

INTERACTION APPROACH AND LIABILITIES: A CASE ANALYSIS OF START-UP FIRMS

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Abstract

The paper provides some evidence on the relationship between interaction and liabilities in domestic and foreign markets. The paper has a twofold aim: the first is to explore how different types of liabilities affect firms, with particular regards to start-up firms; the second aim is to investigate to what extent interaction between actors on the market represent a way to overcome such liabilities that firms may suffer. Different theoretical perspectives on this issue are presented. We present liabilities related to age – liability of newness – and size – liability of smallness – introduced into the organizational literature (Freeman et al., 1983), and liabilities of foreignness and outsidership as developed in the literature of internationalization (Zaheer, 1995; Johanson and Vahlne, 2009). Liabilities are analysed both in the domestic and in foreign markets. The topic of interaction is addressed on the basis of the interaction approach developed by scholar of the IMP group (Ford et al., 2008). With regard to methodology, the paper presents case studies of start-up firms, aiming at deeply analysing the theme of the paper. We also present a theoretical background in which the literature on liabilities and the literature on interaction based on the IMP approach are both reviewed with the aim of bringing out common features and outlining future research agenda. The resulting framework is discussed comparing literature and case analysis with the contents emerging from the case analysis. The paper points out the main liabilities that represent a constraint and difficulty for start-up firms both in domestic and foreign markets, and the role of interaction with other actors in overcoming such liabilities.

Keywords: liabilities; interaction; start-up; business network

INTRODUCTION

The paper aims at exploring how different types of liabilities affect firms, with particular regards to start-up firms; a second aim is to investigate to what extent interaction between actors on the market represents a context in which liabilities occur or a process to overcome such liabilities that firms may suffer. More precisely, the relationship between liabilities and interaction processes is studied in a context particularly rich of liabilities which is that of start-up firms.

In order to reach our aims, the paper is structured as follows. In next paragraph we provide a brief literature review on the concept of liabilities, both in domestic and foreign markets, highlighting the relationship between liabilities stemming from the literature and start-up firms. On one hand, we rely on organizational theory to analyse two liabilities related to age and size, that are the liabilities of newness and smallness; on the other hand, we rely on the international business literature, in particular the internationalization process of the firm, to introduce two other relevant liabilities, those of foreignness and outsidership. We rely on the concept of interaction developed by scholars of the Industrial Marketing and Purchasing (IMP) group, that is briefly introduced in paragraph three. The fourth paragraph includes our empirical investigation of the topics proposed in the theoretical background. As a methodological choice, the literature review is contextualised immediately to the reality of start-up firms through a case analysis of three innovative start-up firms. Our research has been designed by collecting data from secondary sources and directly interviewing three innovative Italian start-up firms located in Florence and Prato. The final section of the paper focuses on the results emerging from the three cases, in order to discuss our research questions and understand how different types of liabilities affect start-up firms and the role of interaction, in an IMP perspective, as a context in which liabilities occur or a process to overcome such liabilities. We conclude the paper highlighting the limits of our research and the future research agenda.

LIABILITIES IN DOMESTIC AND FOREIGN MARKETS: A FOCUS ON START-UP FIRMS

Start-up firms may have to face some key challenges due to their age and size, namely liabilities of newness and smallness.

NEWNESS AND SMALLNESS

Start-up firms can simultaneously face survival challenges and benefit from distinct advantages based on their newness. The liability of newness has become an important research agenda in organizational theory and organizational ecology research.

The liability of newness (Stinchcombe, 1965) refers to the fact that young organizations have a higher propensity to die than old organizations because of both their inability to compete effectively with established organizations and their low levels of legitimacy. In particular, the liability of newness was first theorized by Stinchcombe (1965) in a seminal paper: the author directed the attention of organization theorists to the age-dependent decline in organizational death rates and he argued that young organizations have a higher propensity to die than old organizations because of both their inability to compete effectively with established organizations and their low levels of legitimacy.

The liability of newness indeed refers to the need of establishing the legitimacy of young organizations in general and during the years this thesis has come to occupy an important place in organizational ecology research (Carroll, 1983; Freeman, Carroll and Hannan, 1983). The liability of newness raises the issue of legitimacy which directly affects the solution to all the operational challenges. Compared to incumbents, new entrants have to work hard to prove themselves in order to establish relationships with various stakeholders. The legitimizing process can be both expensive and time-consuming, substantially increasing the challenges faced by new firms both in the domestic and foreign markets.

The study of the liability of newness is often related to organizational mortality and business failures (Bruderl and Schussler, 1990; Kale and Ardit, 1998; Nagy et al., 2012). Research has investigated potential environmental, individual and firm-level factors contributing to start-up firms failure. At the environmental level, political and industry trends occurring at new venture founding may impact its long-term survival (Carroll and Delacroix, 1982; Le Mens et al. 2011). At the individual level, an entrepreneur's previous industry experience may also impact a new venture's survival odds (Preisendorfer and Voss, 1990; Thornhill and Amit, 2003). At the firm level, Stinchcombe (1965) introduced the term liability of newness to describe the intangible characteristics associated with organizational newness and discussed several reasons for their existence. On one hand, liability of newness is related to processes that are internal to the organization, such as learning and developing trust and cooperation among organizational members. Internally, a start-up firm may lack operational routines, resulting in significant competitive disadvantages relative to more established competitors (Stinchcombe 1965). Organizational members often must learn unfamiliar roles, which requires significant time and other resources and, in turn, may lead to internal inefficiencies and missed opportunities; moreover, trust, cohesion, and understanding among the organizational members often takes time to develop in new ventures.

On the other hand, liability of newness is related to processes that are external to the organization (Kale and Ardit, 1998), such as establishing relationships with customers, suppliers and other relevant actors. Researchers have often noted that a start-up firm's lack of a "track record" makes it difficult for entrepreneurs to convince potential stakeholders (e.g. investors, customers, and suppliers) to conduct business with the firm (Singh et al., 1986). Without these external resources (e.g. capital, raw materials, relationships etc.), however, a start-up firm cannot survive. Extant research has frequently examined difficulties in establishing external ties, which often result from a new venture's lack of legitimacy with external stakeholders, as a major cause of organizational mortality (Dobrev and Gotsopoulos, 2010). Legitimacy, defined as an opportunity-enhancing property that results from stakeholders perceiving a firm as competent, effective, and worthy (Zimmerman and Zeitz, 2002), is regarded as an asset conferred upon start-up firms after stakeholder expectations have been met. Stakeholders' perceptions related to organizational age may also affect the likelihood of the success of the new venture. Age is defined as the chronological time that a firm has existed (Brüderl and Schüssler 1990). Nagy et al. (2012) argue that age is an imperfect and insufficient proxy for stakeholders' liability of newness perceptions for at least two reasons. First, liability of newness characteristics may manifest themselves differently in new ventures of the same age (Le Mens et al., 2011), depending for example on prior start-up experience (Politis, 2006). Second, although age can be measured fairly

objectively, stakeholders may be unfamiliar with a new venture's actual founding date. Previous research suggests that a lack of perceived reliability, accountability, and availability with stakeholders may represent other liability of newness that may hinder start-up firms survival (Choi and Shepherd, 2005). Reliability is defined as the ability to systematically produce consistent results during multiple time periods (Hannan and Freeman, 1984).

Stakeholder reliability perceptions often result from factors including a firm's consistent product or service attributes. Entrepreneurs, therefore, must manage external perceptions of reliability (Guercini, 2003), especially if stakeholders value it more than other organizational characteristics like efficiency or innovativeness (Hannan and Carroll, 1995). Entrepreneurs must also counter perceptions of lack of accountability, defined as the ability to demonstrate assignment of responsibility related to a firm's operational activities and outputs, to overcome liability of newness. Guaranteeing outputs through certifications and warranties is a common manifestation of accountability. Availability is the condition of making products and services obtainable at the times they are required by stakeholders. Constraints related to organizational size and budgets may prevent a new venture's ability to supply products and information to meet demand (Aldrich and Auster, 1986).

Choi and Shepherd (2005) argue that the youthfulness of a start-up firms may also be considered an asset and not a liability, namely the asset of newness, that may enhance a new venture's survival odds. Specifically, the asset of newness represent stocks of intangible properties that encourage stakeholders to view new ventures as fresh, dynamic, flexible and innovative. Organizational flexibility, defined as the ability to respond to unanticipated changes and modify products and procedures to meet stakeholder demands (Feldman and Pentland, 2003) may be one important asset of newness.

Nagy et al. (2012) suggest that another newness characteristic, organizational energy, is a critical dimension of asset of newness. Organizational energy is defined as the perception that employees are working vigorously, enthusiastically, and tirelessly in the pursuit of organizational improvement. Specifically, start-up firms may have organizational members that have more intense positive, possibly passionate, feelings about their work and about their organizations. Following this line of reasoning, the newness dimensions are: legitimacy; organizational age; reliability; availability; accountability; organizational flexibility and organizational energy. Organizational ecologists often discuss the liability of newness in connection with the liability of smallness, even if not all organizations are born small (Aldrich and Auster 1986; Bruderl and Schussler 1990).

The liability of smallness refers to limitedness in terms of resources and capabilities, and thus vulnerability to environmental changes. The assumption is that large new businesses have better survival prospects than small new businesses (Hannan and Freeman, 1983). Initial size may be measured in terms of either the amount of financial capital or the number of people employed at the time of founding (Aldrich and Auster 1986). A large pool of financial resources improves the chances of a new firm to weather the critical start-up period and to cope with random shocks from the environment. Furthermore, large organizations may have advantages in raising more capital, may face better tax conditions, and may be in a better position to recruit qualified labour. In addition, start-up firms' size is typically associated with a very

limited market presence and little market power, putting small firms into a disadvantageous position in negotiations.

The liabilities of newness and smallness represent key challenges to manage in the domestic market, but they may also occur in the internationalization process of the firm, becoming a suffering and complicating factor. The liabilities of smallness and newness are often used among studies on the internationalization of SMEs and in particular those related to “Born globals” or “Global start-ups” (Oviatt and McDougall, 1994, 2005; Zhou et al., 2007; Zahra, 2005).

LIABILITIES IN INTERNATIONALIZATION: FROM FOREIGNNESS TO OUTSIDERSHIP

Another liability is highlighted, that is the liability of foreignness, appeared in the literature on internationalization. The liability of foreignness is a broad concept that has been studied both with reference to large multinational companies, born global and start-up firms (Knight and Cavusgil, 2004; Zhou et al., 2007; Bals et al., 2013). The liability of foreignness refers to the fact that foreign firms incur additional costs when operating internationally, compared to local firms that have better information about their country, economy, laws, culture, politics etc.

Liabilities of foreignness (LOF) refer to phenomena first described in Stephen Hymen’s dissertation, which was completed in 1960 and published in 1976, and labelled it as the cost of doing business abroad. Zaheer (1995) introduced this phenomenon with the notion of “liabilities of foreignness” (LOF) and classified sources of LOF into four categories: (1) costs directly associated with spatial distance between parent and subsidiaries; (2) specific costs incurred exclusively by foreign subsidiaries due to unfamiliarity with host-country environments; (3) costs resulting from economic nationalism and a lack of legitimacy in the host country; and (4) costs from sales restrictions imposed by the home country. While this list is not exhaustive, it identifies the key sources of additional costs facing by foreign firms operating abroad.

Similarly, Matsuo (2000) argued that liabilities of foreignness stem from three major sources: culture and language differences, economic and political regulations, and spatial difference between parent and subsidiary. Liabilities of foreignness have spurred the interests of scholars who have laid its theoretical foundations (Eden and Miller, 2001; Mezas, 2002; Zaheer, 2002); they have also started not only to explore the drivers of these additional internationalization costs but also to propose strategies to overcome the challenges (Bell et al., 2012; Luo and Mezas, 2002; Mezas, 2002; Zaheer and Mosakowski, 1997).

Internationalization process scholars highlighted the constraints of foreign entrants due to insufficient knowledge and psychic distance from the host country. In particular, the Uppsala model of internationalization (Johanson and Vahlne, 1977; Welch and Wiedersheim-Paul, 1980) argues that firms first internationalize to culturally proximate countries before expanding to more distant markets, assuming a lower degree of liability of foreignness in culturally closer countries (Johanson and Vahlne, 2009; Johanson and Wiedersheim-Paul, 1975). In this model, the LOF is related to the construct of psychic distance, where “...the larger the psychic distance the larger is the liability of foreignness” (Johanson and Vahlne, 2009, p.1412).

Johanson and Vahlne (2009) suggest that another relevant liability, the liability of outsidership, is becoming a key challenge for internationalizing firms, even more than the liability of foreignness. The authors consider markets as networks of relationships in which firms are linked to each other in various complex and invisible patterns.

Therefore, they argue that insidership in relevant networks is necessary for successful internationalization. In order to become an insider, firms need to gain trust from and develop relationships with members of a network, otherwise there is a liability of outsidership. The outsidership is the condition of the “outsider”, the actor which is not part of the (relational) context. An outsidership comes with problems of information constraints and uncertainties regarding network developments and opportunities that emerge in networks and business relationships (Hilmersson, 2013).

The liability of outsidership is a difficulty for a firm that tries to penetrate a foreign market, but it can be also a problem in the domestic market. Recent studies on the topic focus both on multinational companies and SMEs (Eriksson et al., 2013; Hilmersson, 2013; Vahlne et al., 2012; Schweizer, 2013). Vapola (2011), exploring the factors that drive small, globally oriented start-up firms in choosing one global multinational corporation (MNC) partner over another, argues that not only start-up firms may suffer from liabilities of newness, smallness and foreignness, but also from the liability of outsidership, so that the survival of start-up firms may depend considerably on choosing the right partner who can help them to overcome these liabilities.

Table 1. Definitions of liabilities

Liability	Definition	Main references
<i>Newness</i>	The liability refers to the fact that young organizations have a higher propensity to die than old organization because of both their inability to compete effectively with established organizations and their low levels of legitimacy. Proxy: legitimacy; organizational age; reliability; availability; accountability; organizational flexibility and organizational energy.	Stinchombe (1965); Carroll (1983); Freeman, Carroll and Hannan (1983); Singh et al. (1986); Bruderl and Schussler (1990); Hannan and Carroll (1995); Choi and Shepherd (2005); Nagy et al. (2012).
<i>Smallness</i>	The liability of smallness refers to limitedness in terms of resources and capabilities, and thus vulnerability to environmental changes. Initial size may be measured in terms of either the amount of financial capital or the number of people employed at the time of founding.	Freeman, Carroll and Hannan (1983); Aldrich and Auster (1986); Kale and Ardit (1998).
<i>Foreignness</i>	The liability of foreignness refers to the fact that foreign firms incur additional costs when operating internationally, compared to local firms that have better information about their country, economy, laws, culture, politics etc.; related to psychic distance.	Hymer (1976); Johanson and Vahlne (1977, 2009); Zaheer (1995); Zaheer and Mosakowski (1997); Matsuo (2000); Eden and Miller (2001); Mezas (2002); Zaheer (2002).
<i>Outsidership</i>	The liability of outsidership is a situation when a firm enters a business environment without knowing who the business actors are, or how they are related to each other. The liability of outsidership has to do	Johanson and Vahlne (2009); Vahlne et al. (2012), Eriksson et al. (2013); Hilmersson (2013); Schweizer (2013).

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	with the uncertainty and difficulties associated with being an outsider in relation to a certain network.	
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Source: author's elaboration

Starting from this review of the literature on liabilities (table 1), our first aim is to answer to the following questions:

RQ1: *which are the main liabilities faced by start-up firms?*

RQ2: *how the main liabilities are related to each other in start-up firms?*

We adopt the point of view of the firm (see Methodology) providing an understanding of the main perceived difficulties faced by start-up firms, related to their newness, smallness, outsidership and (eventually) foreignness.

THE INTERACTION APPROACH IN THE IMP LITERATURE

The idea that interaction between individually significant actors is a primary characteristic of the business landscape, is a basic observation for the theorists of the “market as network approach” (Håkansson and Snehota, 1995) and in the IMP studies (Håkansson, 1982). The focus is not on what’s going on within a company, but between companies that constitutes the doing of business. All companies simultaneously interact with several others and interaction between any two companies may in this way affect their interactions with these others, and this gives the business landscape a shape that can be depicted by the network metaphor (Håkansson et al., 2009).

Interaction is a process over time, where connections (more or less systematic and conscious, and between different actors such as customers and suppliers, but not only) develop between different interaction processes in which the two companies are involved: through participating in a single interaction process with a single counterpart, a company becomes related to a set of many others. In this way, business interaction is a way to obtain information and leverage resources, it’s a process in which ideas, solutions, technologies, problems and interdependencies are transferred across a network of companies. Continuing interaction with others provides some kind of stability in a world of unpredictable outcomes and unknowable influencing factors. In this way, interaction is both a dynamic and a stabilizing force. Therefore, interaction has been conceptualized as “*the substantive process that occurs between business actors through which all of the aspects of business: material, financial and human and all of the elements of business: actors, activities and resources take their form, are changed and are transformed*” (Ford et al., 2008).

One important consequence of this conceptualization is that business interaction should never be seen simply as communication or negotiation, even if these may be important aspects of it. The greater the involvement of a company in a particular interaction, the greater will be the effects on its own activities, on its resources and on the company itself. The actors, activities and resources of business are defined by interaction. Interaction has been analysed with respect to time: it has been argued that there is no such a thing as a new network. Ford et al. (2008) discuss that “*...If we recognise the existence of a particular network for the first time, then we are simply isolating part of a pre-existing and wider network. Similarly, neither a new actor nor a newly developed*

relationship creates a new network. Instead, new actors and new relationships always emerge from something that pre-exists them and there is always a history behind them. Each new actor or relationship is always related to others that already exist” (Ford et al., 2008, p.16).

Following this line of reasoning, a start-up firm doesn't create a new network, but it fits into the (existing) network and relates to other actors and relationships that already exist. The idea that start-up firms use alliances, social ties and networking activities to survive and develop their business is not new. If we look at the literature on entrepreneurship, we can see that the topic of networks is a prominent and outstanding issue; this literature assumes that entrepreneurs try to mobilize, and actually benefit from social network resources in the start-up period of their businesses (Zhou et al., 2007). Moreover, the network approach has been studied in relation to new ventures, in particular with reference to their early internationalization process (Coviello, 2006; Vapola, 2011; Soderqvist, 2013).

Following the IMP approach to interaction in business networks and the relation with the liabilities concept presented before, we propose the following research questions:

RQ3: which is the role of interactions to overcome liabilities in start-up firms?

RQ4: to what extent interactions can represent a solution or a source of liabilities for start-up firms?

METHODOLOGY

The paper aims at exploring how different types of liabilities affect firms, with particular regards to start-up firms; the second aim is to investigate to what extent interaction between actors on the market represent a context in which liabilities occur or a process to overcome such liabilities that firms may suffer.

Proposing a qualitative questionnaire (table 2) oriented to explore the research questions in the previous literature review section, we try to “unpack the box” of interaction providing an understanding of what are the main relationships for start-up firms that enable an overcoming of liabilities, including the actors, resources and activities involved in these relationships.

The topic is addressed by using a case study method (Stake, 1994) in order to provide some indications regarding the previously outlined research questions. The approach at this level is mainly descriptive and interpretative and in this sense we includes some parts of the systematic combining process (Dubois and Gadde, 2002). Our research has been designed by collecting data from secondary sources and directly interviewing three innovative Italian start-up firms located in Florence and Prato. In particular, we have chosen start-up firms from the Incubator of the University of Florence (IUF) and from the project carried on by the Province of Prato called “Stand up Start up”. We started with a list of 24 spin-offs from the IUF and 25 from the Province of Prato. We focused on innovative start-ups established by 2012 in the form of limited company. The accessibility has been also a determining factor.

We had in-depth interviews with the CEOs and top management and our research benefited from the sharing of part of the environment of the university from which the cases considered were generated as a spin-off, facilitating the researcher-manager interface (Guercini, 2004). Each interview was taped and transcribed to ensure

accuracy. We completed the case analysis collecting data also from other sources such as: the company website; the IUF website; annual reports when available. The case analysis and the qualitative questionnaire are summarized in the following tables.

Table 2. Case analysis

Firm	Sectors	Data sources	Interviews
Apptec	Software and server platforms, audio-video streaming platforms	- In-depth interview - Data published in the Province of Prato website	Conducted in March, 2014, with the three founders
Ergon Research	Mechanical and energetic engineering	- Firm annual reports - Firm website - Data published in Csavri website - In-depth interviews	2 interviews conducted in April 2014, with the CEO
Massa Spinoff	Environmental protection and monitoring	- Firm annual reports - Firm website - Data published in Csavri website - In-depth interview	Conducted in March, 2014, with the President and the CEO,

Table 3. Questionnaire for the in-depth interviews

Questions	Details
Q1. Data and history of the firm	Year of establishment, number of employees, product/market, top management, organizational history, previous experience of the founders, innovative idea, role of incubator.
Q2. Perceived difficulties for the development of activities and actions undertaken to overcome these difficulties (comparing the answers of the interviewee with the types of liabilities found in the literature).	Smallness: size of the company (employees, financial resources). Newness: legitimacy; organizational age; reliability; availability; accountability; organizational flexibility and organizational energy; liability or advantage? Foreignness: internationalization process of the firm and perceived difficulties associated with foreignness; individual perception of distance. Outsidership: membership in business networks Other emerging liabilities different from those in the literature
Q3. Interaction and its role in overcoming relevant liabilities	Main interactions; actors involved in the relationships; object of the relationship; some examples of relevant interactions; overcoming liabilities through interaction processes.

Source: author's elaboration

THE CASE OF APPTEC

Apptec was founded on 12/11/2012, under a project of the Province of Prato "Stand up Start -up". It is composed of three members – the three founders – and operates in the market of software and server platforms, primarily with a focus on audio-video streaming platforms (current turnover < € 100,000). In addition to developing server platforms, Apptec also works with embedded hardware and open source systems based on Linux. The market for open source products is growing fast and the advantage is that there are no royalties (additional costs) for clients. Apptec works with Italian customers, only some prototypes or specific applications for software are bought in Asia, especially Korea, where most of these applications for software are developed and sold at lower prices. Apptec was created primarily for the passion for software and

software development of its three founding members who found a good business opportunity in the Italian market for the development of server platforms:

“Our main clients are private companies and also people that need to develop software for their business, yet we do not work with the public sector. For example, we develop e-commerce solutions”.

The project of the Province of Prato has allowed Apptec to be born quickly. PIN, a Consortium of the University of Florence, also participated in the project of the Province of Prato, and PIN represents the main interface for Apptec, from the constitution to the training on specific subjects (eg. occupational safety, privacy, marketing...).

The innovative idea behind the company lies in the development of software for audio-video streaming, and the strong convergence of embedded hardware and server platforms. Moreover, Apptec tries to "embrace" the customer by providing a comprehensive and fully customized service. The idea of Apptec has its origin not only in the passion of the three founders for software developing, but also in their previous work experiences. In particular, they have been working for an online University in the development of the e-learning platform, and for the security system area of a railway company, in the development of software and hardware for the safety of passengers. After this important experience from a learning point of view, Apptec was founded:

“I cannot say if we would have otherwise established or not our company, but it certainly was very important to have a structure, such as PIN and the Province of Prato, that welcomes you, accompanies you and pushes you in the beginning, because we can be hard workers and great software developers, but becoming entrepreneurs is another thing, it's a new world for which you are not prepared”.

To date, Apptec is formed by the three founders, with no employees. Being small, in terms of number of employees, is seen as an advantage in the sense that the organizational structure is leaner and faster. The software sector itself is an area primarily made up of freelancers:

“Software houses are almost always formed by a hard core of a few stable people, and then many projects are done with external resources. Being small in our sector is not a problem in order to meet the needs of the customer, but we must always make use of trusted people, mainly freelancers, and pay them regularly”.

The biggest problem is not the smallness but the legal and administrative part of the job, that slows down the activity. Another strength is the newness:

“We really want to focus on being new and young, even if we have almost ten years experience in this sector. This is the key message of our start-up and our communication project. We have a direct and close interaction with our customers in order to create solutions, and there has never been a situation where the customer has complained of our being new. But there can be a bit

of distrust towards the field of open source, which is not yet known and sometimes it happens that open source is perceived as a synonym of for free etc. . So rather than us too young, our ideas might be perceived as too new”.

The problem of newness is instead in business management and organization of activities between the three partners, mainly because of the inexperience (eg. who does what, who interfaces with the customer, etc.), even if being small has helped to overcome this difficulty. Another important issue is the flexibility, since Apptec tries to be flexible in the relationship with its customers, and to adapt to the need and different types of customers:

“It often happens that newness and flexibility are perceived as synonymous in a positive sense, so often customers have contacted us because of that. This plays into our favour and becomes a lever to bet on, which allows us to offer even more personalized services than other software houses, we go more towards the specific needs of the customer”.

They are still in phase of development of their products so they do not want to over-exposure to the market. Apptec comes in contact with customers mainly through personal contacts, from their previous work experience and also thanks to the PIN that has put them in touch with a number of potential customers.

“At the beginning of our activity, we realized that we had, and we still have, the need in some way to become part of the sector, making "networking". So, we attend conferences, and other events just to network, learn about other businesses and eventually develop collaborations. The most important relationships are developed in the sectoral meetings”.

The PIN has contributed anyway to insert Apptec into a network of contacts because many of these events are organized by the PIN itself, or by the Province of Prato or the Tuscany Region, but, according to one of the founders, this is not enough to be included in the network of people and other companies. It is necessary to have an “entrepreneurial spirit” to be able to promote company:

“When you find yourself in these conferences you are not a software developer but you're an entrepreneur. You can enter the network, but then in the network you need to know how to extricate, no one teaches you how to do it, you do not become an "insider" automatically. The entrepreneurial spirit makes a difference, knowing how to sell your idea as the best”.

The relevant interactions occur with the PIN in the first place (and with consultants provided by PIN to Apptec), and with the Province of Prato. They are also developing a new project with the incubator at the University of Florence (IUF), but it is still a work in progress (even if the IUF has a key role in training and teaching how to become entrepreneurs). They have been provided with the consultants to start-up their and activate a process of learning, and acquiring new competencies, especially in marketing. Apptec has also business relationships with PIN, where the exchange is equal in the sense that PIN involves Apptec into projects or introduces them to potential customers, but if Apptec does a good job is PIN itself that earns in

terms of image. Moreover, PIN is a trading partner for some projects, where services offered by Apptec are combined with those offered by PIN and its research centers. PIN is seen as a dynamic environment, so the message that the company is trying to send is that Apptec has a great relationship with PIN and PIN can improve the products offered by Apptec through complementary services.

There are no relevant relationships with customers, since Apptec has many small clients. The only significant relationship they have is with a client who wants to start up his own company and has asked Apptec to develop a software to be able to start his business. According to one of the founder, this has been a big responsibility in the first place because Apptec had to believe in the project and if his business is successful, it's a success also for Apptec in terms of image and positive word of mouth. In general, the three founders believe in a "human to human" relationship with our clients, especially now in this time of crisis.

THE CASE OF ERGON RESEARCH

Ergon Research is a consulting firm in the mechanical and energetic engineering field. The aim of the society is the supply of highly specialized capabilities to develop and design innovative products, components and systems. Its mainstay is the integration between theoretical aspects and the most innovative simulation and experimental techniques in the thermo-fluid-dynamic field. Ergon Research operates in an highly skilled engineering environment as link between the research and the industrial communities bringing into action all the experience of its founders. The society market deals with the industry, service companies, commercial and residential building. They work with: small/medium size manufacturing and service companies; energy service providers and producers; building and plant companies; engineering services societies; energy service companies; public and private corporations.

The firm has been founded in 2008 by five engineers, who are still working in the company, that has no other employees at the moment. All the members have a PhD degree in the Energy Engineering field. The members have been actively involved with the University of Florence in several EU research programs in cooperation with the main European gas turbine manufacturer (such as AVIO, Rolls Royce, Snecma, Turbomeca, ITP, MTU).

Ergon Research was founded in 2008 and then in 2012 it became a spin-off of the University of Florence. In particular, the company was founded by the CEO and another partner in 2008, then two more partners came in 2011 and the last one in 2013. The first two years have been of incubation: during that period all the members of the company were still working as post-doc at the University of Florence, and they were trying to understand if there were potential clients and a potential market for their services. Even if now the company is stable and well-known, the CEO still considers themselves as a start-up, because they don't have employees and they are still trying to expand in foreign markets. At the moment, they don't have clients abroad, they are only partner in two European projects with the University of Florence.

The problem of not having employees is perceived mainly in relation to their clients:

"In our case it is not a big problem to be small with respect to the way in which we organize the work. We have a one-to-one relationship with our

clients, based on the skills and the competencies of each of us. The only problem is precisely the lack of other people working with us, and this problem was highlighted by the customers themselves that are asking us to hire additional staff because they want dedicated staff. Indeed it is a requirement of the customer more than our need, even if actually we realize that the volume of work is getting a bit too big and then we're actually thinking about one or two new hires".

The problem of expanding their workforce therefore emerges only with clients, not with other actors such as suppliers, universities, research centres. Moreover, the fact that Ergon Research is a new company, founded in 2008 but actually in operation since 2010, is seen in a positive way especially by technicians and engineers, in the sense that newness is perceived as synonymous with dynamism and speed in finding solutions, ability to respond quickly and conscientiously:

"Being small and new is related in some way, because we are few people working here so there are few intermediate steps, the exchange of information between us is instant and allows us a certain timeliness of response. For me this is our point of strength, not a weakness. But if for other engineers smallness and newness are not a problem, I have the feeling that this might be a problem for the sales department of the large companies we work with, not so much for technicians. It's just my feeling at the moment, there are no concrete situations about it".

The fact of being a young company reflects more on their organizational routines and daily practices that are still in the making and not well-structured, but this has no consequences on their clients, because the relationship with the customers is managed by the individual members according to the skills required. A central role for Ergon Research is played by the University of Florence and its research centres:

"If we had established our company regardless of the relationship with the University, or perhaps in another country, surely it would not be successful. We took advantage of a series of contacts with potential customers during our time at the University, others based on word of mouth starting from the work done previously at the University. Our role as a spin-off is also not to lose the know-how and human capital that had developed in the research group of the University, human capital and know-how that would be lost if we had not established this company. From the point of view of networking and relationships, being related to the University is crucial in this sense. If I have to represent our relevant relationships, I'd make a triangle with Ergon Research in one corner, our customers in another corner and the University of Florence in the other corner".

In particular, there are situations where Ergon research and the research centres of the University of Florence share their know-how to meet the needs of the customer, while there are other situations where the relationship is two-way with a big industrial partner and several universities, and in two European projects that involve a whole network of European players in the field, such as aeronautics. To get into these projects,

on the one hand it was the University of Florence that that involved Ergon Research, on the other specifications of the EU ban itself, which required the presence of at least one innovative SME. The IUF seems not to have an important role for the growth and development of Ergon Research, even if they have been incubated but they have never made use of IUF resources (with exception of writing a business plan), such as a space inside the incubator's facilities, or economic and financial support.

In the business of Ergon Research the need for investment, in terms of software and hardware, goes hand in hand with the number of people who work in the company. The CEO argues that being so connected to the University sometimes may not be too positively perceived especially by customers, since sometimes the spin-offs are created by the University maybe because it fails to include people in its structure and puts them in a spin-off that is just a continuation of a research group with no innovative ideas and skills. The CEO has the feeling that this has happened to the company in the beginning of their relationships with large companies that did not know them, so they had to figure out if Ergon was able to do the job and the level of independence from the university. This has been a minimal problem with new customers but it did not alter the development of the relationship with them.

THE CASE OF MASSA SPIN-OFF

MASSA Spin-off (Scientific Methods and Applications for Environmental Protection) was founded in 2007 by the collaboration between the National Research Council (CNR), the University of Florence and industrial partners. The company works in the field of environmental monitoring to provide scientific and technical expertise, and to develop ad-hoc instrumentation (turnover approximately € 1.22 million in 2012, between 15 and 20 employees). The activity is characterized by the ability to identify the pollutants, rebuild their spatial distribution and establish the origins and causes of contamination. The activities cover the following lines of business: landfills; areas and industrial processes; urban areas; sites of storage of gas; agribusiness.

MASSA Spin-off originated from the skills and experiences acquired by the Institute of Geosciences and Earth Resources (IGG) of the CNR and the Department of Earth Sciences (DST) of the University of Florence in the development of analytical techniques relating to fluid (gas and water) emissions. The main lines of research of the DST concern the prediction and prevention of geological hazards, exploitation and protection of natural resources, the study of paleoecology, the analysis of volcanic processes, the assessment of impacts on the environmental components. MASSA Spin-off is now considered a model of spin-off and technology transfer success and enjoys the position of greatest spin-off of Italy in the environmental field. The company has passed the stage of start-up recently (according to the perception of respondents), but it is believed to have been an interesting example of start-up. The spin-off was born after a certain time of ripening, so when it started to work, it had a capacity for effective management of the market, in this sense the start-up phase has lasted about a year later the establishment of the company. From 2008 there has been a strong growth:

“We have always been careful to integrate the technical, scientific and managerial expertise, which is why perhaps the most proper start-up phase was short-lived. Organizational development, integrating immediately

managerial functions, marketing and sales, has led the company to a high level of growth. Probably our process was faster than that of other spin-offs. We tried to accrue both the innovative idea – to fill a gap in the market – and the managerial skills before setting up the company, thus speeding up the start-up stage”.

During the start-up period, the problem of being small was at the level of the organizational structure, especially on the side of the technicians employed, given the rapid growth as well. According to the CEO, innovative start-ups always begin small. The dimensions of the company were initially proportionate to the objectives of growth and even if they felt that we had size limits, this did not affect their growth and survival.

The problem of newness seems to be related more to the newness of the business idea than to the organizational age, since the environmental sector is still in evolution: when MASSA Spin-off was founded, it was in a “blue ocean”. The company was new in terms of age, but the people in the company had years of experience and mature skills in the sector. Moreover, from the beginning MASSA Spin-off benefited from the relationship with CNR and the University of Florence:

“Being new has never been a problem for our customers and other stakeholders, because we had a great prior experience and we worked with well-known institutions. In summary we can say that the previous experience and relationships with CNR and the University of Florence have cancelled any issues related to the size or age, that maybe other start-ups might have”.

MASSA Spin-off has also undertaken a process of internationalization, in the Balkan market and in South America, in particular Argentina and Brazil, with a business unit in Sao Paulo. Their activities in these markets were preceded by the relationships between the University of Florence and several universities in Argentina and Brazil: “The University of Florence has a strategic role in our company and introduced us to relevant stakeholders in those countries, facilitating the process of transferring our technologies and skills in countries, such as Argentina, that have many environmental problems regarding pollution”. According to the CEO, however, the process of internationalization is not easy at all. The process towards Latin America started in 2009 using the relationship with the University of Florence. Moreover, they were introduced by a diplomatic in Argentina. They were able to start to collaborate with universities and to generate the system of relations which later led to the presentation of their offer, and to the generation of business opportunities:

“We found, however, our inability to penetrate the foreign market. We clashed, in Argentina and Brazil, with systems of German SMEs accompanied by the German Government and supported in building a system of relationships and the creation of the offer. Instead, we had no government support. We suffered the lack of the right government support and therefore lack of visibility. We were small and couldn’t compete with an organized system of SMEs. We tried to send our staff to Sao Paulo to start relationships with relevant actors, but this was very difficult with the resources we had, since we were small compared with the players in the

global markets. We therefore initiated the partnerships with university departments and units of the CNR to increase our 'specific weight', but it was not enough to get in a solid system in the destination country. We have relied on some projects, such as those of the Tuscany Region for internationalization, to gain some financial resources, but again it wasn't enough".

The process of internationalization is still on going, and the CEO argues that an opportunity could be linked to the creation of a coordinated network of firms to manage the process of internationalization, where the network should therefore take a different size than the individual company, supported by the national government. In domestic and foreign markets, anyway, a critical success factor in the start-up stage was to have relationships with relevant actors such as universities, industrial partners and research institutions. The relationship with the University of Florence and the CNR is essential but not enough to be fully inserted into the network of relevant relationship where to develop business opportunities, in the sense that the company itself, and the top management, has a role in establishing relationships. Certainly the University of Florence and the CNR are a mix of important interactions that led the company to success. There are also some practical issues that arise from these relationships, such as the fact that their operating headquarters of Pisa is housed within the structures of the CNR, so during the start-up phase they have inherited some relationships, activities and customers of the CNR itself. The same applies to the University, in the sense that some customers of the University were then transferred to the company. The relationship with the University of Florence and the CNR can be summarized as an exchange of expertise and complementary skills.

DISCUSSION

What we propose is the study of interaction, as a main feature of the “market as network approach”, combined with the study of liabilities in domestic and foreign markets. Starting from the idea that interaction is central to the business landscape, the aim of the paper is to analyse the relationship between interaction and liabilities. Starting from the the three cases of start-up firms analysed, we discuss the research questions outlined above (see also Table 3)

RQ1. Which are the main liabilities faced by start-up firms?

The cases of start-up firms analyzed show that the liability of smallness and newness exist but are not always relevant, and don't affect the survival of the firms. The newness of the firm in terms of organizational age does not affect the development of activities and relationships, primarily with clients. In all three cases, the previous experience of the founders in their respective sectors mitigates (Ergon Research) or cancel (Apptec, Massa Spin-off) the liability of newness.

In addition, the newness of the firm in the sense of "young age", is tackled thanks to the credibility of the “mother” organization, such as the University. In all three cases, the newness is perceived more in terms of new/innovative business idea than in terms of the other elements related to the liability of newness expressed in the literature (see Tables 1 and 2). The issue of liability of newness is therefore a matter of some confusion on the part of respondents; particularly in the three cases the "liability of newness" is confused with the "new product/service": one thing is the "novelty of the product/service", which is in many cases constitutive element of entrepreneurial innovation, one thing is the "new organization", in terms of age, experience and credibility gained with other actors in the environment. Communicate to the market the innovative business idea seems to be the main difficulty. The newness of the business idea, the flexibility (related to the smallness) and organizational energy are perceived as an advantage rather than a liability. There is a liability of smallness in two out of three cases (Apptec and Ergon Research) in the sense of lack of employees. The problem of organizational dimension appears anyway linked to the specificity of the sector (for example , in the case Apptec the development of software does not require the presence of many employees in the company). Only in one case (Ergon Research) lack of employees becomes a real problem in dealing with customers. In all three cases, the possible lack of personnel is resolved through collaboration with the University in the creation of team with complementary skills.

In one case (Massa Spin-off) there is the interesting issue of liability of foreignness and how this appears overlapped to the liability of outsidership, with reference to the role of German Government in facilitating access to Latin American markets. It therefore highlights the role of relationships (and therefore of outsidership) more than that of psychic/cultural distance (and therefore of foreignness). In all three cases there is awareness of the need to reach a position of insider in the business network. While relationships with entities such as universities allow easier access to existing networks in the sector, the role of entrepreneurial skills is recognized as fundamental in building and maintaining a position of insiders .

RQ2. How the main liabilities are to related each other in start-up firms?

The link between newness and smallness is evident in the sense that during the start-up phase the small size of the organization appears as normal for an innovative start-up firm. Some dimensions of newness proposed in the literature, such as flexibility and organizational energy, seem to be linked to the small size of the firm (in particular the lack of employees) and seem to be more an asset than a real difficulty. A case (Massa Spin-off) shows how the problem of outsidership is significant when compared to the foreignness and smallness in the sense that the small size of start-ups has a negative impact on visibility and the capacity to enter into business networks in foreign markets.

RQ3. Which is the role of interactions to overcome liabilities in start-up firms?

A first examination of the descriptive empirical data collected on the three cases of start up firms shows a strong role of the University and other institutions (such as CNR and PIN) to allow start-up firms to address various liability. The interaction takes place mainly in the three cases with universities and research centers associated with it. Scopes of the interaction are training (Apptec), the development of know-how, creating interdisciplinary team with complementary skills, looking for clients (new or existing customers that universities or research centers commit to start-ups) . The interactions can take place not only within dyads, but also within triads in which the start-up works with the University or the research center and the customer (particularly evident in the case Ergon Research, but even in Massa Spin-off). These interactions may allow to face liability of foreignness and liability of outsidership, especially in situations in which the boundaries between the two liability are not always specified or specifiable (Massa Spin-off).

RQ4. To what extent interactions can represent a solution or a source of liabilities for start-up firms?

The interaction plays a twofold role in start-up firms. On the one hand it can become the context in which the perception of liabilities is developed. This is evident especially in the relationship with customers that may bring out problems related to the lack of dedicated staff or legitimacy of the organization (Ergon Research). This can be a key factor in stimulating the development of new skills, and might indicate the awareness of the limits of the organization but also the opportunities that could be achieved. The interaction then allows to perceive and to "take measures" of liability that firms might face. In some cases, however, the interaction with an actor can also be a source of a not useful perception from other. In one of the cases examined, for example, the firm saw as a problem in the relationship with potential customers the fact of being perceived as linked to the University, being the latter perceived as distant to the activities of the firms (Ergon Research). On the other hand, the interaction with specific actors such as universities and research centers from which start-ups originate becomes the process by which overcome the liability, primarily the outsidership.

LIMITS AND FUTURE RESEARCH

The paper has contributed to the analysis of the main liabilities reported in the literature with reference to a specific type of company: start-ups firms. Starting from an understanding of the main liabilities faced by these companies , the topic has been developed in the light of the interaction approach proposed by scholars from the IMP

Group, trying to highlight the relevant relationships, the actors involved and the object of the relationship with specific reference to start-ups. The case analysis shows clearly the theme of “heritage” left by the membership of the network. This “network heritage” means that some aspects of the network, also in the case of the examined start-ups, are pre-existing, in some cases for a long time, in relation to the pre-existing relationships with other institutions (Universities, CNR, PIN, some customers or suppliers, etc.). Stretching this aspect, some features in the network to which start-ups belong are not new, but can be even “ancient”, for example related to the relationship between public institutions and companies. Some “ancestral” network effects can survive in the network. In network can survive network effects “ancestral” (for example, the relationships gained from secular organizations such as universities) and can in this sense be a part of the “network memory”, but also of the “culture/language” of the network. Network heritage, network memory and network culture/language are issues that can inspire future research on the relationship between liabilities and interaction in business networks. Finally, this work still has several limitations. The number and type of cases examined require a comparison with the results of further research. The paper adopted a qualitative methodology by proposing the study of three cases of innovative start-ups. This is not a limit, but some of the research questions could also benefit from quantitative tests, explicating proxies for each liability and assigning them a score to analyze the correlations. Above all, the research could be further developed through a more qualitative methodology, developing additional cases with different characteristics from the three proposed here (e.g. start up in different context from that of the University, start-ups from other countries etc.).

Table 3. Relations between interactions and liabilities

Cases Liabilities	Apptec	Ergon Research	Massa
<i>Newness</i>	Previous experience and relationships with PIN reduce the effects of newness and smallness. Problem of the newness of the business idea in the interaction with customers.	Previous experience and relationships with the University of Florence reduce the effects of newness and smallness. Perceived problem in the interaction with the sales department of large companies (lack of legitimacy and reliability).	Previous experience and relationships with research institutions (CNR, University of Florence) reduce the effects of newness and smallness
<i>Smallness</i>	See above. Liability of smallness in the lack of employees with administrative skills.	See above. Liability of smallness in the lack of employees: this problem arises in the interaction with customers.	See above.
<i>Foreignness</i>	None (no activities abroad)	None (no activities abroad)	The psychic distance is relatively reduced with some regions of the world as Argentina or Brazil
<i>Outsidership</i>	The presence of relationships with PIN and the Province of Prato reduces the liability. Role of entrepreneurial skills to become insider.	The presence of relationships with the University of Florence reduces the liability. Insidership in relevant networks (customers, public institutions) since the establishment.	The presence of relationships between the University of Florence and several University in Argentina and Brazil reduces the liability – the absence of the national institutional actor increase liability. Role of entrepreneurial skills to become insider.
<i>Relations between liabilities</i>	Strong relationship between liability of newness and smallness	Strong relationship between liability of newness and smallness	Strong relation between liability of foreignness and liability of outsidership. Strong relationship between liability of smallness and liability of foreignness.

Source: author's elaboration

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