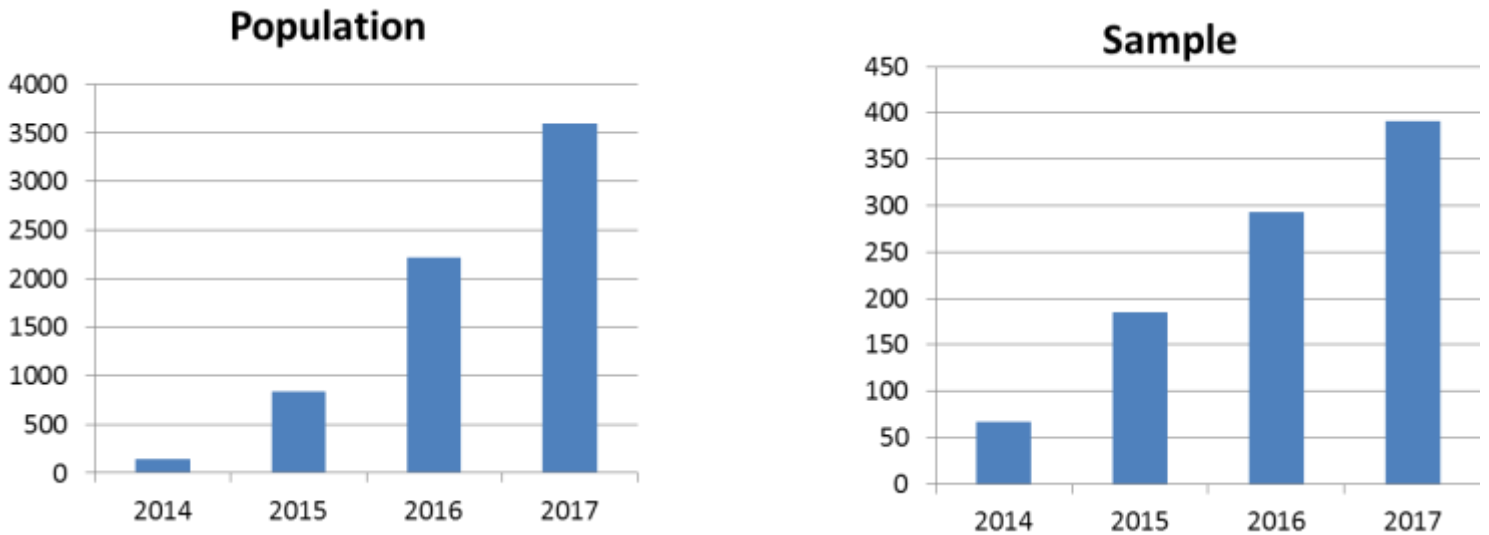


Figure 1: Number of registered operators per year (cumulative)

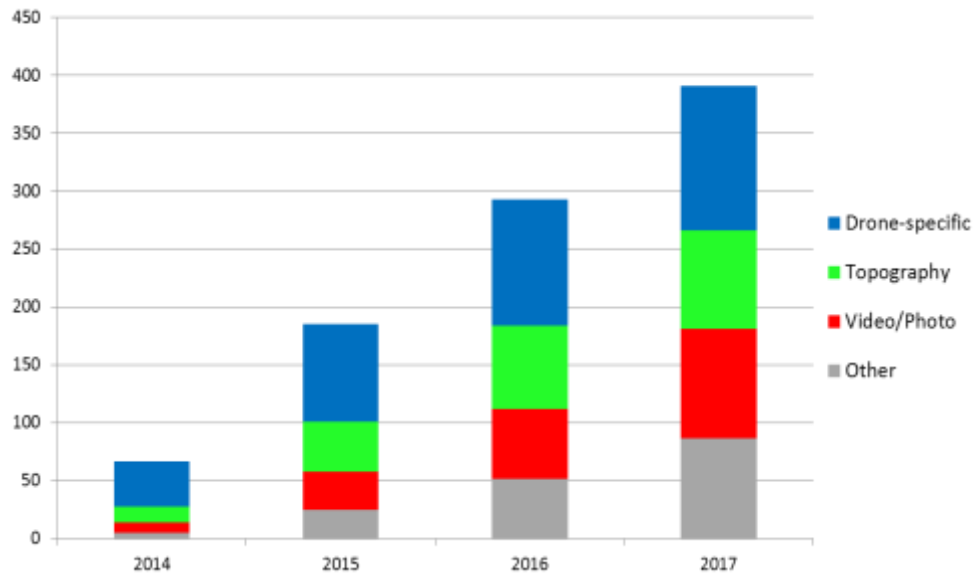


Figure 2: Sample of operators distinguished by type

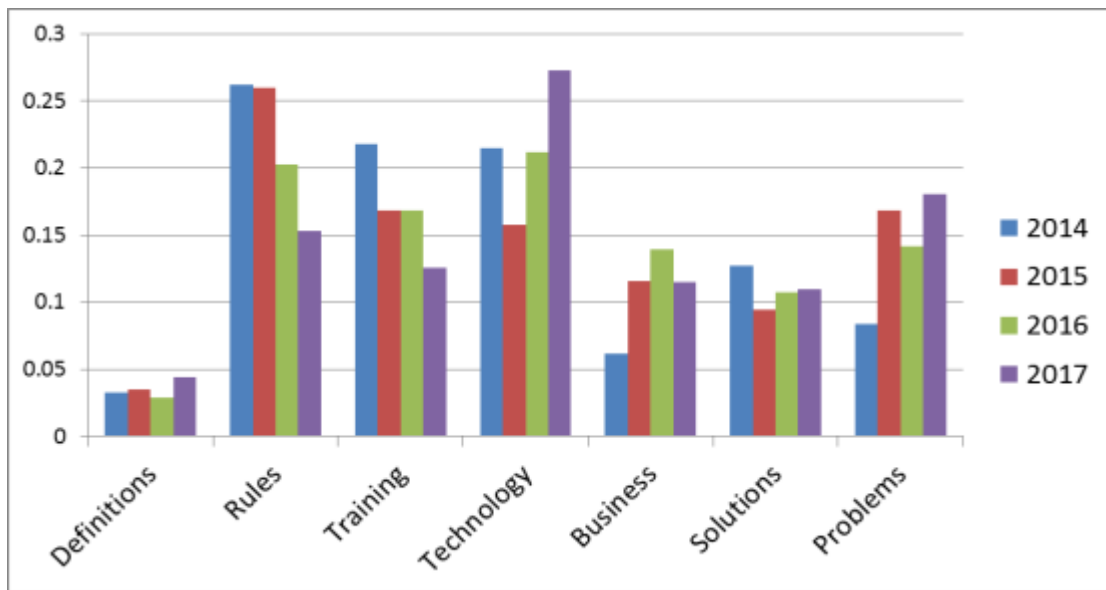


Figure 3: Proportions of coded articles by issue and per year

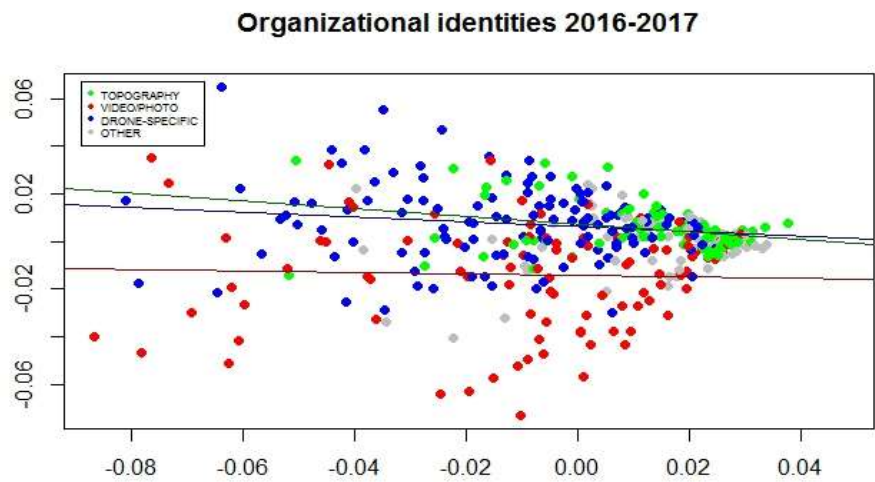
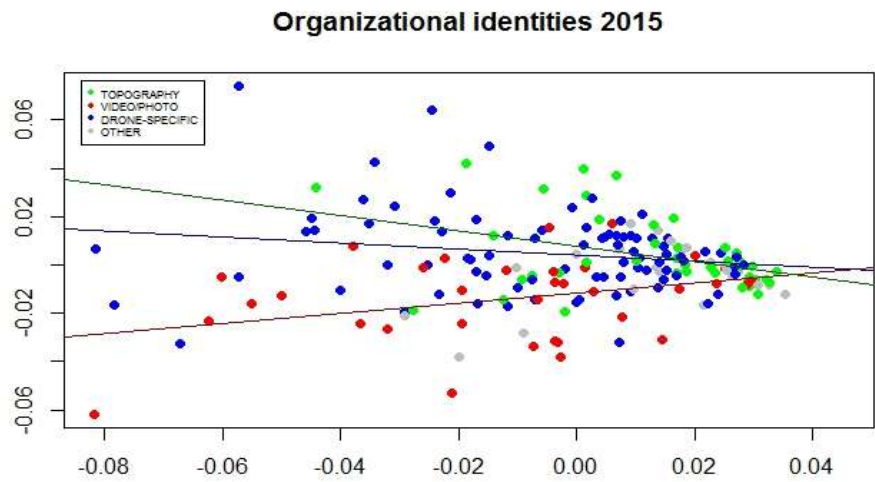
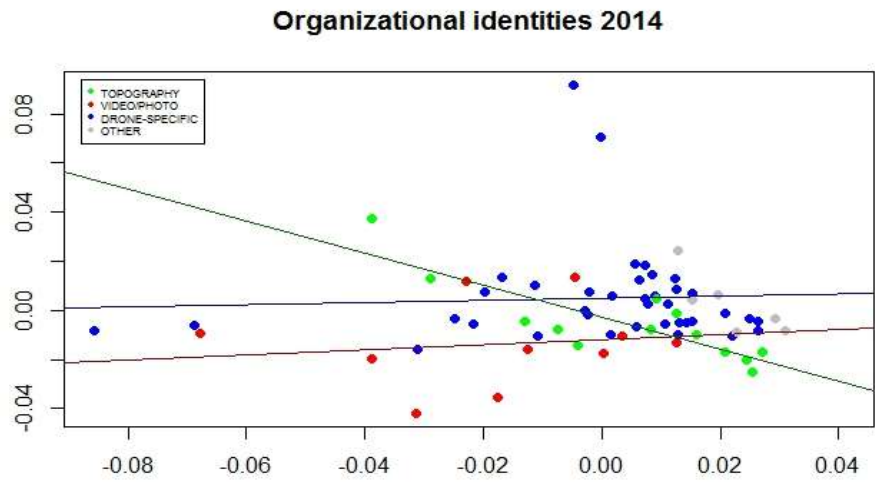
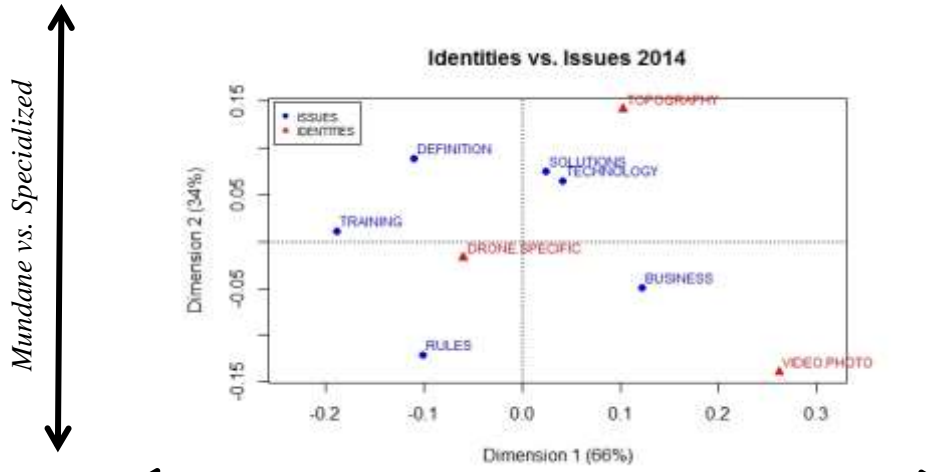
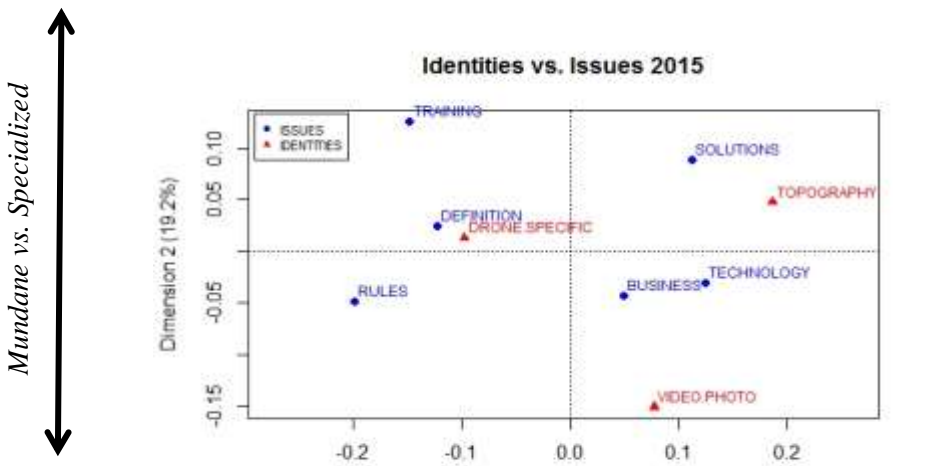


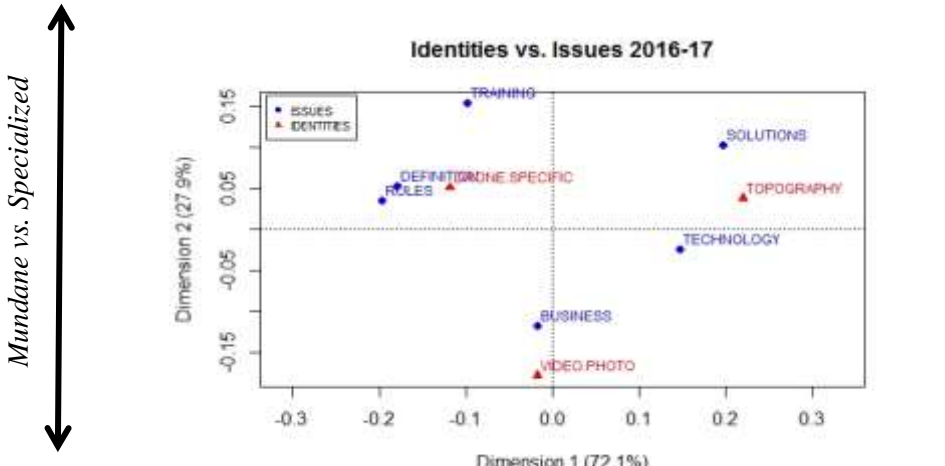
Figure 4: MDS of organizational identities period by period, distinguished by group



Ideational vs. Pragmatic



Ideational vs. Pragmatic



Ideational vs. Pragmatic

Figure 5 CA maps period by period of community identities and discourse issues

APPENDIX 1: Contingency tables, period by period, displaying the number of times any given issue is referred to in organizational identity claims, grouped by community.

2014

	DRONE-SPECIFIC	TOPOGRAPHY	PHOTOGRAPHY
RULES	147	23	17
TRAINING	84	16	5
DEFINITION	86	22	6
BUSINESS	214	59	41
TECHNOLOGY	151	46	20
SOLUTIONS	122	37	15
PROBLEMS	16	2	2

2015

	DRONE-SPECIFIC	TOPOGRAPHY	PHOTOGRAPHY
RULES	287	72	55
TRAINING	139	46	16
DEFINITION	174	57	30
BUSINESS	423	199	111
TECHNOLOGY	272	152	77
SOLUTIONS	229	131	46
PROBLEMS	34	10	4

2016-2017

	DRONE-SPECIFIC	TOPOGRAPHY	PHOTOGRAPHY
RULES	399	138	130
TRAINING	184	82	45
DEFINITION	229	83	72
BUSINESS	566	314	296
TECHNOLOGY	356	283	170
SOLUTIONS	302	257	105
PROBLEMS	46	30	12