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Liliana Doganova

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| Liliana Doganova. Entrepreneurship as a process of collective exploration. 2009. halshs-00431695

HAL Id: halshs-00431695

<https://shs.hal.science/halshs-00431695>

Preprint submitted on 27 Nov 2009

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N° 017

2009

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Liliana Doganova
Centre de Sociologie de l'Innovation
Mines ParisTech
liliana.doganova(a)mines-paristech.fr

CENTRE DE SOCIOLOGIE DE L'INNOVATION
MINES PARISTECH / CNRS UMR 7185
60 Boulevard Saint-Michel
75272 Paris cedex 06 FRANCE
<http://www.csi.ensmp.fr/>

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ENTREPRENEURSHIP AS A PROCESS OF COLLECTIVE EXPLORATION

Liliana Doganova

Centre de Sociologie de l'Innovation, MINES ParisTech

Working paper

November 2009

Abstract

The conceptual framework that is prevalent in the literature on entrepreneurship (and which I shall label the “individual/opportunity” model) rests on the assumption of entrepreneurial agency as individual, strategic and deployed in a time sequence in which opportunity recognition - always individual - is followed by resource mobilization - collective, if necessary. In this perspective, the entrepreneur’s partners are deprived of agency, for they are considered as part of the social capital, or endowments, of the new venture and confined to the role of providing complementary, and hence predefined, resources. This paper contributes to a recent stream of research that challenges this view and emphasizes the distributed and emergent nature of entrepreneurship. Building on a case study of the founding of a new venture, I discuss the role played by the entrepreneurs’ partners, such as venture capitalists and early users and customers. I show that they actively intervene in what the “individual/opportunity” model considers as the most intimate and essential activity of the entrepreneur: the recognition of opportunities. My analysis suggests that opportunities are neither purely created, nor merely discovered, but enacted in partnerships. In order to account for the uncertain and collective nature of entrepreneurship, I put forward the notion of exploration. I argue that entrepreneurship can be fruitfully analyzed as a process of collective exploration, which involves a dynamics of framing and overflowing, is punctuated with trials, and results in the production of new entities which are identified and valued.

Keywords: entrepreneurship, exploration, opportunity recognition, partnerships

Introduction

The conceptual framework that is prevalent in the literature on entrepreneurship defines this field of study as addressing the following question: “how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited” (Shane & Venkataraman, 2000). Locating entrepreneurship in the nexus of the offer of enterprising individuals and the demand for entrepreneurial activity (Venkataraman, 1997), this model is based upon the hypothesis of a time sequence that could be summarized as follows: an opportunity exists; an individual endowed with specific characteristics discovers it and decides to exploit it, by introducing a new product or service to the market and by founding the organization capable of delivering this product or service; in order to do so, the individual mobilizes the necessary resources. At the beginning of the process, the entrepreneur is alone, for the opportunity exists as long as others do not recognize it. In the subsequent stages of the process, however, a growing number of actors come on stage. Given that new ventures are resource-constrained and suffer from the “liability of newness” (Stinchcombe, 1965), not only does the entrepreneur have to convince prospective customers and users, but also those who possess the complementary assets (Teece, 1986) that must be accessed to enable the development, manufacturing, or commercialization of the product or service offered by the new venture.

This conceptual framework, which I shall label the “individual/opportunity” model¹, has recently come under attack. Some scholars have argued that the individual entrepreneur is a myth (Schoonhoven & Romanelli, 2001): she existed, and may still do when artificially sustained by the support of public policies; however, today innovation “is more and more a result of collective activity and no longer the monopoly of an inspired and dedicated individual” (Akrich, Callon, & Latour, 2002). Others have emphasized the rareness of a plot in which opportunities are first discovered and resources are then mobilized (Baker & Nelson, 2005). Garud and Karnoe’s analysis of entrepreneurship as involving distributed agency and “bricolage” synthesizes these two lines of criticism (Garud & Karnoe, 2003). It is to this new

¹ I gather under this label works that examine entrepreneurship by focusing on the individual entrepreneur who recognizes and exploits opportunities (such as Kirzner (1997), Casson (1982), Venkataraman (1997) and Shane and Venkataraman (2000)). I will present these studies in the first part of the paper.

stream of research on entrepreneurship that I aim at contributing in this paper. Building on the case study of a French academic spin-off², I provide an analysis of the process of new venture creation which challenges some of the assumptions of the “individual/opportunity” model. Instead, in order to account for entrepreneurship, I suggest the notion of exploration. I view entrepreneurship as a process of collective exploration whose constituent properties - ends and means, opportunities and resources - are not pre-given, in the form of initial conditions or context, but emergent. I shall argue that they are enacted by a collective whose boundaries go beyond the individual entrepreneur: it includes a set of partners whose agency is not limited to the reception of technologies, which are already turned into products and services, or to the provision of resources, the identity and purpose of which are pre-determined by the rules of complementarity.

The paper begins with a review of the literature on entrepreneurship which aims at identifying the origins and implications of the “individual/opportunity” model. I show that this model implies a discrepancy between the entrepreneur and her partners, which lies in the exceptionality of the entrepreneur’s personal qualities and in the uniqueness of the information that she possesses. The corollary of this hypothesis is a reduction of the agency of the entrepreneur’s partners to the provision of resources. Keeping in mind the criticism that has been addressed to this model due to its assumption of an individual and strategic entrepreneurial agency, in the second part of this paper I examine the process that led to the founding of a French academic spin-off called Kelkoo. Publicly available material on this case³ reveals that the founding process involved three successive business models, which responded to different opportunities and required different resources. In order to understand how the entrepreneurs moved from one business model to the other, I interviewed two of the founders of Kelkoo and two of the venture capitalists who invested in the start-up. In addition, the interviewees provided me with a number of internal documents, such as business plans, corporate presentations, evaluation documents and contracts. The analysis of the empirical material thus collected allowed me to identify the role of diverse partners in the evolution and stabilization of Kelkoo’s business model. In the third part of the paper, I discuss the part played by two types of partners – venture capitalists and early customers/users – in the entrepreneurial process. I suggest that encounters with partners are the locus of opportunity

² Academic spin-offs are new ventures founded on the basis of scientific results and technologies generated in public research organizations (such as universities and research institutes).

³ This material includes: a book that was dedicated to the “success story” of Kelkoo, the annual reports of the research projects during which the technology that Kelkoo will use was developed, the recording of a conference given by one of the researchers who founded Kelkoo, as well as scientific papers and conference presentations.

enactment. This discussion leads me to put forward, in the last part of the paper, the notion of exploration in order to account for entrepreneurship. Building on the case study of Kelkoo, I argue that entrepreneurship is an exploration which involves a dynamics of framing and overflowing, is punctuated with trials, and results in (the identification and valuation of) new entities.

1. The “individual/opportunity” model and the entrepreneur’s partners

1.1. The entrepreneur: an individual endowed with exceptional characteristics

The seminal studies of entrepreneurship located the entrepreneurial function in the person of the individual entrepreneur. Schumpeter’s analysis is certainly the best known example of this approach (Schumpeter, 1968 [1934]). Here, I will briefly review two other studies (Casson, 1982; Kirzner, 1973, 1997) which are particularly enlightening in their positioning with respect to economic theory and in their consequent focus on the individual entrepreneur, whose impossible mission – correct market disequilibrium and make the best decisions – requires her endowment with exceptional qualities.

Kirzner (1997) criticized neoclassical economic theory for its modelling of individual decision as a “mechanical exercise in constrained maximization” (p.64), which does not leave any room for imagination and surprise, and for its focus on the market in equilibrium, where there is no scope for pure profit. These two hypotheses drive the entrepreneur out of the analysis of economic theory because they impede the consideration of uncertainty (in the sense of (Knight, 1921)) in the entrepreneur’s decision and they cancel the possibility of profit that is said to prompt the entrepreneur. Conversely, Kirzner argues that “each market is characterized by opportunities for pure entrepreneurial profit” – opportunities that consist in price discrepancies and resources misallocations and can thus be exploited through arbitrage: “[buying] where prices are “too low” and [selling] where prices are “too high”” (p.70). In order to recognize these opportunities, the entrepreneur needs to be “alert”, “daring”, and “imaginative”.

The list of the entrepreneur’s characteristics, initiated by Schumpeter⁴ and thus continued by Kirzner, is completed by Casson (1982). Criticizing economic theory for depersonalizing the market process, Casson argues that individuals differ in their access to

⁴ Schumpeter (1968 [1934]: 93) outlines the following three characteristics of the entrepreneur: “the dream and the will to found a private kingdom”, “the will to conquer” and “the joy of creating”.

information and, consequently, in their decisions. The author defines the entrepreneur as “someone who specializes in taking judgemental decisions about the coordination of scarce resources” (p.23). From this definition, which insists on the individuality of the entrepreneur⁵, follows a description in terms of personal characteristics: decision making involves a number of activities which require specific qualities (e.g. self-knowledge, imagination, delegation skill, etc.) that must therefore be possessed by the entrepreneur.

The emphasis on the individual comes to a climax with an approach to entrepreneurship, inspired by psychology and behavioural sciences, which examines the individual traits of entrepreneurs in order to: show that they are different from non-entrepreneurs, such as small business owners (Carland, Hoy, Boulton, & Carland, 1984) and managers (Hartmann, 1959; Litzinger, 1965); group them in different categories (Gartner, 1985); and determine the likelihood to become an entrepreneur or outline success factors (Begley & Boyd, 1987). The characteristics of the individual-entrepreneur relate to her psychology (need for achievement, locus of control, risk taking propensity) as well as to her background, experience and attitudes (job satisfaction, previous work experience, entrepreneurial parents, age, education) (Gartner, 1985: 699). To this list can be added other qualities such as over optimism (Cooper, Woo, & Dunkelberg, 1989), low risk aversion (Kihlstrom & Laffont, 1979) and prior entrepreneurial experience (Carroll & Mosakowski, 1987).

Certainly, the individual is not alone and isolated. For instance, in order to describe the phenomenon of new venture creation, Gartner (1985) considers not only the individual who creates a new organization, but also the organization that is created, the process of creation and the environment, with the latter including the entrepreneur’s partners. Like the entrepreneur, the “environment” is described through a series of characteristics which are spelled out in terms such as “availability” (e.g. of venture capital), “accessibility” (e.g. of suppliers and customers), or “presence” (e.g. of experienced entrepreneurs) (p.700). Thus, even though the environment appears here as an explanatory variable next to the individual-entrepreneur, it is relegated to the status of context: a series of conditions which are external to the entrepreneur, be they constructed by her (according to the perspective of strategic choice) or imposed on her (according to the perspective of environmental determinism). In this view, the interaction between the entrepreneur and her environment is limited to a relationship of (unilateral or reciprocal) causation.

⁵ “(...) the entrepreneur is a person, not a team, or a committee, or an organisation. Only individuals can take decisions” (Casson, 1982: 23)

1.2. Entrepreneurship, networks and alliances

More recently, there have been efforts to “personalize” not only the entrepreneur, but also the “environment” that surrounds her. Considering the embeddedness of the entrepreneur in a network of relationships (Granovetter, 1985) and her need to access complementary assets (Teece, 1986), the literature in entrepreneurship has enlarged its scope in order to include other actors who accompany the entrepreneur and to account for their role in the entrepreneurial process (Alvarez, Ireland, & Reuer, 2006). The bulk of these studies build on the resource-based view of the firm (Barney, 1991) and emphasize the resource constraints experienced by new ventures. Some of these resource gaps can be filled by means of inter-organizational collaborations. Thus, entrepreneurial firms ally with partners who are likely to provide them with complementary resources (Deeds & Hill, 1996; Eisenhardt & Schoonhoven, 1996) such as financing (Coombs, Mudambi, & Deeds, 2006), diverse information and capabilities (Baum, Calabrese, & Silverman, 2000), social status and recognition (Stuart, 2000), technological resources (Kelley & Rice, 2002), downstream value chain activities (Rothaermel, 2001), or knowledge of and presence on foreign markets (Leiblein & Reuer, 2004).

Beyond the variety of the assets on which they shed light, these studies share a common assumption by defining the role of the entrepreneur’s partners as the provision of resources. Even though the role of partners is increasingly acknowledged in the literature in entrepreneurship, it is generally considered as independent from the entrepreneurial process itself: partners appear as a complement at the end of a time sequence that begins with the new venture and its pre-given resource configuration. Collaboration affects the amount of the start-up’s resources but leaves their nature, configuration or purpose unchanged. Each party knows what to look for in what the other party already possesses. The opportunity pursued determines the resources that the start-up owns and those which it lacks and hence needs to access. Uncertainty weighs only on the likelihood to access these resources, not on their identity, which is defined by the rules of complementarity.

Certainly, the social resources – among which partnerships – initially possessed by the entrepreneur affect the ones that she will be able to access as her entrepreneurial project unfolds. For example, entrepreneurs who have social ties with venture capitalists are more likely to obtain funding (Shane & Cable, 2002; Shane & Stuart, 2002). In the case of academic spin-offs, the characteristics of the mode of transfer (Moray & Clarysse, 2005) and

of the parent research organization (e.g. its support to new venture creation (Clarysse, Wright, Lockett, Van de Velde, & Vohora, 2005), the intensity of its links with industry, or its reputation) influence the resources that the spin-off possesses at start-up and the ones that it is capable of accessing. The social network of the entrepreneur plays a part in the very decision to found a new venture, by providing benefits related to opportunity enhancement, access to information and resources, timing and referrals (Nicolaou & Birley, 2003a, b). These links, inherited from the past, are part of the new venture's "social capital" (Burt, 2000), "endowments" (Shane and Stuart, 2002) or "endorsements" (Stuart, Hoang, & Hybels, 1999). They are mobilized for the achievement of an objective in the characterization of which the partners that they involve merely play the part usually given to context. Partners are seldom endowed with agency in these studies, since they are considered as part of the social resources of the entrepreneur, who remains the unit of analysis.

1.3. The role of partners in the "individual/opportunity" model

Such a reductionist view of the role played by the entrepreneur's partners is closely related to the conceptual framework that views entrepreneurship as the nexus of individuals and opportunities (and which I called the "individual/opportunity" model). In this framework, the very notion of opportunity implies a discrepancy between the entrepreneur and her partners. Since opportunities are "available (but hitherto overlooked)" (Kirzner, 1997: 73), the entrepreneur is under the threat of the competition of other entrepreneurs. Her advantage stems from her singularity and from the uniqueness of her revelation. Therefore, the entrepreneur "has to keep apart the people between whom he is intermediating" and "avoid giving away too much information" (Casson, 1982: 66). The gap that separates the entrepreneur from the others lies not only in her exceptional qualities, but also in the fragility of the opportunity which is menaced by the disclosure of its existence.

The discrepancy between the entrepreneur and her partners is a key element in the conceptual framework built by Shane and Venkataraman (2000). Defining entrepreneurship as the discovery, evaluation and exploitation of opportunities, the authors contend that the very existence of these opportunities implies an uneven distribution of information on the value of resources between those who possess them and those who (may) seek to access them:

"Entrepreneurship requires that people hold different beliefs about the value of resources for two reasons. First, entrepreneurship involves joint production, where several different resources have to be brought together to create the new product or service. For the

entrepreneur to obtain control over these resources in a way that makes the opportunity profitable, his or her conjecture about the accuracy of resource prices must differ from those of resource owners and other potential entrepreneurs (Casson, 1982). If resource owners had the same conjectures as the entrepreneur, they would seek to appropriate the profit from the opportunity by pricing the resources so that the entrepreneur's profit approached zero. Therefore, for entrepreneurship to occur, the resource owners must not share completely the entrepreneur's conjectures. Second, if all people (potential entrepreneurs) possessed the same entrepreneurial conjectures, they would compete to capture the same entrepreneurial profit, dividing it to the point that the incentive to pursue the opportunity was eliminated (...)." (Shane and Venkataraman, 2000: 220)

Shane and Venkataraman (2000: 218) criticize previous work for focusing exclusively on the individual and argue that "it is improbable that entrepreneurship can be explained solely by reference to a characteristic of certain people independent of the situations in which they find themselves". However, they limit the description of these "situations" to the existence and characteristics of the opportunities that they bear. The exclusion of the entrepreneur's partners from the entrepreneurial situation is not a matter of oblivion. Quite the contrary, the little, if any, room given to other actors is a consequence of the model which lays down a discrepancy in the evaluation of resources (such as novel information and complementary assets) as a necessary condition for the emergence of opportunities. Here, the success of the entrepreneur is conditioned upon the containment of the diffusion of information, which is how quickly others could access new information and how well the entrepreneur could prevent them from doing so. The entrepreneur is different from others, by her personal characteristics, and kept apart from others, by the necessity to preserve an informational advantage. She is still alone, albeit located in a "situation" (in which there is an opportunity). Such a view significantly complicates the action of the entrepreneur who faces the paradox of preserving the informational advantage that she holds (so that the opportunity continues to exist) while disclosing enough information to enrol the actors who are likely to provide her with the complementary assets that she needs (in order to exploit the opportunity that she has discovered).

1.4. Distributed and emergent entrepreneurial agency

The "individual/opportunity" model is based upon a sequence in which the discovery of existing opportunities is followed by their exploitation, with the latter involving the access

to complementary resources that may be held by other actors. In this model, the entrepreneur is depicted as an individual endowed with strategic agency that consists in setting goals and finding the means to achieve them, amongst which the establishment of partnerships. Although this conceptual framework prevails in the literature on entrepreneurship, recent studies challenge its underlying assumption of individual strategic agency.

According to Schoonhoven and Romanelli (2001), neither the individual-entrepreneur and her attributes, nor the opportunities that present themselves, suffice to explain entrepreneurship:

“Entrepreneurial activity arises, rather, from the collective activity of entrepreneurs and others, such as venture capitalists, lawyers, and industry professionals, who together actively create and sustain legitimate market space for new products, services, and technologies.” (Schoonhoven and Romanelli, 2001: 384).

Describing entrepreneurship as “the purposive and collective market space-creating activities of entrepreneurs and others”, the authors urge to abandon the “myth of the lonely only entrepreneur” (p.384) that originated with Schumpeter (1968 [1934]) and arose again with Venkataraman (1997). They argue that the main challenge of entrepreneurial collectives is not that much recognizing opportunities as obtaining “buy-in from area experts and from those who influence resource allocation for new product development” (p.389). The difficulty that entrepreneurs face is to convince their partners and to demonstrate the technical and commercial viability of their innovation. As Akrich et al. (2002: 204) put it, the entrepreneur needs to master the “art of interessement” in order to integrate the innovative object that she aims at commercializing into “a network of actors who take it up, support it, diffuse it”. It is such collective action, carried out by entrepreneurs and the partners that they seek to interest and enrol, that Garud and Karnoe (2003) observe in their study of the emergence of wind turbines. They show that technology entrepreneurship implicates agency that is distributed across heterogeneous actors - manufacturers and the owners of complementary resources, but also users and customers (von Hippel, 1986), evaluators (Garud & Rappa, 1994) and regulators - and involves “the creation of new opportunities by a collective” (p.280).

This collective action does not always follow the well-oiled gearing of the strategic sequence of opportunity recognition and resource mobilization. Garud and Karnoe (2003) and Baker and Nelson (2005) put forward the notion of “bricolage” (Lévi-Strauss, 1962) to account for the emergent co-shaping of technologies and allies, of resources and opportunities. Baker and Nelson (2005: 358) refute an objectivist characterization of resources and opportunities, as well as the claim of their distinct existence and sequential intervention, and

contend that “a temporal ordering in which opportunities are pre-existing objective phenomena that may be discovered and evaluated, with those that are favorably evaluated subsequently eliciting attempts at resource mobilization” may be the exception, instead of the rule, in entrepreneurship. Resources and opportunities are not pre-given characteristics of the environment (or of the situation), in which entrepreneurs find themselves; instead, they are constructed by entrepreneurs through their activities of bricolage, in a time sequence which is composed of iterations between opportunity recognition and resource mobilization:

“The bricoleurs in our study did not view opportunities as objective and external to the resources and activities of the firm. Rather, the processes of discovering opportunities and enacting resources were often one and the same, with both the resource environment and the opportunity environment idiosyncratic to the specific firm and constructed through processes of bricolage. Many of the opportunities exploited by the firms we studied existed for the firms involved only because of the unique resource environments they had enacted.” (Baker and Nelson, 2005: 358-9).

The stream of research that I have presented in this section departs from the “individual/opportunity” model in conceiving of the entrepreneurial process as “emergent and collective” (Shah & Tripsas, 2007). Emergent, for opportunities and resources are co-shaped in an iterative process. Collective, for entrepreneurial agency is distributed across a set of heterogeneous actors - instead of deepening the gap that separates her from the others, the entrepreneur seeks to interest and enrol partners. While the collective nature of entrepreneurship seems to be widely recognized in the literature today (who would still advocate the “myth of the lonely only entrepreneur” today?), agency is still generally concentrated in the hands of the entrepreneur, with partners being confined to the role of resource providers. As for the emergence of opportunities, there is a growing controversy in the literature between “discovery” and “creation” theory (Alvarez & Barney, 2007). This paper aims at contributing to the stream of research that examines the distributed and emergent nature of entrepreneurship through the case study of Kelkoo, a French academic spin-off.

2. Kelkoo, or on the art of mediators and adapters

Kelkoo is an IT company that operates a shopbot⁶ : a search engine that compares prices on the internet. Kelkoo was founded in October 1999 by three researchers from the

⁶ Shopbot is the abbreviation of “shopping robot”.

French information systems company Bull (Mauricio Lopez, Rémy Amouroux and Christophe Odin) and a manager from IBM (Pierre Chappaz). If Kelkoo is said to be an academic spin-off, it is because the technology on which the start-up built its offer had been developed by INRIA (the French National institute for research in computer science and control) and transferred to Bull in the frame of their research joint-venture named Dyade. The leader of the spin-off project, Mauricio Lopez, describes his entrepreneurial path “*from research to commercialization*” as a sequence of “*three successive business plans: professional services, internet services (small ads), internet shopping guide*”⁷. The objective of this case study is to account for the path that led to the founding of Kelkoo, bearing in mind the theoretical issues outlined in the first part of this paper. What are the opportunities that Kelkoo’s founders recognize and pursue, if any? What resources are consequently mobilized, if this is the case? Which actors intervene in the entrepreneurial process and is their role limited to the provision of resources?

My presentation follows the path of the entrepreneurs and is organized around the three business plans that Kelkoo’s founders devised and tried to implement: Kalidata, or professional services; Mediation, or internet small ads services; Liberty Market, or the internet shopping guide⁸. Section 2.1 introduces Kalidata. This business plan was proposed to Bull during the transfer of the technology from INRIA, with the idea that Bull would use the technology to offer professional services for large companies. Section 2.2 describes the second business plan that the entrepreneurs prepared following Bull’s withdrawal from the project and exposed to investors in the spring and summer of 1999. The Mediation business plan included three domains of activities, with an emphasis on the provision of internet services, such as the comparison of small ads, to online service providers. Section 2.3 presents Liberty Market. This business plan, which succeeded in moving beyond paper for it enabled the enrolment of investors, depicted a company that would operate an internet shopping guide. I will describe each business plan by its sociogram and its technogram, which is the social actors that it aggregates and the technical artefacts that hold them together (Latour, 1987), and examine in particular how the entrepreneurs moved from one business plan to the next.

⁷ The quotations used in this paper (in italics and inverted commas) are extracted from my interviews with the founders and investors of Kelkoo, as well as from the internal and public documents that I have collected. I translated these quotations from French to English.

⁸ The name envisaged for the start-up changed with its business plans. Kalidata and Mediation never existed beyond paper. Liberty Market was founded in 1999 but changed its name to Kelkoo soon after.

2.1. Business plan 1: Kalidata, or professional services

2.1.1. DISCO, Mediation and Bull

Between 1996 and 1999, Mauricio Lopez managed one of Dyade's projects, called Mediation, which aimed at further developing and transferring to Bull a technology for the electronic mediation of information, named DISCO (Distributed Information Search Component). The objectives of the project were described in the 1996 annual report of Dyade in the following terms:

“Practically speaking, the objective is to bring easy and efficient information access solutions to corporations, administrations, and other organizations. Data are distributed within and outside the corporation. They have different logical and physical structures, depending on their application environment and on the system used to manage them: Word documents, Cobol files, Oracle datasets (...). Therefore, accessing them requires interacting with different systems, according to different protocols and interfaces (...).

Technically speaking, the objective is to provide software components for building services which allow accessing data that are heterogeneous, stored in heterogeneous systems distributed on Internet and Intranet networks.”

The architecture of the mediation technology was based upon two main components: the adaptors and the mediator. The adaptors drew information from various sources of data and presented it to the mediator, which processed it in order to produce a unified view thereof. Each adaptor was specific to a source of data.

Transferring DISCO from INRIA to Bull entailed developing a second version of the technology (DISCO V2) and “[*outlining*] possible products and application scenarios in several domains”. On the one hand, the “robustness” of DISCO was improved. DISCO V2 needed to be “better mastered by the Bull team and endowed with qualities that [*enabled*] its transfer for industrialisation”. A large part of the mediator was re-written in order to transform a patchwork of “small pieces”, written for different purposes and by different people, and then “pasted together as the development [*unfolded*]”, into software that had a clear structure and was easier to update. On the other hand, commercial applications for DISCO were proposed to Bull. Mauricio Lopez and his colleagues devised three types of applications: professional, documentary and internet services. The one that they “sold” to Bull was professional services. Mauricio Lopez's idea was to create a new business unit within Bull which would offer software and services to Bull's traditional customers: large

corporations, such as banks or insurance companies, which had several subsidiaries, with each subsidiary having its own information system and databases. In his view, DISCO would provide these corporations with a unified view of their scattered activities and hence the ability to monitor them. In order to realize their ideas, Mauricio Lopez and his colleagues needed to convince, to “*defend, in front of Bull, the validity of the concept and the huge potential that it [represented]*”.

2.1.2. From experimentations to applications

The demonstration of DISCO’s “*validity*” and “*potential*” was made by writing documents and experimenting prototypes. The researchers produced a number of documents which varied in their degree of circulation. Some, such as memos and annual reports, were addressed to the “*sponsors*” of Dyade. Others, such as messages posted on the internet and scientific articles presented at conferences, targeted a larger circulation. One common ingredient in these documents was the reference to demonstrations of prototypes (or models) of the software and of the services that it allowed building. The annual reports of Dyade describe five such “*experimentations*”. First, the experimentation of a tourist information service was carried out in the frame of a European research project. Conducted in collaboration with the Austrian company Tyrol Information Services (TIS), it aimed at replacing a manually fed database by an application that allowed an automatic import of data related to weather forecast, exchange rates, accommodation etc. which came from different sources and were stored on different supports (e.g. web servers and hotel reservation systems). The second experimentation was realized as part of the same European research project, but with other partners: the Spanish software company Ibermatica and the Basque Health Service (BSH). It allowed integrating the data relating to a given patient, which were distributed across the different departments of a hospital and located in different databases (Oracle and AS400), in order to build her health record. Third, a demonstrator that provided a unique access point to the documentary catalogues managed by the university centre of the region of Grenoble (France) was developed and made available on the internet. Forth, a pilot online book shopping guide enabled consulting data coming from several online book stores. Fifth, a meta-search engine that integrated the results of several search engines.

The implementation of these experimentations required the gradual transformation of the technology. DISCO improved its robustness and was endowed with new adaptors that enabled it to communicate with diverse data sources (relational databases, Lotus Notes,

structured files, Http servers, web search engines). The need to build new adaptors each time that a new data source was to be integrated in the environment of DISCO led the researchers to construct an adapter development kit (ADK) which allowed them to “*generate the adaptors partly automatically*”. The extension of the network of DISCO’s users required reorganizing its code and producing an extensive documentation in order to “*facilitate its understanding and its command*”.

While DISCO was experimented and transformed, its “*applications*” evolved. These applications were not the fruit of the researchers’ creative imagination: they were “*brought by the firms and other actors which [participated in the project]*” and constructed in and by the experimentations to which the technology was submitted. In the documents produced by the researchers, these experimentations were translated into “*applications*” of the technology. For example, in the business plan that he presented to Bull, Mauricio Lopez identified and illustrated three domains of application for DISCO: professional, internet and documentary services. Each of these application domains corresponded to one of the experimentations conducted as part of the Mediation project: professional services and the pilot health information system; internet services and the pilot book shopping guide; documentary services and the demonstrator providing access to the catalogues of the university centre of Grenoble. In other words, the commercial applications devised were the extension of the experimentations conducted in collaboration with organizations (Tyrol Information Services, Ibermatica, the Basque Health Service) that played the part of users and technology partners.

Through the partnerships that the research team established in order to experiment DISCO, it “[created], in the same move, new products and the demand associated to them” (Callon, 1989): 14), the technology and its applications. The experimentations aimed at demonstrating DISCO’s technical feasibility as well as the “*interessement*” of potential partners. By building the association of DISCO to other actors beyond the scope of Dyade, the experimentations also attempted to reinforce the link between DISCO and Bull – a fragile link which was constantly under the threat of strategic and economic hazards and which the researchers hence needed to sustain continually.

2.1.3. The Mediation entrepreneurs seen through the lens of the “individual/opportunity” model

Not yet aware that they would soon be founding a new venture, Mauricio Lopez and his colleagues were already seeking partners. No need to search for the precise moment when

the researchers became entrepreneurs, for enterprising they already were; I will then leave this question aside. What is the opportunity that they recognized? It may be the possibility to continue developing DISCO by aligning its performance with the interests and funding of Bull. What were the resources available? DISCO. Or may be the reverse: DISCO and its applications were an opportunity that the researchers tried to pursue by accessing the resources (namely financial) held by Bull. Like the distinction between researcher and entrepreneur, the one between opportunity and resource does not seem to be instrumental; I will then put it aside too. What were the attributes of the entrepreneurs? It is difficult to assess their vigilance, risk aversion or need for achievement and, more importantly, such an assessment is not necessary to account for their action; one more question to be left unaddressed.

Finally, what was the unique information that the entrepreneurs possessed? It was materialized in DISCO and its prototypes; it was embedded in the skills and tacit knowledge that the participants in the Mediation project had developed; it was codified in the numerous documents that they had produced in order to present DISCO. Instead of being unique and jealously preserved, it was multiple and distributed. The researchers did not try to keep their discoveries for themselves and to prevent others – resource owners or potential competitors – from accessing them. Quite the reverse, the main part of their job consisted in sharing this information with other actors, such as Bull, the Basque Health Service and its hospitals, or TIS and its Tyrol tourist information service. The researchers aimed at demonstrating the performance and viability of DISCO in order to obtain, and to sustain, the rallying of the actors without whom DISCO could not become a “*living technology*” and would run the risk to remain on the shelves of the research laboratory.

2.2. Business plan 2: Mediation, or internet small ads services

2.2.1 DISCO and Voilà.fr

While DISCO’s different applications were experimented, its association to Bull was put to the test too. Bull assessed the technology and its applications and returned its verdict in March 1999. The answer was negative. In spite of their efforts, the researchers did not succeed in maintaining the commitment of their sponsors. The explanations put forward by the protagonists some years after tend to converge on the financial problems which Bull faced at that moment and which impeded the heavy investments required to industrialise the

technology and to transform the prototype into a product. Whatever the reasons, the Mediation team had to “*externalize itself*” by October 1999. In order to do so, the researchers had to find new (pilot) customers and funding.

As part of their commercialization efforts, they contacted Voilà.fr, the portal of France Telecom. At that moment, Voilà.fr was implementing a service for consulting and comparing small ads on the internet, for which it intended to use the search engine of MySimon, an American company. The mediation technology appealed to Voilà.fr and Mauricio Lopez and his colleagues⁹ developed a pilot application that allowed comparing the small ads for car sales, housing and job offers that were published on the internet. The pilot application was evaluated by France Telecom and benchmarked against MySimon’s engine. The evaluation acknowledged the “*impressive and quite unlimited*” possibilities offered by the adaptors, but underscored the inexistence of a user interface and of a series of administration tools without which “*the everyday management of the web site [was] likely to be problematic*”. France Telecom’s experts concluded that “*the [Mediation product possessed] great capacities (the integration of a merchant should never be a problem) [but that it also had] important limits as regards reporting and administration tools*”.

The evaluation resulted in Voilà.fr investing in the Mediation software by purchasing a licensing and hiring three engineers to work on the project together with Mauricio Lopez, Rémy Amouroux and Christophe Odin. Passing from Dyade to Voilà.fr, the mediation technology underwent transformation. First, DISCO was provided with the new adaptors which rendered it capable of accessing the small ads that were to be compared. This was not that much of a problem, thanks to the adaptor development kit. What was more of a problem was the transformation of a pilot application into a commercial one: the team had to develop a service, not only the technology that underlay it. DISCO had to communicate with users and provide them with a reliable service; for this purpose, a user interface and administration tools were constructed. Moreover, the application was deployed on the servers of Voilà.fr and customized to the portal’s “*visual constraints*”. Finally, the “*search chain*” of the available pilot online book shopping guide (which had been developed as part of the five experimentations described in section 2.1.2) did not suit well the small ads application since there were less data to cover and less possible combinations of requests. Instead of crawling all the relevant web sites and reading all the corresponding information in real time, as it did

⁹ The externalisation prospect did not appeal to all of the members of the Mediation research team. From now on by Mauricio Lopez’s colleagues I mean two members of the Mediation team: Rémy Amouroux and Christophe Odin.

in the book shopping guide application, here DISCO could be made to remember past requests and store previously retrieved information.

Following the interest of Voilà.fr in DISCO, the entrepreneurs faced a new challenge: ensuring the autonomy of the future start-up. The danger was twofold. The licensing agreement with France Telecom revived Bull's interest in the project. France Telecom was a customer of Bull's telecommunications business unit which noticed, and appreciated, the revenue that could be generated by licensing the mediation technology. In Mauricio Lopez's words, the telecommunications business unit tried to "*phagocyte*" the researchers whose initial project was to "*create a separate commercial service, to commercialize the technology in all the possible domains, and not only in the field of telecommunications*". Another actor that may have been willing to absorb the future start-up was France Telecom itself. According to the entrepreneurs, "*[the company did] all it [could] to make [them] totally dependent (...), for example by demanding an exclusive licence*". Thus, even before its founding, the start-up run the risk to lose its autonomy and hence its organizational existence. The entrepreneurs had to maintain a subtle balance in their interestment efforts: interest enough to make allies, but not too much, to avoid absorption.

2.2.2. *The Mediation business plan*

In order to loosen their too strong ties to Bull and France Telecom, Mauricio Lopez, Rémy Amouroux and Christophe Odin tried to achieve their "*financial independence*" and intensified their search for funding. They went round investment forums and presented their project to venture capitalists (VCs). The proposition that they made to investors can be read in their second business plan (Mediation). The future start-up – then called Mediation – would address a series of "*market needs*" which were illustrated by the examples of a bank, a hospital, a university complex, and an internet information service provider. The partners for which the researchers developed pilot applications were thus translated into typical customers whose needs epitomized those of the market. The market targeted by Mediation was composed of three "*application domains*" which were presented by order of priority: "*information services on the internet*", "*documentary services*" and "*professional services*". Actually, the application domains were the same as in the previous business plan, but their priorities had changed: "*the business plan [was] centred on internet services, but also including, in a smaller proportion, business opportunities from the category of documentary services*" while "*professional services [were] considered as a complement for the moment*".

According to the business plan, Internet services would be delivered by products such as an “*online shopping assistant (for books, CDs, used cars)*” and an “*information search assistant*” (namely for job offers). Three configurations were envisaged: the start-up would provide its customers with a mediation technology that they would use themselves; it would configure and deploy this technology for the development of a specific application; or it would use the technology in-house and develop and commercialize products based on it. Targeted customers included online service providers (e.g. France Telecom), but also “*all public and private organizations as well as the general public*”. The envisaged business model combined selling software and its associated services (support, maintenance, training) with selling “*packaged*” applications, such as an internet shopping guide. The entrepreneurs devoted a few lines in their business plan to the possibility to exploit the internet applications directly on a website and generate revenue through commissions on sales and through advertising. Yet, this possibility remained quite marginal, judging by its estimated turnover: between 7.000 and 45.000 euros per year, out of the total of 0.5, 2 and then 3.4 million of euros that the start-up was supposed to generate in its first, second and third year.

The business plan Mediation (small ads internet services) differed from the business plan Kalidata (professional services) in its emphasis on the domain of internet services. How can the promotion of internet services to the “*centre*” of the business plan be explained? According to the business plan Mediation, the reasons were to be found in “*the current state of the Mediation products, the current state of the market and the current state of [the entrepreneurs’] understanding thereof*”. It was a simple calculation. “*The level of functionality, robustness and performance required for these products can be achieved by the means of an R&D investment*” corresponding to six person/months for internet services. Six more person/months had to be added for documentary services, and another twelve for professional services. By triggering and funding the development of an internet application, Voilà.fr had changed the order of priorities. As one of Kelkoo’s venture capitalists explains, between the Kalidata and Mediation business plans “*there was a focusing which [consisted] in Voilà (...) pushing [the entrepreneurs] in the direction in which they had already pushed themselves*”.

2.3. Business plan 3: Liberty Market, or the internet shopping guide

2.3.1. The three conditions of the venture capitalists (VCs)

Among the VCs to whom Mauricio Lopez presented his business plan, there was Dominique Vidal, a partner at Banexi Ventures¹⁰ who had just returned from a trip in the USA. As Mauricio Lopez explains, “*Dominique had seen what was going on in the field of e-commerce [in the USA] and had become very interested in it. When we met, this is what he was interested in, and for us e-commerce was one of the applications, which was similar to the small ads service that we had implemented for France Telecom.*” Following Dominique Vidal’s interest, the entrepreneurs presented their project to Banexi Ventures. The VCs conditioned their potential investment in the future start-up to three requirements that Michel Dahan, General Partner at Banexi Ventures, summarizes as follows: “*reverse the business model*”, find a “*real manager*” as CEO, and reduce the dependency of the future company on Bull and France Telecom.

First, the VCs “*[did] not [want] a technology that [did] everything, [but] a technology that [was] dedicated to an application, to a service*”. Reversing the model meant repositioning the company from B2B to B2C¹¹ : “*instead of selling an engine to internet companies, [the start-up would offer] a service to customers*”. From the wide range of applications devised by the entrepreneurs and described in their business plan, the VCs only retained the few lines concerning the price comparison service on the internet (or the shopbot). Second, Dominique Vidal persuaded Pierre Chappaz, IBM’s marketing manager for Europe who happened to be seeking an entrepreneurial experience at that time, to join the future start-up. Mauricio Lopez left his role as a leader of the project to Pierre Chappaz. Third, the VCs required that the domination of France Telecom and Bull over the future start-up be reduced. In other words, DISCO had to be detached from its first major partners. In a B2C model, an exclusive contract with France Telecom “*[became] a problem*”: the link with Voilà.fr that Mauricio Lopez had nurtured had to be recomposed in order to build new links with the multiple users that DISCO was to have if it became the shopbot envisaged by the VCs. This reconfiguration would be facilitated by the implication of another venture capital firm, Innovacom, which was affiliated to France Telecom. As for the link between DISCO and its

¹⁰ Banexi Ventures is a major French venture capital firm.

¹¹ B2B stands for Business-to-business, and B2S for Business-to-consumer.

parents, Bull and INRIA, the entrepreneurs would have to negotiate the transfer of the “*Mediation software*” to the future start-up.

Thus, in order to enrol the VCs, DISCO had to be deprived of three of its constitutive links: its links with its applications in professional and documentary services; with France Telecom, Bull and INRIA; and with Mauricio Lopez. The latter two were not definitely cut, but lost their strength and change their nature: France Telecom no longer was DISCO’s one and only customer, Bull and INRIA no longer owned the Mediation software, and Mauricio Lopez no longer led the commercialization of the mediation technology. The three researchers, joined by Pierre Chappaz, the new leader of the project, accepted the VCs’ conditions. However, nothing was sure yet. Before moving any further, the new founding team had to write a new business plan and to present it to Banexi Ventures and Innovacom. If the VCs transformed their interest in the project into the decision to invest, the entrepreneurs would then have to set up the new company and build its offer which, for the moment, did not exist even on paper.

2.3.2. The Liberty Market business plan and the VCs’ verdict

The first step of the entrepreneurs was to write a new business plan, which they called Liberty Market. Its executive summary presented the new venture in the following terms:

“Libertymarket.com, an e-commerce portal, provides consumers with the services of the largest online hypermarket. Libertymarket.com federates the main European and American shopping web sites and enables consumers to identify, before buying, the best offers available on all the online stores in Europe and in the world, thanks to its intelligent agents. The intelligent agents of Libertymarket.com search hundreds of European and American web sites, 24 hours a day and 7 days a week, in order to find the products and services desired by consumers and to display the prices offered by referenced online merchants.”

According to the Liberty Market business plan, revenue would be generated through two channels: services (provided to advertisers and to the online merchants referenced by Liberty Market) and licences (the licence to France Telecom). With an expected annual turnover of 1, 6 and then 33.5 million of euros, the company would become profitable at the end of its third year. The technical realization of the first service (shopping guide for France, with 400 referenced websites) was scheduled for February 2000. The compensation of the “*transaction proposed*” by the business plan was an investment of 3 million euros.

The VCs returned their verdict following the entrepreneurs' presentation of the Liberty Market business plan. This time the answer was positive: they accepted the transaction proposed. Then started the second phase of the investment during which the terms of investment were negotiated and the transfer of technologies (the software transfer contract between Liberty Market, Bull and INRIA) and of people (Pierre Chappaz quit IBM and Mauricio Lopez, Rémy Amouroux and Christophe Odin quit Bull) was finalized. In November 1999, Banexi Ventures and Innovacom made a first investment of 2.2 million euros, in exchange of one third of the start-up's capital¹².

2.3.3. Kelkoo's first steps

Thus, Liberty Market extended the scope of its existence beyond business plans and Powerpoint presentations to become an organization, endowed with a legal status, investors, a management team and a new name: Kelkoo. Yet, this was not enough to seal the association between the mediation technology and its new adopters: internet users on the look-out for the best price and online merchants searching for buyers. The (would-be) users and customers of Kelkoo still had to be enrolled. In order to do so, Kelkoo drew without hesitation upon the funds brought by the VCs¹³ by implementing an aggressive advertising campaign and commercial strategy. In addition, changing the sociogram of the mediation technology entailed recomposing its technogram again.

First, the Mediation software was transformed into a website. Moreover, a B2C service raised the challenge of “[*managing*] large numbers”, or the problem of scaling up. The development of the hundreds of new adaptors necessary to access the shopping websites was by then partly automated thanks to the adaptor development kit. As one of the VCs puts it, “*the real difficulty [lied] in maintaining performance with millions of users*”¹⁴. The Kelkoo team had to carry out a number of technological developments in order to transform the Mediation software into the web site www.kelkoo.com. The perfect functioning of the critical nodes of Kelkoo's “*transformation chain*” had to be guaranteed. Some problems arose on one extreme of the chain, where information was retrieved from the sources in which it was located. For example, at that time a lot of internet sites were not designed to be crawled and Kelkoo had to build tools to identify data and make sure that there was no duplication of

¹² As a result, Liberty Market was worth 6.6 million euros.

¹³ The initial investment was followed, a few months later, by a second financing round of 30 million euros.

¹⁴ The business plan Liberty Market forecast 1 million users at the end of 1999 and 10 million users in 2002.

products and that prices were kept updated. Other problems arose on the other extreme of the chain, where the results were displayed to the user. In order to ensure relevance of results and ease of use, Kelkoo developed for instance a new search engine, a technology allowing classification on the basis of data that was not provided by the merchant (e.g. the colour or style of a pair of trousers), and popularity algorithms that ordered the products returned by a query according to their pertinence for the user. Finally, the management of the “*transformation chain*” as a whole required implementing an architecture and a number of tools. In the new architecture information was distributed among several machines (with some servers specialized in searching for information and others in displaying it) so that the storing and processing of data did not encroach on the user’s comfort. As for the tools, their role was to provide Kelkoo and its customers with a complete visibility on the traffic and with the possibility to monitor its evolution continually, so that anomalies could be noticed and addressed as quickly as possible.

I will not further discuss the subsequent transformations of Kelkoo’s techno-economic network¹⁵. Let me just note that the company experienced big success and small failures. Kelkoo generated a turnover of 3, 8 and then 15 million euros during its first three years and became profitable four years after its founding. In 2004 the company, which then employed 250 people in Europe and attracted 23 million of unique users per month, was sold to Yahoo! for 475 million euros cash. The web site www.kelkoo.com still exists today, but Kelkoo is a Yahoo! company - or rather was, until 2008 when Yahoo! sold Kelkoo to an investment fund for a price that is said to be around 100 million euros (almost five times less that the price paid to acquire it).

3. On the role of partners in entrepreneurship

Mauricio Lopez explains the sequence of the new venture’s three successive business plans – professional services, internet services (small ads), internet shopping guide – in the following way:

“Professional services, why, because we were part of Bull, [and these were] the fields in which Bull was strong, as a company commercializing software solutions [to] banks, insurance companies, industrial firms. Hence, professional services. This is for the first one. The second one, why, because we came across France Telecom which was interested in our small ads application and

¹⁵ Julien Codorniou and Cyrille de Lasteyrie provide a detailed and captivating account of Kelkoo’s story in their book entitled “Ils ont réussi leur start-up ! La success story de Kelkoo” (published in 2005 by Village Mondial).

we became aware that there was an immediate (...) industrial and commercial application (...). So we went for it. And we finished with an e-commerce application simply because the investor said: 'This is what I am interested in'."

Bull, France Telecom, Banexi Ventures. How can the "individual/opportunity" model account for the role of these partners in the early development of Kelkoo? This model and the literature building on it tend to concentrate agency in the hands of the individual entrepreneur by reducing the role of the other actors who intervene in the entrepreneurial process, when they are considered, to the provision of resources. The story of Kelkoo shows, on the contrary, that the entrepreneur's partners do not always content themselves with such a supporting role. The accounts of this story emphasize the contribution of Banexi Ventures in the successful commercialization of the mediation technology developed as part of the Dyade joint-venture. They also insist on the part played by the agreement with Voilà.fr which allowed the entrepreneurs to survive for a few months and to continue their path in what turned out to be the right direction. In the third part of this paper, I will examine the role of VCs and early customers and users in the entrepreneurial process, by showing how the case study presented above may contribute to the literature on this issue. The analysis will lead me to suggest moving from a view of opportunities as discovered or constructed by the entrepreneur to the examination of their enactment in partnerships.

3.1. The role of VCs in the emergence of new ventures

That VCs do not bring only financial resources to the start-ups in which they invest and have a "non financial value added" (Large & Muegge, 2008) has been documented in the literature. For example, (Baum & Silverman, 2004) show that VCs do not only "pick winners" but also "build" them; they are not only good at "scouting", but also at "coaching". VCs play a strategic role (by providing financial and business advice), an interpersonal role (as mentors and confidants) and a networking role (through their contacts to other firms and professionals) (Sapienza, Manigart, & Vermeir, 1996). They help raise additional funds and recruit managers (Gorman & Sahlman, 1989) and serve as a sounding board to the entrepreneur (Macmillan, Kulow, & Khoylian, 1989).

In the case of Kelkoo, the contribution of Dominique Vidal and Michel Dahan from Banexi Ventures is certainly not limited to the provision of financial resources. The VCs intervene in the constitution of the human resources (by finding a new leader for the project Pierre Chappaz), technological resources (by conditioning their investment to the conversion

of the Mediation software into a B2C web site) and social resources (by transforming the new venture's relationship with France Telecom) of the start-up. As Michel Dahan puts it,

“Frankly, [funding] is really the least interesting thing that we bring. It is necessary, but not sufficient at all. Of course, if we do not bring any money, I think that, well... But there are a lot of ventures which we are helping right now and in which we are not investors. (...) A lot of companies come to us saying: ‘I have a plan, take a look, it is marvellous.’ We answer: ‘Well, we do not agree with your plan, you should do this differently; come back in a year or two when you will have done this, this and this.’ Sometimes they do not do [what we told them to do], and they are right, because it was stupid. And sometimes they do 80% of what we suggested, saying: ‘Yes, it is a good idea, but this being said, we did it another way for such reasons.’ And in this period, we continue to follow them, and we provide them with people and expertise, we open doors for them, etc.”

I do not claim here the possibility to generalize these findings. Indeed, the degrees of VCs' involvement vary significantly, from a close tracker to a moderate or even laissez-faire approach (Macmillan et al., 1989). Neither do I aim at completing the list of VCs' roles established in the literature. What I would like to point out is the fact that, while most studies have focused attention on the post-deal activities of VCs, their intervention can begin well before the moment in which they invest in a start-up. Banexi Ventures plays a part in the emergence of Kelkoo, by conditioning its investment to three requirements that significantly recompose the human, technological and social resources of the new venture at start-up. The alternative between scouting and coaching only holds when the fact that the identities of entities are reconfigured through their association is overlooked. The case of Kelkoo reveals the involvement of the entrepreneurs' partners, such as VCs, in what the “individual/opportunity” model considers as the most intimate and essential activity of the entrepreneur: opportunity recognition.

3.2. The role of early customers and users

Examining the role of customers in the early evolution of new firms, (Fischer & Reuber, 2001) distinguish four types of resources that customers may bring: financial resources (revenue and investment), informational resources (relating to other customers, communication and distribution tactics, business development and strategy, and the development or refinement of new products and services), communication-related resources (reputation building and introductions to other resource providers) and social-emotional resources (encouragement and praise). Two specific effects of firms' collaborations with their

partners, and customers and users in particular, have received broad attention in the literature on innovation and entrepreneurship. First, the role of users in new product development has been documented in a large number of studies building on Von Hippel's seminal work (von Hippel, 1976). Second, it has been shown that start-ups may benefit from "status transfer" through their relationships with prominent partners (Stuart et al., 1999) and use their current customers to signal reputation to their prospective ones (Reuber & Fischer, 2005) in a leveraging strategy (Venkataraman, Van De Ven, Buckeye, & Hudson, 1990).

In the case of Kelkoo, an early adopter like France Telecom generates, indeed, such reputation benefits. More precisely, the use of the Mediation software by Voilà.fr brings technological and commercial evidence in support of the entrepreneurs. As Kelkoo's VCs explain, "*the best way to check whether the technology works is to have a first customer who has already made all the expertise*". Nevertheless, the "*technological validation*" provided by Voilà.fr is not definite, for the conditions in which the technology is tested are far less demanding than the ones in which it will be operated by Kelkoo. A customer like France Telecom "*does not validate the prices, nor the business model*" but the interest that it shows and the investment that it makes may "*transform [the VCs'] knowledge of a [spin-off project] into a real issue on which [they] start working*".

The part played by early customers and adopters is limited neither to one actor, such as Voilà.fr, nor to a single effect, such as reputation enhancement. What do partners as diverse as France Telecom, the Basque Health Service, Tyrol Information Services, Bull, INRIA, Banexi Ventures and Innovacom have in common? What ties and unties them is the technology whose first and experimental owners, users and customers they are. In the Dyade joint-venture, Bull foresees in DISCO the means to "*[reinforce] its technological portfolio and [to open] new market opportunities*", while INRIA tries to "*transfer its results and identify new research axes*". Through the experimentations carried out in the frame of a European research project, the Tyrol tourism information service foresees in DISCO the means to transform a manually fed database into an interface that automatically integrates the data coming from different sources which tourists may want to consult in order to organise their stay in Austria. The Basque Health Service foresees in DISCO the means to constitute a unified record for the patients who go through different departments of a hospital and generate data which are locally available but have difficulty crossing informational walls. Initiating the development of a pilot internet application, France Telecom foresees in DISCO the means to enable its users to visualise in just one click the small ads that they would like to consult and compare.

As for Banexi Ventures and Innovacom, they foresee in DISCO the means to make money and provide their investors with the returns that they expect.

One main difference between these partners is that they do not share the same DISCO. Certainly, for all of them the technology offers “*a unique access point to numerous sources of heterogeneous and distributed data*”. However, the data in question and the users/customers for which these data are valuable differ from one partner to the other. Data differ by their content (e.g. the weather forecast, the results of a medical test, a job advertisement, the price and characteristics of a product), by their form (e.g. a web server, an Oracle database), and by their organizational location (e.g. the world wide web, a hospital department, an employment agency, an online store); therefore they require the development of specific adaptors. The users/customers for whom these data are valuable differ by the means that they can afford and devote to the purpose of manipulating DISCO. In order to move from INRIA to Bull, from Bull to France Telecom, and from France Telecom to internet users searching for the best price, DISCO becomes DISCOV2, then the software Mediation, and finally the website www.kelkoo.com.

The technology is thus split and multiplied because new uses are implemented thereof. The “*experimentations*” carried out by the researchers are consolidated into “*applications*” in the various documents (e.g. scientific and press articles, annual reports, business plans) that they produce. These applications correspond to the “*market needs*” that the technology is likely to meet - the needs of the tourist information service that has to feed its database manually, of the hospital that has to collect health information piece by piece, of the internet user who has to consult patiently, one by one, and compare, by her own, the products offered by online merchants. These needs, which DISCO aspires to satisfy, are what the literature calls “*opportunities*”. The continuity between experimentations, applications, needs to be met and opportunities, which I underline here, leads me to revisit the prevalent model of entrepreneurship as the recognition of opportunities.

3.3. Partnerships as the locus of opportunity enactment

The “individual/opportunity” model emphasizes the need for the entrepreneur to preserve an informational differential as to the existence of the opportunity, for it vanishes if it is recognized by others. On the contrary, the story of Kelkoo suggests that an opportunity does not last if it is not recognized by others. The entrepreneurs put significant effort into persuading their partners that an opportunity exists; they demonstrate DISCO’s applications

by showing its prototypes and by describing the sources of data with which it communicates and the needs that it meets. The information that the entrepreneurs accumulate “*technically*” and “*practically speaking*” circulates in scientific articles and conference presentations, in annual reports, in demonstrators and models testable on the internet, in press articles and posted messages, and in the business plans addressed to Bull and to external investors.

Like the data that DISCO accesses, the information that underlies the entrepreneurial opportunity is therefore distributed. The information on DISCO’s applications, and hence on the opportunities that it opens and allows pursuing, is distributed not only as a result of the researchers’ dissemination efforts, but above all because it is jointly produced in the encounters between the entrepreneurs and their partners. As noted above, the “*application domains*” of DISCO are constructed in experimentations which involve various partners. Hence these experimental partnerships appear as the locus of opportunity shaping. Neither discovered nor constructed by the entrepreneur alone, opportunities are enacted in encounters with partners.

These partnerships involve heterogeneous actors whose relative status evolves as DISCO tries to interest a growing number of allies. The links with Bull and France Telecom first need to be nurtured and then loosened and recomposed: Bull no longer finances a project in the frame of its joint-venture with INRIA, but invests in a company whose shares it partly owns; France Telecom no longer carries out a development project in which new adaptors are built, but purchases the right to use a technology the scope of which is clearly defined in a licensing contract. Some of these partners become resource providers, and others - users, but this can only be determined at the end of the innovation story. On which side should one place Bull, for instance? The company takes an active part in the development of the technology, namely through the funding that it provides, but it also intends to transfer the technology in order to use it; it is at the end of the entrepreneurial process that its role as a resource provider is stabilized. Instead of an initial condition, the distinction between resource providers and customers is a result here, for uncertainty bears not only on the technical success of DISCO, but also on the modes of its adoption. Since the entrepreneur could not know a priori which actors are her customers and which ones are her partners and resource providers, how could she demonstrate the value of future products or services to the former – an indispensable step, according to the literature on management and innovation – while concealing it to the latter – an essential ingredient of entrepreneurial success, according to the “individual/opportunity” model?

Like the distinction between customers and users on the one hand and partners and resource providers on the other, the distinction between opportunities and resources is not pre-given in technology entrepreneurship. As I noted above, one could hardly determine whether DISCO and Bull's funding are resources or opportunities. If the entrepreneur may not clearly separate the opportunity that she recognizes and pursues from the resources that she possesses and, accordingly, needs to access, how could she share the latter while keeping the former for herself? If the resources/opportunities indetermination is considered, it follows that partners provide not only resources, but also opportunities. These opportunities are not more discovered – as things that exist out there, according to a perspective that leads to objectivist reification – than created – by the dispositions of an entrepreneurial subject, according to a perspective that leads to subjectivist reduction. Instead, they are “enacted” in collective practice (Orlikowski, 2002). If opportunities are enacted in the encounters between entrepreneurs and their partners, it seems relevant to adopt another conceptual framework than the one proposed by the “individual/opportunity” model, in order to account for these opportunity enacting partnerships. It is to this objective that the last part of this paper is devoted.

4. From the individual recognizing opportunities to the exploring entrepreneurial collective

A central assumption underlying the “individual/opportunity” model is that entrepreneurial agency is individual, strategic, and deployed in a time sequence in which opportunity recognition (always individual) is followed by resource mobilization (collective, if necessary). The case study presented here tends to reinforce the criticism that has been addressed to this assumption. The transformation of DISCO into Kelkoo could not be understood if the unit of analysis was confined to the entrepreneur (or to the entrepreneurial team). Partners, such as VCs and early customers and users play a crucial part in the entrepreneurial process. Their role certainly consists in the provision of resources, namely financial and informational ones, but it does not stop here. Given the initial indetermination between resources and opportunities, while bringing resources, partners shape opportunities. These opportunities are enacted in experimentations which involve various actors and result in the concomitant transformation of the innovation's technogram and sociogram, or, in other words, of the technology and of its applications, of the resource and of the opportunities that it both opens and allows pursuing. Technology entrepreneurship involves the simultaneous

construction of the technology and of the network of actors – entrepreneurs, investors, customers – the stabilization of which is required to move from invention to innovation (Schumpeter, 1968 [1934]).

In order to account for the distributed and uncertain nature of entrepreneurship, I put forward the notion of exploration (March, 1991). I follow Shane and Venkataraman (2000) in considering not only the individual entrepreneur, but also the situation in which she finds herself and to which, as the authors put it, she responds. However, I do not limit the description of the situation to the opportunity that it contains, and I do not consider the relationship between the entrepreneur and the situation as one of stimuli and response. More precisely, I view the existence of an opportunity as the result of a situation that involves heterogeneous actors and high uncertainty. In this respect, I build on and integrate the criticism which has been addressed to the “individual/opportunity” model and which emphasizes distributed (as opposed to individual) and emergent (as opposed to strategic) entrepreneurial agency. In the following section I introduce the notion of exploration which I borrow from the literature on organizational learning. Then I discuss four of its characteristics that appear particularly relevant for the study of entrepreneurship: exploration (i) involves a dynamics of framing and overflowing, (2) is punctuated with trials, (3) generates new entities, and (4) simultaneously produces their values.

4.1. Exploration

In his seminal article, March (1991: 72) suggests the notion of exploration to qualify one of the poles of a tension that has been present in various theories of organizational action: the tension between exploration and exploitation, as he puts it. In rational models of choice, the former would correspond to the choice of an individual who, in presence of several alternative investment opportunities, would choose to “[gain] new information about alternatives and thus [improve] future returns (which suggests allocating part of the investment to searching among uncertain alternatives)” rather than to “[use] the information currently available to improve present returns” (p.72). In studies of organization learning, the distinction between exploration and exploitation echoes the one between “refinement of an existing technology and invention of a new one” (p.72). More broadly, March describes exploration by a series of terms – “search, variation, risk taking, experimentation, play, flexibility, discovery, innovation” – that he contrasts to another one – “refinement, choice, production, efficiency, selection, implementation, execution” (p.71). The opposition between

exploration and exploitations reflects the one between “basic research” and “product development”; between “the search for new ideas, markets, or relations” and the “further development of existing ones” (March, 1991: 73); between “the pursuit of knowledge, of things that might come to be known” and “the use and development of things already known” (Levinthal & March, 1993).

March focuses on the balance between exploration and exploitation: a necessary but difficult balance, for exploration is “vulnerable” and can be driven out by exploitation. This vulnerability stems from what Levinthal and March (1993) call “the myopia of learning”, the three forms of which are the tendency to overlook distant times (and hence sacrifice long term to short term), distant places (since learning privileges the effects that are close to the learner), and failures. Exploration is likely to be a victim of these three forms of learning myopia since its results are less certain and more distant - in time and in their organizational location - than the results of exploitation (March, 1991). It is precisely in these distinctive vulnerabilities of exploration that its relevance for entrepreneurship lies: exploration is oriented towards the future, towards what does not (yet) exist and is hence uncertain; it goes beyond organizational boundaries and is therefore distributed. Let me consider the distributed and uncertain nature of exploration in turn.

Levinthal and March (1993: 103) note that since “the fruits of successful exploration, whether new technologies, product ideas, or modes of management, tend to diffuse over populations of organizations”, the results of exploration are “public goods”, in contrast to the private costs and risks incurred to produce them. If one continues the analysis, which the authors stop here, the question of why the results of exploration behave as public goods and could not be contained within the boundaries of a single organization arises. I suggest the following answer: the results of exploration are distributed across organizations because the very activity of exploration is distributed. It requires that the organization moves beyond the “local search” (Cyert & March, 1963) that it tends to perform in its “close neighbourhood” due to the smooth functioning of its routines (Nelson & Winter, 1982) and to the bounded rationality of the individuals who compose it. In the modelling and operationalization of search, this close neighbourhood is generally conceived of as a set of organizational forms that differ up to a certain point (Levinthal, 1997) or as a technological niche in a broader landscape (Stuart & Podolny, 1996). However, it can be viewed as delimited not only by degrees of variation in the attributes or the positioning of a given firm, but also by the intensity of the firm’s collaborations with other actors. In order to move beyond local search, an organization has to span boundaries that can be technological, but also organizational

(Rosenkopf & Nerkar, 2001). The distant search that characterizes exploration implies the collaboration of heterogeneous actors.

The uncertainty of the results of exploration is twofold. On the one hand, the content of these results is uncertain: they can be positive or negative, successes or failures (March, 2006). They cannot be characterized *ex ante*, for exploration does not rely (entirely) on things that already exist, but builds on entities which are produced in the course of activity. On the other hand, the temporal sequence and causal links between the activities of exploration and their outputs cannot be (perfectly) known before the process starts to unfold. The results of exploration are not only more distant in time, but also less tightly coupled to their causes. As March puts it, “the certainty, speed, proximity, and clarity of feedback ties exploitation to its consequences more quickly and more precisely than is the case with exploration” (March, 1991: 73).

Exploration overflows organizational, temporal and causal channels. By venturing into the unknown areas of “distant search”, the explorer enrolls and produces new entities whose identity and degree of reality gradually emerge, on the slope of failure or success. Including new actors in the innovation’s network increases uncertainty since new possibilities open up and new interests are to be aligned. Conversely, the rallying of new actors requires a certain degree of closure, so that the exploratory project can be the object of a shared understanding. Thus, the distributed nature of exploration engenders a tension between coherence and ambiguity, between reducing and maintaining uncertainty – a tension that the entrepreneurial collective manages in a dynamics that, building on the work of Michel Callon, I will term framing and overflowing (Callon, 1998a, b).

4.2. Framing and overflowing

Callon (1998b) defines the notion of framing and emphasizes its role in exchanges between economic (and hence calculative) agents in the following terms:

“if calculations are to be performed and completed, the agents and goods involved in these calculations must be disentangled and framed. In short, a clear and precise boundary must be drawn between the relations that the agents will take into account and which will serve in their calculations and those which will be thrown out of the calculation as such.” (Callon, 1998b: 16)

In Callon’s view, overflowing is the norm, while framing is a costly prerequisite for any economic transaction. Framing allows defining agents and goods that are identifiable and distinct since detached from one another. It is never complete, because any frame is

necessarily subject to overflowing. For example, it is by framing its property rights by means of a patent that a pharmaceutical company simultaneously discloses its results. Callon explains the essential incompleteness of framing by its materiality: framing is not only an intellectual or symbolic operation; it requires equipment whose capacity to frame stems from the multiplicity of its links outside the frame. I will show that the notions of framing and overflowing are instrumental to analyzing the iterations that characterize the exploratory process on which entrepreneurs, like Kelkoo's founders, embark.

At the point of departure, the situation in which Mauricio Lopez, Rémy Amouroux and Christophe Odin find themselves overflows: it is characterized by the multiplicity of possible but uncertain applications for the technology that they aim at commercializing. The experimentations that they have carried out in order to demonstrate DISCO's viability have generated a range of various applications. The entrepreneurs' first business plan attempts to hold all these applications together. As Mauricio Lopez explains, "*this business plan was beautiful, because it was very complete. There were all the alternatives. It was not a definitive business plan; it was a business plan aimed at showing the potential*", so that "*the investors can see all the different possibilities*". Such an overflowing situation is problematic: as they multiply possible applications, the entrepreneurs do not succeed in enrolling investors. The aesthetic qualities evoked by Mauricio Lopez are major flaws in the VCs' eyes: "*this is a plan centred on: 'my technology can do this, so I will address these markets'. A [business] plan is after all about asking customers what their needs are, where it hurts, and see what kind of solutions can be brought to them.*"

The researchers' encounter with France Telecom operates a first framing. The transaction between the two parties is made possible by the disentanglement of DISCO from the multiple links that tie it to other sources of data. A licensing contract materializes the framing. The contract does not regard DISCO, but "*the software Mediation*" which is defined as follows: "*one unit of the software Mediation V1.0*"; "*one hundred units of the software Adaptor http V1.0*" (with each adaptor being "*configured to access selected small ads or shopping internet sites*"); and "*a user interface that is accessible on the internet and that allows consulting small ads*". The adaptors that enable DISCO to communicate with other sources (e.g. Oracle, Excel, Access, structured files and documents, Lotus Notes and AS400), and hence to interest other users, are excluded from the frame.

However, for the framing to hold on, a new set of associations, with other customers and with investors, must be realized. Therefore the entrepreneurs continue their exploration work by circulating their business plan and meeting VCs. Instead of reinforcing the framing in

which DISCO is a small ads search engine sold to online service providers, these encounters result in overflowing. From the business plan presented by the entrepreneurs, Banexi Ventures and Innovacom only retain a tiny part¹⁶: the possibility that DISCO becomes an internet shopping guide which would have direct users and would thereby attract online merchants and advertisers. For the overflowing thus generated to be framed, the new actors revealed must be associated to the entrepreneurial project. As mentioned above, Kelkoo resorts to a range of marketing and technological means, as well as to a heavy investment, in order to enrol its users and customers. Framing also requires DISCO to be detached from its links with professional and documentary applications, with its first sponsors and customers, and with the researcher who orchestrated its transfer.

The dual process of framing and overflowing is not sequential. Like the patent in Michel Callon's example mentioned above, the business plan is a tool that produces both framing and overflowing. We have examined business models as innovation devices in technology entrepreneurship in another study (Doganova & Eyquem-Renault, 2009). Let me note here that the business plan requires framing, in order to be circulated, and generates overflowing, by circulating. Compelling the entrepreneurs to present their project in a few pages, the business plan limits the range of the entities that can be taken into account. At the same time, it requires translating the value of the technology in terms that are easily understandable by non-specialists, such as VCs. It thus prompts the researchers to build on other criteria than the ones that they would have put forward in a scientific publication for example: in order to demonstrate the validity and potential of their technology, the entrepreneurs resort to evoking the multiplicity of its applications. Not framed enough, Mauricio Lopez's first business plans do not succeed in enrolling investors. Yet, by circulating, they allow links to be created around a new entity: the internet user searching for the best price - present but hitherto overlooked - comes to the centre of the business plan. The VCs realize a first step towards framing, by drawing a boundary between the entities that are to be taken into account (e.g. internet users) and the ones that are to be thrown out of the calculation (e.g. banks and adaptors for Oracle databases). The entrepreneurs do the rest: they stabilize the entities that are taken into account. For example, in the business plan Liberty Market, the results of various surveys and reports provide the internet user with weight (e.g. *"[in 2003], the number of internet users in Europe should achieve 170 million"*) and habits (e.g. *"80% of internet users utilize search engines to find the site that they will visit"*).

¹⁶ This part corresponds to 6 lines out of the 46 page business plan Mediation, and to around 1.5% of the expected turnover of the future start-up.

The process of framing and overflowing is costly. With users turning from big companies to people shopping on the internet, the whole network of the innovation has to change. Software is not enough to hold Kelkoo and its users together; the construction of a new user implies modifying the technology, so that the latter could be attached to the former. In order to bring a valuable solution to internet users searching for the best price, Kelkoo has to reconfigure its network, including its technology, from editing software to providing services. The three successive business plans of the new venture correspond to idiosyncratic technograms and sociograms: enrolling France Telecom requires the development of new adaptors and of a user interface; enlisting internet users and online merchants incurs much bigger costs. In compensation for these costs, new entities are produced.

4.3. Trying new identities and values

4.3.1. Trials and the production of new entities

The encounters between the entrepreneurs and the partners that they seek to enrol take the form of trials, such as the demonstrations in which prototypes and business plans are put to the test by users and investors. Trials are experimentations which occur in the course of action and which result in a higher or lower degree of reality of the entities that are engaged in them and resist (Latour, 1988). Trials experiment associations (Callon, 1986). The encounters between Mauricio Lopez, Rémy Amouroux, Christophe Odin, DISCO, the software Mediation, its adaptors, its early users and customers, and the VCs from Banexi Ventures and Innovacom put to the test the association between a mediation technology, the entrepreneurs that aim at commercializing it and the partners whose implication is necessary if innovation is to succeed. The notion of trial emphasizes the results of these encounters: the partnerships that are established or avoided there augment or diminish the degree of reality of the innovation, for “whatever resists trials is real” (Latour, 1988: 158). All the entities that are engaged in the trial are transformed by it: DISCO gains or loses adaptors and allies in the same move.

The notion of trial is instrumental to the analysis of entrepreneurship because it seizes both the uncertainty and distribution of entrepreneurial agency. By definition, trials are collective experiments, for they involve that which is tested and that which tests. Tried and trying entities are uncertain: their definition and their degree of certainty and reality are the result of the trial. This perspective sheds new light on opportunities. “Nothing is known – only realized” (Latour, 1988: 159) by the entrepreneurial collective. Paraphrasing Latour

(1988: 160), by substituting the opportunities and resources that an entrepreneur is supposed to recognize and mobilize for the rules, laws and structures that an actant is said to follow, “we cannot say that an [entrepreneurial collective] follows [opportunities] and [possesses or accesses resources], but neither can we say that it acts without these. By learning from what the other actants do, it gradually elaborates [opportunities and resources]. Then it seeks to make the others play by these [opportunities] that it claims to have learned, observed, or received. If it wins, then it verifies them and has thereby applied them.”

Thus, the trials that punctuate exploration result in the realization of new entities: opportunities and resources, of heterogeneous – technological as well as social – nature. Indeed, exploration is not only a less “local” and more “distant” search, for it is characterized by the impossibility to ascertain *ex ante* the object of search, that which is to be found. It is on this aspect that David Stark insists when he distinguishes between problem solving on the one hand and inquiry, in the sense of Dewey, on the other hand (Stark, 2009). Exploration is not one of these “occasions when we look for solutions within a set of established parameters” (Stark, 2009: 2); instead, it is a situation rife with uncertainty not only as to the possibility to find a solution, but also as to the very definition of this solution and of the problem to which it responds. In order to clarify this point, Stark reproduces the following citation from Dewey:

“[It] is artificial, so far as thinking is concerned, to start with a readymade problem, a problem made out of whole cloth or arising from a vacuum. In reality such a ‘problem’ is simply an assigned *task*. There is not at first a situation *and* a problem, much less just a problem and no situation. There is a troubled, perplexed, trying situation, where the difficulty is, as it were, spread throughout the entire situation, infecting it as a whole. If we knew just what the difficulty was and where it lay, the job of reflection would be much easier than it is. ... In fact, we know what the problem *exactly* is simultaneously with finding a way out and getting it resolved.” (Dewey, 1998 [1933]: 140, emphasis in the original)

This perspective sheds light on the new entities that are produced through exploration. They are not only means to be mobilized for a pre-defined end, but also new ends that come to be pursued. Solutions and problems, opportunities and resources, are both the result of the entrepreneurial process. Moreover, Dewey’s analysis allows revisiting the entrepreneurial “situation” that Shane and Venkataraman (2000) put forward but reduce to the presence of opportunities. Exploration is triggered by a “troubled, perplexed, trying situation”, in Dewey’s terms. This situation is overflowing: for example, the proliferation of the entities to which DISCO associates and from which it dissociates by transforming itself creates ambiguity as to the ones that are to be taken into account. This ambiguity perplexes DISCO, by endowing it

with new adaptors and tools, and troubles the researchers, by multiplying and complicating the tracks that they could follow. The difficulty lies in framing.

4.3.2 Exploration and valuation

The entrepreneurial situation is “troubled, perplexed, trying” due to the proliferation of the entities that may be taken into account. It is not only the identity of these entities that is uncertain - and gradually realized in the trials that punctuate the entrepreneurial process. These entities and their relations are recomposed as partners are enrolled. The interesement of allies is conditioned upon the construction of their interests as aligned with the project of the entrepreneurial collective. The value of this collective, made of technical artefacts and people, has therefore to be demonstrated. According to Stark (2009: 5), “a perplexing situation is produced when there is principled disagreement about what counts”. The indetermination of what counts stems from the overflowing of the identities and values of the entities engaged in the situation and can produce a “resourceful dissonance”. It is in this ambiguity that Stark (2009: 6) locates the spring of entrepreneurship:

“Where the organizational environment is turbulent and there is uncertainty about what might constitute a resource under changed conditions, contending frameworks of value can themselves be a valuable organizational resource. Entrepreneurship then, in this view, exploits uncertainty. Not the property of an individual personality but, instead, the function of an organizational form, entrepreneurship is the ability to keep multiple principles of evaluation in play and to benefit from that productive friction.”

However, such an ambiguity cannot persist indefinitely, for exchange requires framing. In the iterations of the entrepreneurial process, a frame (materialized in a business plan for example) is presented as stabilized to potential partners and then decomposed and further circulated. Framing cannot hold unless the overflowing that it generates and attempts to contain is identified and measured. For instance, the overflowing triggered by the encounter between the entrepreneurs and the VCs from Banexi Ventures and Innovacom reveals a new entity: the internet user searching for the best price. The innovation network recomposed by taking this new entity into account can start tending towards stabilization only if this internet user searching for the best price is defined, delimited, measured and evaluated. This is the goal that the business plan Liberty Market attempts to meet, by resorting for instance to market surveys and reports. How many internet users are there and what value would they grant to a shopping guide service? This question is translated into three others. First, what is

the price that online merchants would be willing to pay in order to attract the crowd of internet users thus counted out and qualified¹⁷? Second, how much is the start-up, which would bring these internet users to the online merchants waiting for them, worth, or, in other words, how much would VCs be willing to pay to get a third of its shares? Third, what is the value of the technology that would enable this twofold encounter of demand and supply, or how much would Kelkoo need to pay for the transfer of the software Mediation?

Let me address these questions by way of conclusion, bearing in mind that they are not theoretical issues but practical problems that the entrepreneurs need to solve each time that their development trajectory requires the enrolment of allies without whom they could not go any further. First, how much is an internet shopping guide worth? This is the question that the entrepreneurs need to answer in the business plan that they present to the VCs. Their answer is the following: 10 million users and 7000 referenced e-commerce sites in 2002. True or false? The perspective that I adopt here shifts the question. The right answer is the one that holds together the emergent innovation network: it is by being evaluated that users and customers could become real. Second, how much is the mediation technology worth? This is the question that the experts of France Telecom, and then Bull and INRIA, need to answer in the contracts signed with Kelkoo. France Telecom answers: 212.500 francs. Bull and INRIA answer: 2.600.000 francs and 6.120 equity warrants. True or false? Again, this is not a fruitful question: it is by being evaluated that the software Mediation could be adopted or transferred. Third, how much is Kelkoo worth? This is the question that the VCs need to answer as they listen to the entrepreneurs' presentation and are getting ready to acquire some shares of the new venture in exchange of a certain amount of cash. Their answer is the following: 2.2 million euros for 33% of the new venture's capital. True or false? Once again, this is not the most interesting question: it is by being evaluated that Kelkoo could become an internet shopping guide.

In entrepreneurship, evaluated entities and evaluation criteria are initially undetermined. Identity and worth are produced through trials of interessement. The entities taken into account cannot enrol allies if they are not valued; the enrolment of allies transforms these entities and adds or removes degrees of reality; the enactment of these entities realizes their value. In closing, I borrow Stark's (2009: 9) formulation to conclude with the idea that entrepreneurship is an exploration that does not consist in finding what the entrepreneur

¹⁷ These internet users are "qualified" in the sense given to this term by Callon, Méadel and Rabeharisoa (2002) – which is to say endowed with intrinsic and extrinsic qualities – and by the e-commerce jargon – which is to say willing to buy.

knows how to identify and value, but in “distributed practices for recognizing opportunities by re-cognizing resources” – or in the enactment of new entities through their valuation.

Summary and conclusion

Through the case study of Kelkoo, I examined the distributed and emergent nature of entrepreneurship. My analysis of the enactment of opportunities and resources in the partnerships that entrepreneurs engage built on two lines of criticism that have been addressed to what I called here the “individual/opportunity” model and that contest its conception of entrepreneurial agency as individual and strategic. I argued, instead, that entrepreneurship can be fruitfully analyzed as a process of collective exploration, which involves a dynamics of framing and overflowing, is punctuated with trials, and results in the production of new entities, identities and values.

My approach was pragmatic in so far as I studied the situations in which entrepreneurs found themselves. The presence of opportunities is neither the sole nor an intrinsic characteristic of these situations. Situations are made of entrepreneurs, the partners that they seek to enrol and the experimental devices (such as prototypes and business plans) that they put in play for this purpose. Opportunities and resources, I suggested, are enacted in these trying situations as a result of their emergent co-shaping. Such a pragmatic approach allowed me to move beyond the controversy on the discovery vs. creation of opportunities. Considering collective action leads to challenging a view of entrepreneurship as involving a strategic sequence of opportunity recognition followed by resource mobilization. Nevertheless, distributing entrepreneurial agency does not imply reducing the entrepreneurial process to the serendipity (Dew, 2009) of encounters. The trials in which opportunities are realized are planned, demanding, and costly. Opportunities in technology entrepreneurship are no more creations than discoveries, for the entities that bring them into existence – technological artefacts and partners – resist, just as well to their pure construction as to their perfect reification.

Acknowledgements

I thank the participants in the Doctoral consortium of the Entrepreneurship Division at the Academy of Management meeting (Anaheim, August 2008) and in the Innovation session of the “Science and Technology in Society” graduate student conference (Washington, April

2008) for helpful comments on earlier versions of this paper. I thank Morgan Meyer and Brice Laurent for their reading and suggestions on this working paper and on the chapter of my dissertation upon which it is based.

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