Alma Mater Studiorum – Università di Bologna

DOTTORATO DI RICERCA IN

Direzione Aziendale

Ciclo XXIV

Settore Concorsuale di afferenza: 13/B2 – Economia e Gestione delle Imprese
13/B3 – Organizzazione Aziendale

Settore Scientifico disciplinare: SECS-P/08 – Economia e Gestione delle Imprese
SECS-P/10 – Organizzazione Aziendale

TITOLO TESI

Nature and Relevance of Inherited Blueprints on Business Models Choices and Innovation: an Assessment

Presentata da: Francesca Zaccaro

Coordinatore Dottorato

Salvatore Torrisi

Relatori

Raffaele Corrado
Riccardo Fini
Rosa Grimaldi

Esame finale anno 2013

to my family,

and especially to our star scientist and to our young chemist

I hereby declare that I am the sole author of this thesis.
All errors and views expressed herein are on my own.

Francesca Zaccaro

Nature and Relevance of Inherited Blueprints on

Business Models Choices and Innovation: an Assessment

Table of Contents

Abstract

One important metaphor, referred to biological theories, used to investigate on organizational and business strategy issues is the metaphor about heredity; an area requiring further investigation is the extent to which the characteristics of blueprints inherited from the parent, helps in explaining subsequent development of the spawned ventures. In order to shed a light on the tension between inherited patterns and the new trajectory that may characterize spawned ventures' development we propose a model aimed at investigating which blueprints elements might exert an effect on business model design choices and to which extent their persistence (or abandonment) determines subsequent business model innovation.

Under the assumption that academic and corporate institutions transmit different genes to their spin-offs, we hence expect to have heterogeneity in elements that affect business model design choices and its subsequent evolution. This is the reason why we carry on a twofold analysis in the biotech (meta)industry: under a multiple-case research design, business model and especially its fundamental design elements and themes scholars individuated to decompose the construct, have been thoroughly analysed. Our purpose is to isolate the dimensions of business model that may have been the object of legacy and the ones along which an experimentation and learning process is more likely to happen, bearing in mind that differences between academic and corporate might not be that evident as expected, especially considering that business model innovation may occur.

Introduction

One important metaphor, referred to biological theories, used to investigate on organizational and business strategy issues is the metaphor about heredity. This particular aspect of biological theories of evolution according to Nelson (1995) involves the aspects of reproduction and transmission of genes to offspring and is clearly of particular use in analysing spin-offs that clearly have a parental heritage: parental organizations shape their nature at birth and especially in the case of spin-offs, differences among them can be traced directly to their parents "who provide them with distinctive, but limited knowledge (Klepper and Sleeper, 2005).

At present, according to Phillips (2002), an area requiring further investigation is the extent to which the characteristics of blueprints inherited from the parent, helps in explaining "post start-up performance". There has been little formalization linking a genealogical framework with many of the key outcome variables of organizational sociology and little efforts has been done to assess empirically the consequences of transferring resources from parent organizations to their progeny.

What is still unclear is the extent to which legacy influences the spin-off beyond formation, if there are some characteristics of the genetic heritage that are supposed to have the most powerful and enduring effect on the subsequent development of the spin-off, or on the other hand, if some of them are more likely to be discarded during the time. A strong tenet of the imprinting argument, indeed, highlights the enduring impact of prior history on subsequent organizational outcomes (Stinchcombe, 1965) and requests inevitably that once developed, imprinting is irreversible. However, some recent contributions are beginning to question about the validity of this tenet, because of contrasting empirical evidence and because of some contrasting findings emerging from other studies.

In order to shed a light on the tension between inherited patterns and the new trajectory that may characterize spawned ventures' development, Ferriani *et al.* (2012) proposed a process model of intergenerational learning and spin-off performance. In order to

stress the reversible nature of the imprinting process, authors named reimprinting the moment of combination and re-combination of retained and new knowledge.

In this contribution, authors explicitly refer to a clear distinction between spin-off's business model and parent organization's one, but this conceptualization still lacks of a framework to acknowledge along which dimensions and across which stages, business model is shaped and changes. Further investigation is hence needed on these themes, since, as maintained also by Baum and Rao (2004), there is still much room to investigate on the structure of organizational inheritance that foster persistence and transformation over time of organizational processes and forms.

A possible solution to address all this issues linked to multiplicity of factors that may explain the roots of value creation by spin-offs, is to introduce in the analysis the idea of business model. Thus using such a holistic framework and analysing how it has evolved through the time and along which dimensions, we are then able to observe whether there is a similarity in kind of forces inherited from established organizations, and whether a deviation from imprinted patterns has occurred. The idea why we choose the business model as the core concept to understand the process of imprinting and of (eventual) deviation from imprinted patterns is that, as stated by Chesbrough and Rosenbloom (2002), the business model construct assumes a legacy approach by itself: authors consciously maintain that knowledge held by the firm, its customers and third parties is cognitively limited and biased by the early steps of the firm, hence also by what it has inherited.

What is exactly inherited from parent organization and how it is translated in spawned ventures' business model? Blueprints elements affecting initial business model design are long-lasting or are there some characteristics along which spin-offs' business models evolve thus deviating from inherited trajectory? Does heterogeneity exist among spin-offs' business models designed by companies having spawned by an academic or a corporate parent?

We contend that spin-offs inherit different blueprints, that are a function of the contexts were they have been generated, we aim at ascertaining if this difference in lineages is reflected too in the business models they adopt and affects (or not) also business model innovation. For this purpose we have selected five case studies in the biotech industry, wanting to isolate, the elements that may have been the object of legacy and trying to assess

the emergence of a learning process through the analysis of business model evolution, along the same dimensions.

The reason for the choice of carrying out a twofold inquiry is that in the spin-off literature, two types of parent institution have been identified: higher-education institutions and well-established industrial firms represent the two major sources of new high-technology firms (Oakey, 1995). Moreover since universities and corporations have different research focus and a different orientation in performing marketing, production and distribution activites (Zahra *et al.*, 2007) and founders possess different human capital characteristics (e.g. Colombo and Piva, 2008b) we might expect them to transfer different endowments to their spin-offs and hence we might expect also to have heterogeneity in elements that affect business model design choices and its subsequent evolution.

Part I: Theoretical Framework, Literature Review

Chapter 1:
Blueprints Transferred to Spin-offs,
are they Irreversible?

1.1 The Imprinting Argument: its Origins

1.1.1 The use of Biological Metaphor in the Analysis of Organization

Since the relevant work by Hannan and Freeman (1977; 1989) the use of models and metaphors in management studies has flourished and in particular, relevant contributions have been made in the analysis of organizations (e.g. Hannan and Freeman, 1989; Aldrich, 1999). However as argued by many scholars (e.g. Klepper and Sleeper, 2005) considerable investigation has been conducted on the fundamental concepts of selection and variation and relevant contributions to theory have been drawn, but there is still considerable room to investigate on organizational and business strategy issues using another important metaphor referring to biological theories: the metaphor about heredity.

1.1.2 The Use of the Heredity Metaphor

This particular aspect of biological theories of evolution according to Nelson (1995) involves the aspects of reproduction and transmission of genes to offspring and is clearly of

particular use in analyzing spin-offs that clearly have a clear parental heritage: parental organizations shape their nature at birth and especially in the case of spin-offs, differences among them can be traced directly to their parents "who provide them with distinctive, but limited knowledge (Klepper and Sleeper, 2005).

The use of heredity metaphor to explain entrepreneurial phenomena and in particular the creation of new firms is not new in literature and it has been used building on the seminal and crucial argument of imprinting by Stinchcombe that dates back to 1965, whose main insight is that organizational structures maintain historical social influences.

Basically the idea introduced by Stinchcombe is that social structure referred to as the set of "groups, institutions, laws, population characteristics and sets of social relations that form the environment" have a great role in influencing the "organizational inventions that can be made at a particular time in history"; in other terms "groups, institutions, laws, population characteristics and sets of social relations that form the environment" are hence contingent and deeply imprint an organization with characteristics existing at the era the new organization was founded. Stinchcombe himself has provided evidence to support this argument in the case of unions, professional full-time armies and in other types of organizations and industries.

Since this seminal work, several studies have argued that conditions existing at birth have a lasting imprinting on its subsequent evolution: many of them have focused their attention on the effect of genetic characteristics on firm survival (Carroll and Hannan, 1989; Bruderl and Schussler, 1990; Bruderl et al., 1992; Shane and Stuart, 2002; Aspelund et al., 2005); others have been interested in firm growth (Bamford et al., 1999; Heirman and Clarysse, 2005) and some of them have investigated the effect on the choice of particular organizational strategies (e.g. Baron et al., 1996; Ding, 2006).

The studies that we just mentioned, investigate the effects of the imprinting given by mother organizations while considering homogeneous samples of spin-offs (or spin-outs) generated from a given institutional context, whether private (e.g. Ding, 2006) or public (e.g. Shane and Stuart, 2002). However some authors are recently beginning to conduct research with the purpose of assessing differences between spawned ventures originated in a public context and new technology based firms that instead originated in a private one. Still consistently with Stinchcombe's imprinting argument, the main contribution of more recent

studies is in assessing how firms created by academics have, from their founders peculiar "genetic characteristics" that differentiate them from other new technology-based firms (Colombo and Piva, 2008). Those issues too, will be considered in the definition of the research agenda that will inform the present research study.

1.1.3 Prior Research on the effects of Blueprints

Even though the analysis of characteristics and effects of blueprints is a relatively new topic in entrepreneurship and management literature, however there are already relevant studies that focussed on the moment of birth of progeny firms, such as studies by Klepper (2001), Burton et al. (2002) and Klepper and Sleeper (2005). Altogether as maintained also by Phillips (2002) the extent to which the characteristics of blueprints inherited from the parent, important for spin-offs, helps in explaining "post start-up performance" has been overlooked by scholars. According to him, there has been little formalization linking a genealogical framework with many of the key outcome variables of organizational sociology and little efforts has been done to assess empirically the consequences of transferring resources from parent organizations to their progeny.

Several studies have argued that conditions existing at birth have a lasting imprinting on firm's subsequent evolution: many of them have focused their attention on the effect of genetic characteristics on firm survival (Carroll and Hannan, 1989; Bruderl and Schussler, 1990; Bruderl et al., 1992; Shane and Stuart, 2002; Aspelund et al., 2005); others have been interested in firm growth (Bamford et al., 1999; Heirman and Clarysse, 2005) and some of them have investigated the effect on the choice of particular organizational strategies (e.g. Baron et al., 1996; Ding, 2006). What is still unclear is the extent to which legacy influences the spin-off beyond formation, if there are some characteristics of the genetic heritage that are supposed to have the most powerful and enduring effect on the subsequent development of the spin-off, or on the other hand, if some of them are more likely to be discarded during the time.

Indeed, while considering the imprinting argument with reference not to the moment of inception, but with reference to the subsequent development of spin-offs a striking paradox emerges between irreversibility of blueprints central to the imprinting argument, and

the observation of diverging paths for spawned ventures, as in the case of successful ventures which had birth from failed parent organizations (as in the case of Fairchild and its Fairchildren).

A strong tenet of the imprinting argument, indeed, highlights the enduring impact of prior history on subsequent organizational outcomes (Stinchcombe, 1965) and requests inevitably that once developed, imprinting is irreversible (Lorenz, 1970). Consistent with this tenet were also findings on subsequent new venture behaviour from Boeker (1989) who observed some consistency over time of patterns of influence, established at founding, in the distribution of power and subunits' importance. Also Bamford et al. (2000) have demonstrated the lasting impact of initial conditions, and in particular of initial financial capital and environmental munificence on profitability. Furthermore, recently Milanov and Fernhaber (2009) demonstrated that new ventures' initial alliance partners (that could be also parent firms) may strongly imprint new venture network evolution, influencing its subsequent size and focal firm centrality.

However, some recent contributions are beginning to question about the validity of this tenet, because of contrasting empirical evidence and because of some contrasting findings emerging from other studies. For instance, Chatterj (2009) and Sherer (2006) respectively in medical devices and laser industry found that the extent of knowledge transfer and/or overlap between parent organization and spin-off does not influence the performance of the spin-offs. Building also on those findings, while analyzing "intra-industry spin-offs" (entrants in an industry founded by employees of incumbent firms) Klepper and Thompson (2006) observed that (at least in some industries) spin-offs do not derive their superior average performance from any overlap with their parents and maintain, and on a highly speculative basis, that spin-offs have the necessity to deviate from their parents' trajectory to obtain success, establishing their sources of uniqueness and their competitive identity.

In order to shed a light on the tension between inherited patterns and the new trajectory that may characterize spawned ventures' development, Ferriani et al. (2012) proposed a process model of intergenerational learning and spin-off performance. In order to stress the reversible nature of the imprinting process, named reimprinting the moment of combination and re-combination of retained and new knowledge. According to them, then, imprinted organizational effects are not irreversible, they may be overridden and spin-offs,

thanks to interactions with the environment, may develop peculiar characteristics as a result of learning efforts.

Relevance of this contribution has to be found in that authors shed a light on the subsequent phases following the initial imprinting process and on events and conditions (deliberate or serendipitous) that have a role in deviation from parental pattern. Previous conceptualization is enriched by this contribution, by highlighting the reimprinting phases of a whole process of organizational learning. Moreover, authors explicitly refer to a clear distinction between spin-off's business model and parent organization's one, but this conceptualization still lacks of a framework to acknowledge along which dimensions and across which stages, business model is shaped and changes.

Is it just inherited technology that matters in shaping spawned venture' business model and addressing its subsequent metamorphosis, as in the case of the process of technology speciation, where the technological lineage is maintained but adapted to new market niches (Garnsey et al. 2008)? Or the spawning and its business model's metamorphosis are simply due to contributions (financial, professional and knowledge) from new participants? Are there also other dimensions, affecting business model and its evolution that persist over time and inform the way spawned ventures create value?

Further investigation is hence needed on these themes, since, as maintained also by Baum and Rao (2004), there is still much room to investigate on the structure of organizational inheritance that foster persistence and transformation over time of organizational processes and forms. The legacy approach, in this perspective, is crucial to shed a light on dimensions that inform founding conditions and performance of new organizations.

1.2 Spin-Offs and their Genetic Endowment

1.2.1 Spin-offs Definitions: Multiplicity and Heterogeneity

As already mentioned interesting phenomena to look at, for addressing lineage related themes is represented by spin-offs. Spin-offs can be defined using the form proposed by Agarwal et al. (2004), as "a distinctive class of entrepreneurial entrants that inherit knowledge from industry incumbents through their founders". The definition here presented, is crafted

adopting a knowledge-based perspective, which assumes that knowledge is acquired largely through personal experience (Nonaka, 1994); moreover, as stressed by the authors themselves in that definition the underlying principle of organization is the generation, combination-recombination, and exploitation of knowledge as suggested by the widely cited works of Conner and Prahalad (1996) and Kogut and Zander (1996). For those reasons the chosen spin-off definition is best suited to be applied both to academic new ventures and to corporate ones: in both cases inherited knowledge of different kinds (e.g. from technological knowledge to market pioneering one) leads to a new organizational venture and may also produce different kinds of organizational outcomes (Huber, 1991).

This definition however, is crafted adopting a knowledge-based perspective and assumes a process of knowledge inheritance by a progeny firm (e.g. Phillips, 2002) needs to be integrated with relevant contribution by Klepper and Sleeper (2005), whose main and explicit focus is on heredity. Building on Nelson's contribution (1995) they use the notion of heredity to analyze spin-offs that they consider a different class of industry entrants1. Spin-offs are, indeed defined as "entrants founded by employees of firms in the same industry" and because of this they "inherit general technical and market related knowledge from their parents that shape their nature at birth".

The aforementioned definition we decided to use for spin-offs builds on knowledge-based view of the firm and puts forward the issue of legacy. This approach is clearly consistent with the view that considers entrepreneurs as organizational products, as suggested by Freeman (1986) who in analyzing innovative new ventures concluded that they emerge – directly and indirectly – from already existing firms, since their founders because of the skills they acquire are more credible, and are also best placed to know about un-served or badly served markets. Moreover Burton et al. (2002) building on Freeman's argument argue that "entrepreneurial opportunities and resources accrue to incipient entrepreneurs as a function

[1] There is a great heterogeneity on definitions of spin-offs and there are is a also distinction between spin-offs and spin-outs. This distinction refers to the involvement of the parent organization in the creation of the new venture, the possibility that members of the board of parent organizations hold stakes in new ones, the possibility that members of the founding team for the new venture are still affiliated with the parent organization where they have developed knowledge and competencies exploited in spawned entrepreneurial activities. However, consistently with the purpose of this study, we will not take into account those distinctions which could be misleading for the identification of the object of analysis and that could lead to not have a clear cut-off criterion.

of the structural position of their prior employers", maintained that established firms differ markedly along their rates of entrepreneurial activity.

This approach that builds on the imprinting argument as proposed by Burton et al. (2002) and Agarwal et al. (2004) and surely allows to conduct a thoroughly analysis of the phenomena of the creation (and growth) of spin-offs ventures, spawned both by academic institutions and corporate ones. The reason for the choice of carrying out a twofold inquiry is that in the spin-off literature, two types of parent institution have been identified: higher-education institutions and well-established industrial firms represent the two major sources of new high-technology firms (Oakey, 1995). Moreover since universities and corporations have different research focus and a different orientation in performing marketing, production and distribution (Zahra et al., 2007) we might expect them to transfer different technological resources to their spin-offs.

At this point, it is worth to provide a definition for each one of the aforementioned phenomena that we assume to be different from one another. Both the definition we adopt are purposely very broad, in order to be consistent with the aforementioned considerations on the issue of legacy put forward by Agarwal et al. (2004) and by Klepper and Sleeper (2005). In literature it is possible to find also different definitions for university spin-offs, since, by the time, authors have observed a wide and differentiated range of companies originating from universities and other public funded research institutions[2]. However the most suited definition, also because of its strong coherence with the reality of academic spin-offs in Europe refers to academic spin-offs as companies "founded by employees of the university around a core technological innovation which had initially been developed at the university" (Wright et al., 2004); this definition[3] has also been shared by Mustar et al. (2006) and Rothaermel et al. (2007). On the other hand, a corporate spin-off, for the purposes of the present study is to be identified with a "separate legal entity that is concentrated around

[2] A multidimensional taxonomy for the heterogeneity of research-based spin-offs is provided by Mustar *et al.* (2006). Their framework and the related map is developed from a review of papers published since 1990 on new high-technology ventures and spinoffs and the differences among new technology ventures are assessed in relation to three streams of research: RBV, business model perspective and the institutional perspective.

[3] No matter if the owner of IPRs rghts is represented by the university itself, as for the case of the definition adopeted by Shane, 2004 and shared also by the US Association of University Technology Managers.

activities that were originally developed in a larger parent firm"[4] (Sapienza, Parhankangas and Autio, 2004).

1.2.2 Corporate Spin-offs v/s Academic Spin-offs: Lineage from two Types of Parent Institutions

1.2.2.1 Prior Studies on the Initial Endowment of Spawned Ventures

Prior research has already focused on the impact of certain inherited components for spawned ventures performance, altogether most studies have looked at the endowment of the solely spawned firm, considering only one dimension of inherited patrimony transmitted through employees mobility. Scholars have focused on the importance of founders and top management for the future trajectory of individual organizations and significant contributions have been made (e.g. Boeker, 1989; Eisenhardt and Schoonhoven, 1990; Bruderl et al., 1992; Bruderl and Preisendorfer, 1998; Baron et al., 1999; Romanelli and Schoonhoven, 2001; Klepper and Sleeper, 2001) stressing how important was prior career experience and in particular, general business experience (Bruderl et al., 1992; Bruderl and Preisendorfer, 1998), specific industry experience (Klepper, 2002; Shane and Stuart, 2002), start-up experience (Bruderl et al., 1992) for the survival of new founded ventures. The concerned dimension of inherited patrimony, however, was revealed at the progeny level, it was mostly indicated in resources, knowledge (e.g. Agarwal et al., 2004; Klepper and Sleeper, 2005) or routines (Phillips, 2002) and feature knowledge by employees as a by product of their previous employment that they can profitably exploit in their own firms (Klepper and Thompson, 2006). A proper, comprehensive and also continuous link to parental antecedents of some inherited factors is missing.

The same problem we have when considering all the extant literature that has looked at the role of network in favouring or harnessing imprinting. In this stream of research the network was the main (inherited) feature of the spawned that has been investigated, with the result of a lack of a comprehensive framework for the whole process of imprinting and

[4] Also in the case of corporate spin-offs definitions are different and are more or less narrowed according to the purporses of the study.

subsequent development of the spin-offs forms and structures. The persistence of network structures is something that researchers have investigated focusing on the reasons why network structures persist. The first description of the phenomenon of persistence in network structures was provided by Walker, Kogut and Shan (1997), who noticed a path dependence in the formation of the inter-organizational network among biotech firms. In that case they found strong support for the idea of reproduction of the network over time by new firms in the biotech industry, compared to the opportunity of establishing new relationships. A similar result was obtained also by Uzzi and Spiro (2004) who found how pattern of connections among individuals persisted in Broadway musical industry even if, over ninety years there were significant changes in the industry. Those studies were important in demonstrating the persistence of network structures but didn't provide meaningful insights on how founding social conditions affect the persistence of founding conditions5.

We contend that we have to ascertain the influence not of a single inherited factor per se on the formation and growth path of the spawned venture, we have to look for the set of dimensions that may be crucial for the choice of a certain business model by the spin-off and that prove to be crucial also for the process of deviation from imprinted patterns. The interest that informs the whole research process will be both in continuity and discontinuity, and in order to address both of these issues the best approach, especially with reference to the process of imprinting is to look at it, trying to reconstruct the moment of inception, also taking into account which were the conditions existing at the parent organization.

1.2.2.2 Blueprints Heterogeneity across Corporate and Academic Spawned Ventures

While trying to investigate the role exerted by imprinted patterns and the extent to which it is possible for new ventures to deviate from imprinted trajectory with reference to those dimensions connected to business model choices, we make a further assumption. The

[5] According to Marquis, the focus on how the founding conditions influence the social form is the main aspect that differentiates path-dependece arguments from the imprinting one, as it was conceived in Stinchcombe's formulation, where he claimed that "the date of the (growth) spurts is highly correlated with the present social structure".

following assumption clearly descends from the imprinting argument and its implications may prove to be of a certain relevance above all for entrepreneurs, officers of public research organizations and policy makers. We contend, indeed, that because of their origin, academic spin-offs are distinct from corporate ones, have a different lineage and so it is for dimensions that determine imprinting process and exert an influence on business model choices.

As already mentioned and illustrated in the previous sections of this paragraph, prior research has mostly investigated separately the phenomena of corporate and academic entrepreneurship, thus overlooking the differences across them. Only few studies, have investigated and recognized the differences existing between new entrepreneurial ventures (more precisely high-tech start-ups) originated in the public research domain and other new technology based ventures (Clarysse and Moray, 2004; Ensley and Hmieleski, 2005; Moray and Clarysse, 2005). However, as stressed by Colombo and Piva (2008a) little insight is provided in those contributions about the influence of such peculiarities on firms' strategies and performance. Particularly significant, instead, was the research by Colombo and Piva (2008a) who introduced prominent peculiar differences between corporate and academic new ventures relying on insights from resource-based view of the firm and the literature on social networks and financial economics. Factors that differentiate academic new ventures from other new technology based ventures were identified in the lower initial funding gap and an higher and more consistent endowment of technical knowledge, still coupled with a lack of commercial knowledge and a search for relations, alliances and investors aiming at strongly protecting their technical knowledge from the risk of appropriability by third parties. These differences, as outlined also by other studies (e.g. Lockett et al., 2005; Colombo and Piva, 2008b) mostly depend on human capital characteristics of founders, and the values, beliefs and norms that they have developed during their professional experience in a given context, consistent with the institutional logics approach (Friedland and Alford, 1991).

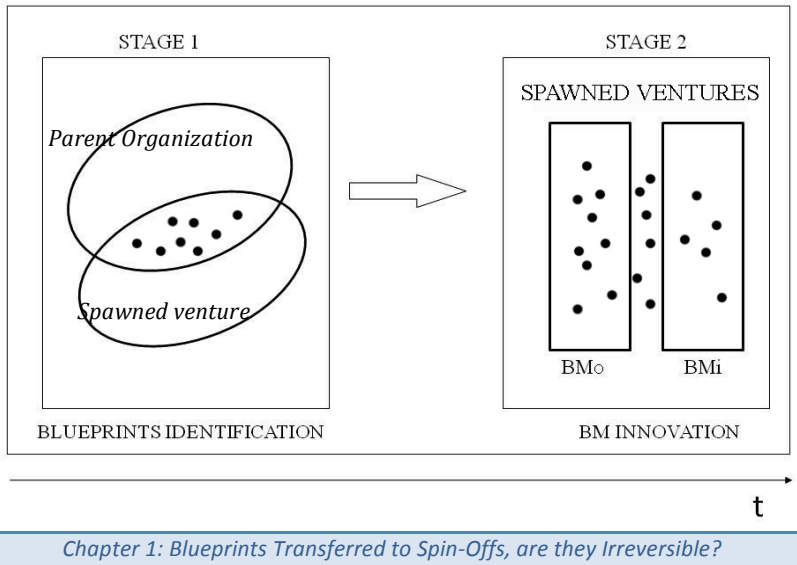
Aforementioned contributions dealing with the issue of differences in imprinting, put forward the issue of imprinting while referring it simply to public research institutions, rather than to both kinds of institutions. However it is possible to recognize some different features that may be inherited (and eventually discarded) from parent organizations and that play also a role influencing new venture subsequent evolution and, as far as we are concerned, also on

business model choices and innovation, as it will be better illustrated in the remainder of the our work.

1.3 The Need for a Holistic and System Activity Perspective

1.3.1 Lineage: Prior Organizational Studies and the Analysis of Single Inherited Dimensions

An approach aiming at discovering the factors that are more subject to be inherited and then eventually retained or discarded for business model design, requires that we first look at both the parent organization and the spawned one. Even if, in recent times scholars have claimed for studies that keep the process of spin-off creation analytically separate from its subsequent success or failure (e.g. Djokovic and Souitaris, 2008; Hackett and Dilts, 2004), in order to look at the evolution of the imprinted patterns during the development process of the spin-off, we still need to have a thorough understanding of the process itself of the transmission of genes and hence need to look both at the moment on new firm creation and at the moment when it develops its idiosyncratic trajectory. The process of transmission of genes, according to many organizational scholars occurs during a finite period of time and the need to study also "organizational parents" in order to understand growth patterns of the progeny descends from the imprinting argument itself (Stinchcombe, 1965). Forms and structures developed at the parent level, persist at the level of the spawned ventures (Ferriani et al., 2007) and it is of a certain relevance to understand which are the key features and properties of those forms and structures and, finally, if there is some heterogeneity across academic and corporate spawns.



1.3.2 Introducing Business Model Construct and the Legacy Approach beside the Construct

Since we are addressing research questions that cover multiple factors that may explain the roots of growth and value creation by spin-offs, a possible solution to address all this issues, is to introduce in the analysis the idea of business model. In doing so we have to be extremely careful, in clarifying from the beginning, what we meant by this locution and which dimensions will be involved in our analysis, also to be sure that the research could be of some use for other scholars.

Indeed, as maintained by different scholars, and in particular by Zott, Amit and Massa (2010), business model is often studied without explicitly defining the concept with a consequent lack of consistency and clarity in the research and in its contribution to management literature. In the attempt to review all the scientific and managerial production on the construct of business model, the same authors have identified the main phenomena that literature has tried to address and explain: strategic issues such as value creation, competitive advantage and firm performance represent one of the most relevant, together with innovation and technology management.

This review, furthermore, reveals a strong consensus that the business model construct, in most of relevant works, hinges on the construct of value creation (Ammar, 2006 defines it as a customer-centric construct) while highlighting the role of networks architecture for the value creation pattern, as stressed in the widely cited contribution by Amit and Zott (2001). This dual focus stresses the nature of the business model as a construct that seems to support an activity system perspective (Zott, Amit and Massa, 2010).

This activity system perspective surely informs the definition of a business model that has been provided by Chesbrough and Rosenbloom (2002) as acknowledged also by Zott and Amit (2009). In Chesbrough and Rosenbloom's view, "business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs. The business model is thus conceived as a focusing device that mediates between technology development and economic value creation".

Chapter 2:
Business Model,
to What Extent Is It the Result
of a Deliberate Choice?

2.1 Business Model Construct

2.1.1 What do we refer by using "Business Model" term? Why is "Business Model" Construct so relevant?

The starting point of any discussion or, even more, dissertation on business model, must be a clear and shared understanding of the object under our analysis, especially when this object is widely used by a large number of people with different expertise and in different knowledge and industrial domains.

The use of the business model term had began to flourish in practice and in management literature since the end of the 90s, with the emergence of the Internet, as a term to describe a particular approach to market and value generation in the era of e-commerce first development (Ghaziani & Ventresca, 2005). But this close link with internet-based companies, was also the cause of a first misuse and distortion of the construct of business model, which generated also a widespread scepticism among scholars on the rigor and usefulness of this managerial concept. However its "enormous practical value" (Magretta, 2002), allowed the concept not to be flawed, following the failure of many dotcom companies of early 2000s.

Business model, by now, is widely used because it is both a simple and relevant concept useful to understandably grasp and express, while not oversimplifying the complexities of how enterprises function. And so effectively is still, as observed by Osterwalder and Pigneur (2010).

In the remainder of this section, definitions provided by the time, by scholars and practitioners will be presented and discussed. For the moment, and for the purpose of having a shared understanding of what the object under our investigation is, we will refer to business model as the articulation between the different activities a focal firm designs and performs, to generate value to customers, capture this value.

Indeed, following Scheweizer (2005) and Hoppe and Kolmer (2001), the term "business model" is composed of the word "business" and "model": the first refers to the purpose of a company to make profits, while the second refers to "the description or representation of a system that is composed of different elements and the relationships between them".

The concept of business model we have just presented, for the purpose of generating common understanding of our construct, is consistent with the large part of the definitions so far introduced in literature. It captures the main points highlighted, by the time, by the authors who confronted with the theoretical modelling of business model construct and also by practitioners: (coherent) articulation of firm's activities, value generations, value capture and distribution (e.g. Amitt and Zott, 2001; Chesbrough, 2002; Magretta, 2002; Baden-Fuller and Morgan 2010; Osterwalder and Pigneur, 2010). Business model, hence, provides an integrated description of a firm and the way it generates revenues (Ghaziani and Ventresca, 2005, Schweizer, 2005).

"Does the idea of business model matter?" is the question that many scholars have begun to answer only recently. For a relatively long time, this concept has been considered fuzzy by scholars who have under appreciated the topic, being much more concerned with strategy, competitive advantage, core competences, resources and strategies (Baden-Fuller and Morgan, 2010).

Generally speaking the idea of business model matters, because it is "profoundly important to the world of work" (Baden-Fuller and Morgan, 2010). Indeed, the most relevant studies, for the number of research works they solicited and new knowledge they contributed to produce, deal with the idea of deepening the understanding of a concept widely used (and

probably even misused) and that for most organizations has proved to be essential for their success. However, besides the relevance for the practice, academicians are solicited to thoroughly analyse this construct also because of its "multivalent character" that impedes its easily compartmentalization (Baden-Fuller and Morgan, 2010). Indeed, the review of extant literature, suggests that this field of research is still highly fragmented.

2.1.2 Relevance of the Construct for Managerial Practice

We have already pointed out, that the concept of business model has observed a widespread use, because of its "enormous practical value". In this paragraph, we will outline the key reasons why the construct is so relevant for practice.

First of all, as Magretta (2002) observed, business model are not "arcane" and are not exclusively a matter of performance as measured by numbers. They are "stories that explain how enterprises work". Even if practitioners, do not immediately associate business model to story –telling and often are not aware of its power (George and Bock, 2011), other management scholars underlined the importance of the construct in generating a organizational sense-making (e.g. Demil and Lqcocq, 2010; Osterwalder and Pigneur, 2010).

Magretta (2002) observes that stories besides business model consent to answer to Peter Drucker's age-old questions on who the customer is, and what he is willing to pay for, and questions relevant to each manager such as the question on the way to make money in a certain business, or the way to reduce costs. Moreover, if we consent in looking at business models as stories, we are also sure to include in our story and analyses two important parts of the whole narrative plot: all the activities associated with making something and all the activities associated with selling something to someone who values it. Obviously the narrative value of business model construct, is much more relevant when considering the power of the plot to get people aligned in the organization, helping them to understand the role of their jobs for the organization; the good plot that business model expresses, furthermore, is of capital importance for external communication, since it helps in attracting possible partners, investors and human capital, to be part of that story (Lounsbury and Glinn, 2001; Magretta, 2002; Downing, 2005; George and Bock, 2011).

A thorough study on the importance of business model, as a tool for organizational legitimacy, has been conducted by Demil and Lecocq (2010) and Casadesus-Masanell and Ricart (2010).

Besides the importance of business model construct for its story-telling value, to the world of practice, the most important value of the business model construct is to have a map, against which confront the linkages between activities involved in their value proposition. In other terms, business model is most relevant since it helps in organizational design (George and Bock, 2011). Business models in this sense, act as templates, and in many cases industry-based templates, that may help, above all emerging companies, to individuate the elements to be designed and shaped and the patterns to be adopted.

In other cases the map is not regarded as a roadmap with the clear evidence of all the patterns, it is more simply a recipe (Baden-Fuller and Morgan, 2010) or an architects' construction model to be precisely designed, while individuating the firm-specific (organizational) design. The aspect of having a map or a recipe is so important that to this approach is dedicated an entire coral publication, one of the top best-seller among management books, *Business Model Generation* edited by Osterwalder and Pigneur (2010).

According to Osterwalder and Pigneur (2002), business models help in "understand, communicate and share, change, measure, simulate and learn more" about company's business and conceive business models, as a "building plan". In 2011, the same authors, above all to help practitioners, propose the idea of business model canvas, as a tool which resembles a panter's canvas, composed with nine preformatted business model building blocks, whose design may have similarities among different companies and across industries. The tool can be used to "paint" pictures of new or existing business models. Practitioners use this tool, its building blocks and the recurrent patterns, or similarities, which the authors have individuated too, to do a "reality check" on the business model designed for a start-up, making sure that all the process aspects have been designed; otherwise the canvas is used to purposely design business plan, thinking through all the aspects of a new entrepreneurial project or even as a reminder to the teams for holistic thinking about the business, without being stuck on details.

Moreover, authors provide also the indication on the phases of the process to be followed and all the techniques (from the world of design) to generate better and more innovative business models.

Having a business model conceptualization at hand that describes the essential building blocks and their relationships makes it easier for managers to design a sustainable business model.

2.1.3 Relevance of the Construct for Management Literature

Although management scholars where at first sceptical in doing research on the topic of business modelling, by the time research on this filed has flourished. At the beginning of 2000s, the business models were seen as being "inextricably linked with the onset of the Internet " (Baden-Fuller et al., 2010) and this happened because, at a first stage, management studies on business models were exclusively intertwined with studies on Internet-based companies (e.g. Rayport, 1999; Afuah and Tucci, 2000; Mahadevan, 2000; Damanpour and Damanpour, 2001; Lee, 2001; Amitt and Zott, 2002)

However, starting from those studies, a high number of research works has been produced, both going in-depth into the concept of business model itself, both analysing this firm's activity system across different industrial sectors. Nowadays the concept, as observed by Zott and Amit (2010) in its system activity perspective, has been used to understand changes in the organization of activities performed by a focal firm in different industries.

Indeed, in literature, we find studies on business model that have been conducted in various sectors, ranging from industry and computer science (e.g. Amit and Zott, 2001; Chesbrough and Rosembloom, 2002; Bower, 2003; Doganova and Eyquem-Renault, 2009) pharmaceutical and biotechnology industry (e.g. Mangematin et al, 2003; Willemstein et al., 2007; So et al., 2011), fashion (e.g. Saviolo, 2002; Moore and Birtwistle, 2004; Giesen et al. 2007) to, obviously, e-commerce (e.g. Amit and Zott, 2002; Osterwalder and Pigneur, 2002; Dubousson-Torbay et al., 2002).

Maybe the flourishing of the literature on this topic is also due to the particular nature of business models: indeed as observed by Doganova and Eyquem-Renault (2009), business models are "strange entities" and some scholars are still sceptics about the relevance of such

a concept to offer "sound depictions of the future prospects of enterprises", following Porter's contribution (2001) who questions the (scientific and practical) usefulness of this construct and analyse why it cannot either help practitioners (e.g. Porter, 2001)[6].

Different streams of research on business model can, hence, be detected, since scholars have continuously be interested by the theoretical development of a concept (or simply a tool?) whose use has became largely widespread among practioners (e.g. Afuah and Tucci, Amit and Zott, 2001; Chesbrough and Rosenbloom, 2002), especially in high-technology industries (e.g. Delmar and Shane, 2003). Moreover, also investors still refer to it as a "key ingredient of their economic endeavours" (Doganova and Eyquem-Renault, 2009).

The frequently asked questions posed by scholars in management literature about the meaning and rationale of the construct (Honig and Karlsson, 2004; Magretta, 2002, Baden-Fuller and Morgan, 2010), and some of them still show their reluctance on its usefulness. One of the most recent studies, that investigated the rationale of the construct, was the study conducted by Osterwalder (2004) who emphasized the model aspect of the construct, as intended in scientific domains: since models are supposed to help understand, describe, or predict how things work in the real world by exploring a "simplified representation" of a particular entity or phenomenon, thus business model will help in understanding, describing and predicting "the activity of buying and selling goods and services and earning money in a company" (Osterwalder, 2004, p.14). The idea of deepening the scientific sense beside the business model construct has been also the object of the theoretical investigation by Baden-Fuller and Morgan (2010). But instead of focusing simply on the aspect of the model as a simplified representation of a particular phenomenon, they valued the relevance of the construct, showing how, as it is in the domain of science for any model, it could serve to create a taxonomy or a typology. In this sense business model act as "classifying device" and are particular useful for accruing the understanding of business phenomena and the development of ideal-types. Furthermore the authors also highlight for management literature the value as instruments for scientific inquiry, in order to develop knowledge about how and why is successful as business and why it is profitable. If we consider business model as the "managerial equivalent of the scientific method" is then easier to test own (managerial) hypotheses and revise if necessary (Magretta, 2002). Finally, Baden-Fuller and Morgan (2010),

[6] The strongest detraction has been from Porter (2001) that defined the construct as "fuzzy" and as "an invitation for faulty thinking and self–delusion".

acknowledge the importance of looking at specific business models as models in the sense of recipes, ready to be copied and also varied or innovated, according to circumstances. This last interpretation of model is the one that is closer to the world of management practice, as we already mentioned. The consideration of "business models as models" and modelling in general, may thus have a central role in progressing management thinking.

Second, the concept of business model is relevant and appealing also because, as maintained by McGrath (2010), suggests a change to the way that strategies are conceived and executed: business model, indeed, represents a useful approach to figure out strategies, particularly relevant in complex and fast-moving environments.

Nowadays new research on the construct of business model is being pursued and undoubtedly scholars acknowledge to the construct the value of providing a description, or representation, of the reality (to be) of the focal firm. The depiction of the (future) reality of the firm (e.g. Afuah and Tucci, 2001; Chesbrough and Rosenbloom, 2002; Teece, 2010), that emerged in entrepreneurship literature is then considered one of the element of newness of the construct, with a explicative and predictive power in regard to the value created by a new venture (Amit and Zott, 2001)[7].

Another reason for what business model construct is relevant to management studies is that the business model construct provides new insights also on business strategy studies. Some scholars, indeed have deepened their focus to investigate the connections existing between the classical topics of management literature and business model construct. According to Magretta (2002), it is simply a matter of competition: strategy implies competition, and how to deal with (and do better than) competitors is a matter of strategy, while business model describes, as a system how the pieces of a business fit together, doesn't factoring for competition, that is a matter of strategy. Besides this first conceptualization on the connection between strategies and business model, other scholars use a more instrumental approach to explore this link and are also able to trace cleaner boundaries: as

[7] Partly consistent with this view of a construct having a highly explicative and predictive power, some scholars have investigated the usefulness of business model construct and have focused in their story-telling power. Business model, indeed, may be regarded to as a tool for providing evidence for the feasibility of an innovative project and gaining the interest of third parties. In this perspective, the focus is on what business model do, beside what they are and require to take into account not only "the object that they represent (a new venture), but also the audience, for which this object is made visible and put into words" (Doganova and Eyquem-Renault, 2009)

maintained by McGrath (2010), business model is a relevant construct for management studies, especially when considered in its relationship with strategy, because it suggests a change to the way that strategies are conceived and executed: business model, indeed, represents a useful approach to figure out strategies, and this is particularly relevant in complex and fast-moving environments. This view is the same that inspires Osterwalder and Pigneur's designer oriented view: business model and in particular the tool of Business Model Canvas they propose, helps in re-interpreting strategy and strategically examine the environment and how it may evolve (Osterwalder and Pigneur, 2010).

Casadesus-Masanell and Ricart (2010) contribute to this debate on the link between strategy and business model, adding that business models are nothing that the "reflection of the firm's realized strategy", thus blurring again the boundaries around the two constructs, especially if we consider that they define strategy as "the choice of business model through which the firm will compete in the market place". The different positions we have just mentioned, provide a sound example of how relevant is the topic of business model, especially in its link with strategy and how important is further research in order to increase understanding of the essence of business model and the place it has in social and organizational sciences.

Another reason for the relevance of Business Model Construct to management studies is represented by the new perspective it may offer in deepening the understanding in organizational learning and how it unfolds.

Recent studies on business models have also began to investigate the relationship between business model and time. Studies focusing on the dynamic perspective of the business model construct have began to question the approaches that see business models as the result of an explicit planning activity by managers (as it prevails in Osterwalder and Pigneur's view, 2010), preferring a discovery-driven approach (McGrath, 2010) and a transformational one (Demil and Lecocq, 2010; Sosna et al., 2010). In particular, Demil and Lecocq (2010) adopt the transformational approach to "integrate voluntary and emerging dynamics in business models, by considering several potential sources of evolution" while not completely refusing the idea that business models may be recipes or blueprints. Sosna et al. (2010) in the attempt to study the antecedents and drivers of business model innovation propose a two-phased process of trial-and-error learning for business model innovation. As

observed by Osterwalder et al. (2005) the relationship between business model and time is still little discussed in management literature and dynamic perspective has only recently been incorporated into research on this topic (Demil and Lecocq, 2010), the adoption of business model construct may also help in clarify the effects of management decisions on firms' evolution and foster the thorough understanding of processes of organizational learning that encompasses a various number of activities.

Finally, a relevant element of the construct, that has been introduced into management literature, (and whose relevance for managerial practice we have already analysed) is related to its holistic properties thus consenting to transcend the focal firm and span its boundaries for the analysis of the activities involved in value creation. This holistic perspective allows to take into account the interdependencies among activities that are "created by entrepreneurs or managers who shape and design both the organizational activities and the links (transactions) that weave activities together into a system" (Zott and Amit, 2010; Zott, Amit and Massa, 2010). According to scholars, the most relevant advantage of adopting the activity system perspective is that it encourages managers and entrepreneurs to holistic thinking when designing business model, instead of concentrating on individual and isolated issues.

2.2 Definition

Despite the flourishing of literature on business models, a precise definition of what a business model is, it is still missing. Zott et al. (2011) denounce the adoption of idiosyncratic definitions which fit the purposes of undergoing studies but that are difficult to reconcile with each other, thus resulting in the production of nonaccretive quality of the literature on business models (George and Bock, 2011) and the alert of Eden and Ackermann (2000) on the lack of a construct definition is still there. Scholars (e.g. Schweizer, 2005; Zott et al., 2011; George and Bock, 2011) denounce that except for some studies, research on business models has not built on extant research to build a coherent framework.

In the following pages, we will deal with the different definitions of business model that have been produced by the time, in order to build the framework for the choice of the definition that we will use in our research. No new definitions of course will be provided,

making the modest attempt to build upon an already existing contribution. Of course, we will also provide reasons for the choice we made.

Attempts to represent business models and highlight its components have already been made and some authors have even proposed a (e)business model ontology (Osterwalder and Pigneur, 2002) that is the "conceptualization and formalization of the essential components of a business model into elements, relationship, vocabulary and semantics". Business model ontology is conceived to decompose business models into several levels, having diverse depth and complexity. The main and basic components that are individuated as crucial for business model are infrastructure, financing, customer and offer.

But other authors that have attempted to provide representation of what precisely a business model is through textual definitions and graphical representations (e.g. Amitt and Zott, 2002). One of the most widely known attempt is the one made by Afuah and Tucci (2001) and the other is the one made by Afuah (2004). Afuah (2004), sharing what has been identified the activities system approach and focussing on firm's profitability, refers to the following business model components: activities, resources (which include competences and capabilities), position and industry factors. This decomposition however is mostly conceptual, and does not permit to capture extensively all the elements that in the case of spin-off may constitute the objects of a lineage transfer from parent organization to the spawned venture.

As a basis for our empirical enquire, we prefer then to draw on the older contribution from Afuah and Tucci (2001) that helps in keeping track of blueprints and eventual deviations from them. The decomposition proposed by Afuah and Tucci (2001) is articulated as follows:

- Customer value: is the position toward customers expressed in differentiation or cost leadership strategies;
- Scope: the customers served by the firm and the range of products and services that embody the value offered by the firm;
- Pricing: choices related to the charged price;
- Revenue source: where the income comes from and who will pay for what value and when, it refers also to definition of margins in each market and finding out what drives them;
- Connected activities: set of activities the firm has to perform to offer its value and when and it expresses also how activities are connected;

- Implementation: the company defines the fit between connected activities and organizational structure, systems, people, and environment;
- Capabilities: possessed and needed for allowing the firm to offer the value better than other firms and difficult to imitate.
- Sustainability: how the firm keeps in making money and sustains competitive advantage.

A remarkable property of this decomposition of business model construct is that it also is consistent with subsequent empirical assessment of the business model design construct and with its validity in explaining firm's performance, such as the one attempted by Amitt and Zott (2007). Business model is formally described as depicting "the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities".

Always according to Zott and Amitt (2009) content, structure and governance are the fundamental design elements of an activity system like the business model that describe its architecture. Content refers to the good or information that are being exchanged and to resources and capabilities that are required to enable the exchange. The element of structure instead refers to the parties that participate in the exchange and the ways in which they are linked, while governance refers to the ways in which relevant parties in the exchanges control the flow of information, resources and goods. Another advancement of business model theorization is furthermore determined by the individuation of design themes that may characterize business model choices; those themes that are not mutually exclusive and may be present at a certain extent in any given business model are individuated in novelty, lock-in, complementarity and efficiency (Zott and Amit, 2009)[8].

Innovation and efficiency have already been regarded to as the common design themes that connect the elements of a business model (Zott and Amitt, 2007) and efficiency-centered business model design refers to measures aimed at achieving transactions efficiency, while novelty centered business model design refers to "new ways of conducting economic exchanges among various participants".

[8] The individuation of those themes moreover, stresses the holistic dimension of the construct of business model, since it helps in understanding why this construct builds on ideas advocated by the main theoretical frameworks of strategic management and entrepreneurship research, such as Schumpeter's idea of innovation as an act of creative destruction, the resource-based view of the firm, Porter's value-chain framework and strategic network theory

Recent contribution to management literature, however challenge those definitions, trying to enrich them, in order to further develop theory on business modelling, to overcome literature fragmentation on this topic and to take account of faster developments in business practice. As observed by Onetti and Zucchella (2012) literature on the topic is still fragmented and lacks any clear conceptualization, especially for what is related to the interrelation among the strategic design and management of business models and business model innovation. According to them, especially in technology based ventures, it is possible to "explore the embryonic and innovative business models established by entrepreneurs and firms to meet the challenges of rapid technological change, environmental turbulence and globalization". In particular, since they maintain that for science-based ventures, strategic decisions and growth processes are characterized by a deep inter-relationship amongst the processes of internationalization, innovation and entrepreneurship, they propose a new definition for business model that emphasizes also the internationalization of the activities accounted for in business model design, beside the aspects of entrepreneurship and innovation. Based on previous research work, made in high-technology contexts and following Onetti et al. (2010) they define business model as "the way a company structures its own activities in determining the focus, locus and modus of its business".

Scholars, though maintaining the system activity perspective, try to enrich the construct emphasizing the relevance of location decisions. According to Onetti et al. (2012) location decisions have not been considered by extant business model literature, even though the importance of the geographical dimension has been highlighted by David Audretsch and Taylor Aldridge, especially in such contexts which are characterized by the participation of scientists to entrepreneurial activities. They hence suggest that business model affects the firm's collaboration incidence and that processes of innovation and internationalization are deeply intertwined, since transnational social capital, contributes to scientist entrepreneurship (Audretsch and Aldridge, 2008; Greiner and Ang, 2010). The locus of firms' processes needs hence to be considered in holistic concept of business model and this conceptualization has the prerequisite to apply not only for high-technology ventures, but it has also general applicability.

2.3 The Relevance of Business Model Construct to Our Study

2.3.1 The Relevance of a Holistic Approach

Prior research studies aiming at discovering peculiarities of academic small ventures and factors that differentiate academic high-tech start-ups from other newly technology-based start-ups (e.g. Bruderl et al., 1992; Chiesa and Piccaluga, 2000; Colombo and Piva, 2008a; Colombo and Piva, 2008b) are really important in our model because they allow to assume that heterogeneity between academic new ventures and other new technology based ventures exist also (and perhaps in a greater extent) for those elements that may affect business model choices and innovation in the case of academic spin-offs and corporate ones.

As already mentioned, most of the genetic characteristics that allow to distinguish academic new ventures from others are to be found mainly in personal characteristics of founders and their competence endowments. The human capital characteristics of founders, determining what they know and are able to do, have a strong impact on firms' initial endowment (e.g. Lockett et al., 2005), we have to understand how this effects unfold on business model and how long they will last.

Building on findings from Colombo and Piva (2008b) we contend that academic spin-offs inherit from their founders a richer and stronger technical knowledge than their corporate counterparties whose commercial competencies are, instead superior, together with general competencies in managing a firm. Moreover as far as relational capabilities are concerned, again consistently with findings by Colombo and Piva (2008a and 2008b), we contend that academic spin-offs will inherit a stronger propensity to team up with other people from other public research organizations, thus fostering a process of subsequent innovation also in the case of business model designs, while a strong orientation to market will lead founders of corporate spin-offs searching for partners that will shorten the period of return for investments. Moreover, we may also assume a stronger propensity for corporate spawned ventures to look to go public and look for research and commercial partners more willing to speed up the process of market commercialization of resources with which they are endowed, for instance recurring more extensively to licensing agreements.

Consistently with the components which spin-offs may inherit from parent organization having institutionally different strategic orientation and traits, we can hence

assume that spawns originating from a public context will be closer to novelty-centered business model design, while spin-offs originating from existing companies will be closer to efficiency-centered business model design features.

Our problem is now to understand whether and how those business models change and if their assumed heterogeneity is preserved by the time because of persistence of imprinted pattern by parent organizations or, on the other hand, if this heterogeneity is eliminated by learning processes that, in the same industry, lead to a similar business models also in the case of firms having, institutionally, a different endowment.

In order to provide an answer to all the questions that have emerged in this brief essay and to account for the factors that may engender or harness a process of evolution of firms, we think also that a twofold analysis is requested: its main objective would be to shed a light on factors that may prevent or foster reimprinting in organizational context that are different since the moment of inception. In other words, this means trying to assess the relative strength of imprinted patterns of different kind, how long they did survive and whether or not deviation on certain dimensions, rather than others, produced an impact on performance.

2.3.2 Is the Business Model Construct Steeped in the Legacy Approach?

Among the questions that have been unresolved by extant literature on business model, is the one about eventual business model path dependence (George and Bock, 2011). One of the purpose of this study is to shed a light on the idea that path dependence processes, affect business model since the inception of the firm and since its first design. And also general mechanism for the evolution of successful or dominant business models remain unexplored.

The idea why we choose the business model as the core concept to understand the process of imprinting and of (eventual) deviation from imprinted patterns is that, as stated by Chesbrough and Rosenbloom themselves, the business model construct assumes a legacy approach by itself: authors consciously maintain that knowledge held by the firm, its customers and third parties is cognitively limited and biased by the early steps of the firm, hence also by what it has inherited. According to the authors it may also well be that the forces that apply in a de novo venture are similar in character, although they may present

differences in the degree, to those forces found in (successful) established firm. Moreover, the idea of engaging in effective business model design activities that has been put forward by Zott and Amit (2003) and pushed forward by Osterwalder and Pigneur (2010) allows for modelling some aspects of what may be close to deliberate reimprinting choices. In fact, building on previous research findings, (e.g. Aldrich, 1999; McGrath, 2000) they stress the importance for firms to adapt business models design to their own particular markets even when they replicate (inherited) business models of existing organizations.

Thus using such a holistic framework and analyzing how it has evolved through the time and along which dimensions, we are then able to observe whether there is a similarity in kind of forces inherited from established organizations, and whether a deviation from imprinted patterns has occurred.

The idea of using the business model construct is not new in management study with reference to spin-offs, and in particular to academic research-based spin-offs (Bower, 2003). Moreover, we are supported in the choice for the opportunity of looking at business models as a mean to look at the evolution of the firm also by choices made by Vohora et al. (2004) who looked at the (radical) changes in business model, in order to account for the dynamic process underlying firms' emergence and growth. Also Druhile and Garnsey (2004) adopt a dynamic perspective while analysing the interplay between the entrepreneur's prior knowledge and experience; they observe that business models are altered as entrepreneurs improve their knowledge of resources and opportunities, thus putting forward, in our perspective, the issue of a deviation from the imprinted patterns.

Having assessed the value of using business model and thus a system activity approach to analyze spawned ventures, the characteristics they have (inherited) at the moment of founding and the deviation from imprinted pattern, we now need a representation of this holistic framework in order to delve into involved processes and to specify, hence, the definition we choose to deal with the construct.

2.4 Architecture and Themes which Shape Business Model Construct

As already mentioned, the review of extant literature, suggests that this field of research is still highly fragmented and that the definitions proposed for business model

construct are high in number. However, as illustrated also by Zott and Amit (2010) in their brief review of recent literature on business models we may ascertain some common traits to all the definitions which have been proposed. First of all, business models construct seeks to explain both value creation and value capture. Indeed, Teece (2010) observes that business model construct "cristallizes customer needs and ability to pay, defines the manner by which the business enterprise responds to and delivers value to customers, entices customers to pay for value and converts those payments to profit through the proper design and operation of the various elements of the value chain".

Moreover, the construct of business model itself refers to a unit of analysis that is distinct from the firm, the industry, or network" (Zott and Amit, 2010); even tough each definition is centered on a focal firm, however it considers firms' boundaries wider than those of the firm's itself. Finally, as it has been further developed in this chapter, business model construct represents a holistic approach to firms' activities design and representations since the construct "emphasizes a system-level approach to explaining how firms 'do business'" (Zott and Amit, 2010).

For the reasons we have just mentioned and also because of the high consistence in the two business model definitions provided by Afuah and Tucci (2001) and Amit and Zott (2007), finally, we choose as best suited business model definition, useful for the purposes of our inquiry the one proposed by Amit and Zott in 2007 and its subsequent development. (Amit and Zott, 2007; Zott and Amit, 2010). Even if it is true that definition from Afuah and Tucci (2001) helps in operationalizing business model construct and, above all, in tracking down all the possible elements that have been the object of lineage and that may influence business model innovation, on the other hand, we are persuaded that the tracking down of all those descriptors will not be easy, for instance because of the youth of the companies under inquiry or because the particular context companies are working in. Insofar, to operationalize our construct and analyse how business models arise and evolve we will use Zott and Amit definition (2010), also because it is the one that best suits the approach that looks at business model as a system activity construct.

We will hence focus of those parameters (some of them have already been mentioned) which "activity systems designers" must consider, because they describe the main architecture of the system and the sources for its value creation (Zott and Amit, 2010). The

parameters that describe the architecture of the activity system are referred to as *design elements*, while the parametes that describe sources for value generation are referred to as *design themes*. The remainder of this paragraph will be dedicated to *design elements* and *design themes* . Moreover we will also prefer this definition, because it allows for taking into account the dynamism, which is inside the business model construct.

2.4.1 Design Elements and Themes

As Already mentioned, Zott and Amit (2010) individuate as main design parameters that characterize an activity system its content, structure and governance. According to those authors, which thoroughly build on extant literature on the business model construct, those elements go far beyond the description of interdependencies among activities or notions of network structure.

They describe those design parameters as independent and orthogonal, however they acknowledge that this parsimonious choice has been made for the purpose of simplicity and conceptual clarity. Business models' design elements are instead highly interdependent and entrepreneurs and managers often have to simultaneously make decisions on all the parameters.

Supporting their theoretical development with examples coming from different industries, and drawing from extant research, Zott and Amit (2010), describe the activity system content as the selection of activities the firm should perform and the related actions needed to perform those activities. The activity system structure is intended as the description of the *modus* in which activities are connected and sequenced, while the activity system governance refers to who is in charge of performing the activities.

For what concerns themes, authors propose also a classification of design themes they consider relevant to ascertain the dominant value creation drivers. Zott and Amit refer to those themes by the acronym NICE which stand for *Novelty*, *Lock-In*, *Complementarities, Efficiency*.

Propositions emerged from the literature review and discussed above are presented in the following Box.

Propositions

1a *Content, Structure and Governance for a spin-off's business model depend on characteristics inherited from parent organizations.*

1b *The choice of business model design themes may not deliberate and clear-cut*

2a *Business models are altered as entrepreneurs improve their knowledge of resources and opportunities, thus putting forward, in our perspective, the issue of a deviation from the imprinted patterns*

2b *Content of activities is the design element whose persistence is assumed to be higher, together with their governance, while the change in structure is supposed to be more likely*

3a *Because of their origin, academic spin-offs are distinct from corporate ones, have a different lineage and so it is for dimensions that exert an influence on business model choices and innovation*

3b *Academic spin-offs' business model will be more focused on innovation-oriented design, while for corporate ones efficiency-oriented themes will prevail*

2.5 Business Model Design and Evolution: Choice or Legacy?

It is not easy to draw a conclusion and answer to the question posed in the title of this paragraph. Much of the aforementioned research work, proposed the idea of business model as a deliberate choice, by the management team in charge. And also large part of recent contributions refer to this idea as a consequence of interrelated and deliberate decisions, made at different levels at the moment of enterprise foundation. This approach obviously claims for an high degree of integration, thus promoting its consistent generation by managers and proposing schematic and simple model (or tool) to help the business model generation (Osterwalder and Pigneur, 2010). However, as already mentioned, some recent studies have begun to question this approach, while preferring a contingent one, that

moreover, stresses also the aspects of narrative and sense-making of the tool, thus challenging the idea of a directive approach to business model design, preferring an emerging one, that seems also to be consistent with our idea of lineage of elements that may affect activity system design parameters and themes.

2.5.1 Business Model Design: the Legacy Approach beyond this Framework

We have already mentioned that the Business Model construct hides a legacy approach. The most relevant (and widely cited in subsequent studies) contributions that introduces the idea of transfer of genitival elements that may affect business model design are the one by Amit and Zott and (2001) Chesbrough and Rosenbloom (2002).

In particular the research conducted by Amitt and Zott (2001) showed that traditional configurations of firms asset and managers' resistance to experimentation may prevent change in business model. This hindering effect is not explicitly referred to parental heredity, but since it is due to management resistance, it is not excludable that this resistance may have been developed at the parent organization, as it is in the case of designing business model for a new technology: the business model the firm has previously adopted for an extant technology is likely to be same that managers will design also for a new technology, no matter if it disruptive as compared with the old one (Amit and Zott, 2001). Actually, as observed by Chesbrough (2010), the idea of barriers to business model experimentation (and so the idea of legacy) was already present in Christensen's reflection on disruptive technology: according to him, incumbent organizations' survival is threatened not by the inability to develop a disruptive technology, but by their inability to develop the business model that matches for that technology (Christensen, 1997).

Furthermore, this idea of legacy hindering business model autonomous design is put forward by Chesbrough and Rosenbloom (2002) who individuate the legacy barrier to business model experimentation and innovation in "dominant logic", building upon the contribution of Prahalad and Bettis (1986). According to Chesbrough and Rosenbloom (2002), the dominant logic may represent a cognitive barrier that impedes managers to recognize what the right business models ought to be.

It is important to notice, while commenting on studies which denounce the existence of "business model heredity" that in Christensen (1997) and Amitt and Zott (2001) perspective, managers are aware of the characteristics of the ideal business model for the firm to capture value from a new technology, but inherited constraints limit the possibilities to organize the whole set of activities as they wanted. Instead, in the case of Chesbrough and Rosenbloom (2002) contribution, authors assume the impossibility, due to dominant logic, to perceive how the "ideal" business model is, which are the characteristics that its activities and links must have to create value to customers and appropriate this value for the sake of the company.

2.5.2 The Possibility for Business Model Innovation beside the Influence Exerted by Legacy

In the previous section of this chapter, we have already referred to the recent attention paid by scholars in investigating how business models change, which are the antecedents and drivers of business model innovation, or, instead, the barriers to this change. For the purpose of our research work, it is now useful to go thorough such contributions that introduced the idea of the possibility for company to overcome barriers due to inheritance and that try to explain how the process of business model innovation unfolds.

The starting point of our reflection is a more recent contribution by Chesbrough (2010) who solicits managers to expand their perspectives for the individuation of the appropriate business model that allows to capture value from firm's competencies and technology. In particular they solicit management and organizational commitment to experimentation. According to the author the idea of experimentation is consistent with the scientific approach which considers "business model as a model" (Baden-Fuller and Morgan, 2010) and allows for constructing maps of business models. Using maps, it is, hence, possible to clarify the process which underlie business models, and which may "allow them to become a source of experiments considering alternate combinations of the processes" (Chesbrough, 2010, p. 359). However, besides the use of maps, that could serve merely as diagnosis tools, to promote experimentation and innovation with the models, in Chesbrough's view it is

necessary to promote the process of effectuation and rely on organizational leadership. The process of effectuation refers to creation of new business –and consequently new business models- without thoroughly analysing the environment, but taking actions that create or enact the market for its own value proposition (Sarasvathy, 2008). By the locution "organizational leadership" refers to a subsequent step after effectuation, that he considers vital for changing the business model and consists of leading the change in the organization, thus engaging in business model experimentation. Moreover, Chesbrough solicit the identification of internal leaders for business model change.

The idea of experimentation, however, has also been the object of enquiry by McGrath (2010) who suggest that experimentation has a central role when considering a more dynamically oriented approach to business modelling. In particular, instead of focusing on the idea of effectuation and on the role of an (internal) organizational leader, concentrates her attention on the learning-by-doing processes. While acknowledging that business model design and evolution are highly path-dependent, she maintains that experimentation is the key to further business model innovation, not only within a single firm, but also across industries. New business models emerge on a discovery-driven approach guided by experimentation and not simply thanks to superior resources (we will say, inherited or not) which have been the object of careful planning in terms of business model design.

Aforementioned contributions are relevant because, as maintained also by Demil and Lecocq (2010), show how the business model construct is subject both to a static approach (that implies careful planning and posits also path-dependence trajectories, as a blueprint for the coherence between core business model components) and to a transformational one, which uses the concept of business model as a tool to address change and innovation. However those studies, while showing how business model change may be fostered, basically thanks to experimentation to overcome patterns imprinted by previous experiences (or also by parent organizations), they do not model which dimensions or elements of business model construct are more likely to be affected by the result of experimentation process.

A step forward in trying to understand how business model innovation unfolds has been made by Sosna and colleagues (2010); authors by case-study in-depth analysis stress the concept of trial-and-error learning process as the base for business model change, thus shading a light on the difference between business model conceptualization and

implementation, which by the time, has been identified as an important but under-researched area, as already showed above. In the analysis they made, the trial-and-error learning process is accrued and leveraged by the relevant length of time during which experimentation took place, a possibility that is not opened to start-ups as authors explicitly refer, by entrepreneur's psychological and emotional character, and by previous repositories of learning.

In particular, the lastly mentioned contribution is highly consistent with the research questions we propose and with the assumptions we already made and one of the results of this research work will be to expand with insight from other case-studies the propositions Sosna et al. (2010) put forward.

Part II: Evidences Collected in the Empirical Setting

Chapter 3:

Model and Method of Analysis

3.1 Reasons for conducting the study only in Italian Biotech Industry

3.1.1 Reasons for the Choice of One Single Industry

The analysis has been conducted in only one industrial sector. Even if examples of industries where spin-offs are high in number are many (e.g. laser industry, consultancy and legal services, semiconductor, automobile, pharmaceuticals), we have decided to limit the analysis to only one industry: the biotech. The reason for this parsimonious choice has to be found in the need of controlling for diverse contingent and industry specific factors that may have a relevance in determining business's models choices by the spin-offs, thus preventing to clearly isolate business model innovations due to persistence or discard of lineage elements.

Hence, the nature of this study and its purpose suggest not to adopt a cross-sector analysis; furthermore, since the choice of the industry to analyse cannot be completely separated from a preliminary idea on the particular field we want to study, the focus only on a particular industry, the biotech one, has been determined also by the characteristics of the industry itself. Further explanations are provided in the remainder of this chapter.

3.1.2 Reasons for the Choice of the Biotech Industry

We now have to provide a sound explanation for the reason we choose the biotech as the industry where to select case studies for our investigation. According to the Organization

for Economic Cooperation and Development (OECD, 1989), biotechnology is the use of scientific and engineering principles (based on microbiology, genetics, biochemistry, chemical and biochemical engineering) to transform materials using biological agents with the aim of producing goods and services (OECD, 1989). Some of the examples of obtainable goods are pharmaceuticals, new diagnostic kits, foods, chemical compositions, and environmental control and treatment of effluents are, instead, some examples of services offered.

Biotechnology is one of the most attractive empirical contest for research in management and entrepreneurship themes because of its impressive growth and the subsequent entrance of many new ventures (Owen-Smith and Powell, 2006).

The exploration of the relationship between business and science is perceived by many scholars as a fundamental issue, maybe because for many of them in no other industry science and business are so tightly interrelated as they are in biotech. Indeed studies concerning companies that have born to profit and grow to exploit R&D efforts, although advancing scientific knowledge are perceived as much more relevant also because they help in the further development of the science itself. In particular, as observed by Pisano (2006) for science-based business "experimentation and innovation in business models, structures and arrangements are as important to the health of these sectors as the experimentation and innovation in the science".

Moreover studies in this filed have flourished also because of the disappointing performance of a whole industry that, at first sight, seemed to offer great opportunities in terms of science advancement and wealth creation, particularly in the field of drug discovery (e.g. OECD, 1989; Powell et al., 1996; Long, 1998; Audretsch and Stephan, 2001; Baum et al., 2000; Deeds et al. 2000), that is also the privileged field for this research study. A large number of scholars began to question about the causes of this unmade promise, focusing on different aspects ranging from regulatory and policy explanations (e.g. Casper, 2000; Zechendorf, 2004; Rosiello and Orsenigo, 2008; Montpetit, 2011), to strategic and organizational ones (e.g. Pisano, 1991; Liebeskind et al., 1996; Powell, 1998; Lowe and Gertler, 2000; Orsenigo, 2001; Nosella et al., 2005; Pisano, 2006; Teece 2010).

In this study, our focus will be on managerial issues, since we are deeply persuaded that the study of business choices and practices in such a particular science-business and the

analysis of successful performances will also help in understanding industry-level dynamics and guiding more effective policies, above all at the regional level.

Until this point we have stressed the intrinsic relevance of the choice of the biotech sector, but as already anticipated, we have also to provide a much more consistent explanation for not having attempted any comparison with other sectors, and in particular other sectors where science and knowledge content are relevant too. Our parsimonious choice , however is supported by analogous decision made in the past by other researchers, both conducting qualitative and quantitative research. The sciences behind biotechnology create a very specific set of "functional requirements" for the business and involve "unique challenges based on the nature of science that stress traditional business models, approaches and arrangements".

In particular, Pisano (2006) who studied extensively the field, observes that the distinctive "anatomy" of the sector hinders any comparison and borrowing of models from no other industry. "Anatomy" is intended by Pisano (2006, p.14) as the "roles of various types of players (new entrants, established firms, universities, etc.) and their strategies; the institutional arrangements, such as markets for capital, labor and know-how that link these various players together; and rules of engagement, composed of regulations and norms that shape behaviours and interactions". "Anatomy" of biotech industry in particular, also because of the characteristics of the underlying science, cannot be associated to anatomy of any other industry and so it is also for strategies adopted by firms in the industry and for the business models they design. During the first decades of development of this science, the vast majority of companies, start-ups and companies generated both by academic and corporate organizations, have extensively and "indiscriminately borrowed business models, organizational strategies, and approaches from other high-technology industries under the (false) premise that if it worked there, it will work also in the biotech industry".

Scholars have already observed that even though some industries such as semiconductors or software, and systems for innovation appear to be similar to the biotech, in fact they are not, and it is not possible to extend to the biotech sector organization, business models and practises that have already worked elsewhere (Feldman, 2003; Powell et al., 2005; Pisano, 2006). This work, will hence contribute in understanding the unique challenges companies are claimed to face and the peculiar elements which are assumed to

characterize implemented strategies, organizational structures, and business models of the biotech industry; thus contributing in shading a light also on those organizational and strategic elements that in the past may have prevented the growth of some companies and the flourishing of the whole scientific field. In particular, biotech industry differs from other industries essentially because knowledge at the basis of the entrepreneurial activities in most cases comes from basic research conducted in universities; although there are diverse companies that all over the world are engaged too in basic research (Pisano, 2006).

Even though many scholars have investigated various factors which affect performance of biotech firms involved in developing and commercializing new molecules or processes (e.g. vertical integration, cooperation with main pharmaceutical companies, funding, interactions with public universities, localization) according to Pisano (2006), three are the main issues and the "functional requirements for the business" that claim for deeper investigation: risk management, integration and learning. The specificity of the biotech business along these dimensions, prevents to borrow models and practices from other industries. In particular, the "biotech business puzzle" needs, to be solved, that integration and learning are effectively achieved, since commercialization of IP and collaboration has already helped in resolving the issue of risk management.

Finally, the choice of the biotech industry (and in particular the field of drug development) has also been made easier because biotech is also one of the industries were spin-offs are high in number and are a substantial fractions of entrants and in addition this industry, being both high-tech and science-based, is characterized by a significant evolution in company organization and management (Nosella et al., 2005) thus being a good context where to investigate how business models form and evolve, how imprinted patterns are impressed and how deviation may (or not) occur. We assume that the construct of business model and its holistic approach may help in explaining also, as suggested by Pisano, what prevents integration and learning and how established spin-offs, generated from different parents, cope with those issues (Pisano, 2006).

We are also confirmed in the choice to analyse business model construct in a science-based industry as biotech, also by recent research work in this field. Indeed, as observed by Onetti et al. (2012) "business model" and "business model design" had become key challenges for management, particularly in industries characterized by new and emerging technologies.

They claim that literature on the topic is still fragmented and lacks clear conceptualization, thus providing a promising context for research on this subject. Indeed, in the last decade the emergence and rapid growth of science based industries have accelerated the need for new and innovative business models; according to them business modelling is an essential construct in competitive positioning and in value creation for new technology based firms and constitutes the key element of their strategic design. This work may, hence, provide a useful perspective and help in exploring the relationship between business model design and strategic management in new technology based firms and, in particular, life sciences.

However, since our purpose and research objectives are quite ambitious, some words of caution are necessary. In the remainder of this research work, we will be confronted with practice and look at some actions put in place by managers from selected case studies to improve performance. As suggested also by Pisano (2006), there are no easy answers or good data to demonstrate, in this industry, which practices work better than others. Moreover the small sample of "winners", the highly stochastic nature of R&D activities for drug development and the relatively short time frame constrain researchers' ability to draw inferences from specific company examples, and to identify, true best practices. We hence hope not to get precise answers or to detect best practices in business model design from existing companies, but we hope to get at least clues from them.

3.1.3 Reasons for the Choice of the Italian Biotech Industry

The Italian biotechnology industry is characterized by a rapid development of scientific knowledge and a high level of technological complexity that nowadays represents highly competitive and qualifying key factors. This area, indeed, recorded positive results and is highly competitive at international level. The following considerations are drawn on the basis of the report yearly published by the Italian Association for the Development of Biotechnology (Ernst & Young, 2011, 2012) and by extensive scanning of press releases and newspapers articles.

As a matter of fact, in Italy the biotech field is a growing sector and its economic actors are companies with strong structure that over time have learned to establish concrete and efficient collaboration through which support and further develop technological

innovation. Also in Italy, indeed, biotechnology is one of the emergent sector and its development is largely based on the naissance and creation of a large number of research-intensive small and medium enterprises.

As a result they employ over 5,000 people in the R&D and effectively capable to bring on market the results of their research activities, achieving more than 6,000 million euro revenue per year. For example, in 2011 in Italy the red biotech, which is the leading sector of the entire biotechnology industry, had a turnover of 6.811 billion euros (96% of total biotech) and has invested in R&D € 1,691 million (92% of the total value of biotech companies).

This dynamic has resulted in an increasing interest of the academic Italian and international researcher that in little more than two decades have studied the main economic and business profiles related to the field of biotechnology, the number of alliances, acquisitions and mergers that characterized this filed for several years. Besides, biotech sector has aroused the interest of venture capitalists and multinational companies given the potentiality in the development of new inventions, products and services and their commercialisation.

The youth of the Italian industry and the high dynamism that characterizes its main actors, in terms of competencies developed, patents approved, research publications made, number of companies of new constituency, variety of adopted business models are all the same interesting characteristics this context particularly interesting for our analysis. In particular, the changes observed in the characteristics and markets served by Italian companies and also the mortality we observed and the frequent changes in Boards' composition reported by the press, claim for a further investigation on business model characteristics and innovation.

3.2 Why a Multiple Case-Study Approach

As already mentioned, we can account for a limited number of studies dealing with the issue of individuating dimensions of business models inherited from parent organization and reinforced or (sooner or later) dismissed by spawned ventures themselves. Our research questions ask for an inductive approach and for developing a model from extant literature and

field data. Multiple cases will be selected and analyzed thus alimenting a recursively process among extant literature and collected data.

This design is well suited to approach our research question since the phenomena under investigation are very recent and this method allows for filling up a lack of prior theorizing (Eisenhardt, 1989). Grounding of the emerging theory in the data is especially useful in early stages of research on a topic, since it is not also yet clear the extent to which research questions are informed by existing theories. Using case studies is a well suited research strategy for "examining contemporary phenomenon in its real-life context" (Yin, 1981). Moreover, inductive case studies approach is best suited since the analysis will take place within a specific context and also since the focus is on a process and hence on how questions (Yin, 1994; 2008).

The starting point of our research, must obviously be description and classification (Kerlinger, 1973; Gladstein and Quinn, 1985) of all the involved aspects of expected interesting dimensions of business model, which may have been affected by the parent-progeny relationship. This is sort of a discovery phase, necessary to collect the qualitative data, useful to understand which dimensions of the business models of the spawned company are affected the most by parent-progeny relationship. The purpose of the research, indeed, is not to provide a representative picture of the whole reality. We need to delineate connecting ideas and hence to collect evidence from detailed empirical examples to inform theory and look for elements of the process that may naturally occur at the time of new venture creation and then inform its subsequent development or look for patterns that differentiate spin-offs and how they carry out their activities.

The case-oriented process we adopt is highly iterative and has a tight link with emerging data. In conducting this research we will follow the roadmap traced by Eisenhardt (1989) for providing a contribute to theory building and follow Yin's (2008) suggestions on the design of case study research. Research questions and propositions are purposely defined in not precise ways and there are no strict constructs, since they are both tentative in this type of research; the formulation of assumptions clearly reflects this approach: they are crafted in a way that they have not guaranteed place in the resultant theory, and they can be revised and reformulated as a result of serendipitous findings during the iterative research process.

3.3 Criteria for Identifying Selected Case-Studies

Selected case studies have been chosen on a theoretical, and not on a sampling, basis. Since we are trying to trace imprinting and then reimprinting process having as a reference the business model construct and since this construct in the meaning here adopted is linked to value generation and appropriation and hence to firm's profitability, the first control criterion we decided to use in selecting case studies is represented by spawned ventures orientation to (economic) profit. The second criterion we decided to use is represented by the age of spawned ventures: the idea is to limit the temporal interval during which companies were founded in order to set aside any variation in the imprinting and reimprinting processes (and hence in business model innovation) due to sudden improvement and change of notable technical developments that occurred in the industry (Klepper and Thompson, 2006). Also for the same reason, we decided also to take into account only biotech firms involved in the process of pharmaceutical research and development (red biotech) and not in other fields were biotechnologies are applied (e.g. white biotech, green biotech, grey biotech).

However, given the research questions we are trying to address we have selected case studies looking, during our preliminary scanning of a wider population of biotech spin-offs, to such cases for which business model evolution over time was clear and manifest and at first sight seemed not easily reversible. Starting from the data-base of red-biotech companies available at the Italian Association for the Development of Biotechnology, we individuated in the first time ten case-studies that reflected the aforementioned criteria, and, additionally, benefited from high attention by industry observers and specialized press. The list was then shortened thanks to the help of some experts who have a deep knowledge of the field, a tenured professor from a southern Italian University who extensively researched into the field and a well-known Italian journalist who dedicates in his work great attention to highly innovative industries and companies, especially SMEs. Their contribution was relevant since it allowed to focus the attention on those companies whose histories were richer in terms of facilitating the exploration of the research questions we are interested in.

The cases selected for the study are five: two of the involved spin-offs have been spawned from universities, while two of them have been spawned by prospective profit oriented companies. All the four companies are located in Italy and were founded between 1996 and 2003. We contend that concerned spin-offs have inherited different blueprints, related to the contexts where they have been generated, we aim at ascertaining if this difference in lineages is reflected too in the business models they adopt and affects also business model innovation. The last case-study we will analyse is a spin-off that has been generated as joint venture from a public research institution and a corporate, a big player in the pharmaceutical industry: the analysis of this hybrid venture may obviously help in shading a light on the assumption about heterogeneity of blueprints since it is possible to observe if lineage is effective and which elements are involved when influence is exerted by both kind of parents.

Parent Organization	***Spawned Venture***	***Year of foundation***	***(Current) Activities***	***Current) Ownership***
Corporate Small Player	*Indications for Rareness*	2001	Research, Development, Manifacture	Public
Corporate Big Pharma	*Alii Discovery, synthesis and follow up*	2001	Research, Development, Manifacture, Trial	(Totally) Private
Academic University	*Best in class antagonist*	2000	Mainly Research, Development	(Totally) Private
JV Academic University-Small Company	*Compounds et alia*	2003	Research, Development	(Totally) Private
JV Research Institution-Corporate Big Pharma	*Park Molecules*	1996	Research, Development, Manifacture, Trial	Public

3.4 How Research on the Field Has Been Prepared

3.4.1 Assessing the Relevance of a Comparison among Academic and Corporate Spin-Offs in the International Scene

One of the first task we decided to perform was assessing the relevance of the research questions we derived from literature and a preliminary data scanning and case-studies selection also for stakeholders, differently involved in the activities of biotech ventures. Basically the idea was to assess if this research work would have been of some use to people daily facing scientific and managerial decisions in the industry. Furthermore, beside the straightforward usefulness of this approach to manage our research, we must also stress that when designing a case-study research, a relevant part of the research project relates to the preparation of a case study protocol and in particular to an in-depth discussion of protocol topics, their importance and the possible types of evidence to be collected in relation to each topic (Yin, 2008).

In particular, since our focus of investigation is on those blueprints elements that may affect business models, because of the holistic approach of this construct, we decided to prepare our case study protocol, and assess the relevance of our study involving all the stakeholder that have an interest in the business model a biotech company adopts; we then decided to involve also Venture Capital Fund Managers and business Development Managers from multinational pharmaceutical groups, even though they do not directly design or decide to change business models. Furthermore, in order to be sure that questions under investigation are of some relevance to the whole scientific community, we decided to get suggestions and proofs of relevance for our work in a purely iterative approach, by doing the assessment thanks to the collaboration of stakeholders representative of the industry at the worldwide level, and coming from most advanced and dynamic scientific and entrepreneurial contexts in the world.

3.4.1.1 The importance of Focus Groups in our Research Design (to Assess the Validity of Assumptions and Collect Hints for in-depth Analysis)

The Focus Group technique has long been utilized in social research to study ideas in a group setting [Morgan, 1988]. Focus Groups were rediscovered during the 80s by academics as an alternative or a complement method to others for qualitative research, such as interviews and participant observation. Their widespread use in a number of fields ranging from education, management, sociology, communications, to health sciences, social psychology and political science suggests that focus groups can be effectively designed, fielded, and analysed from varying perspectives and priorities (Stewart et al., 2007). In particular focus groups draw on three of the fundamental strengths of other qualitative methods; these strengths are exploration and discovery; context and depth; and interpretation (Stewart et al., 2007). Focus groups are frequently used to learn about either topics or groups of people that are poorly understood (Morgan, 1996).

A focus group is defined as a moderated discussion among four to ten participants who share their thoughts and experiences on a set of topics selected by the researcher (Morgan and Spanish, 1984). The term focus indicates essentially that the interview is limited to a small number of issues (Stewart et al., 2007). Focus groups are distinguished from other kind of groups by the primary purpose of research, a procedure producing interactive data and that groups are gathered independently of the fact the group exist in other situations as well (Wilkinson, 2004).

The questions in a focus group are open ended even if they are carefully predetermined and the sequencing although it may seem spontaneous, it is carefully planned (Krueger and Casey, 2000). According to Morgan (1996) three are the essential characteristics of a focus group: first, focus groups are a research method devoted to data collection; second, the interaction in a group discussion is the source of the data; third, the researcher has prominent and active role in creating the group discussion for data collection purposes and may act or not as a moderator of the discussion (Morgan and Spanish, 1984).

Some scholars stress the difference among focus group and group interviews, distinguishing the two by the prominence of the role of moderator.

In our perspective what is most important for the use we will make of data collected through focus groups is that this research tool may be used as both a self-contained method and in combination with surveys and other research methods, most notably individual, in-depth interviews (Morgan, 1988; Morgan, 1996). Hence, focus groups may be used as a primary research tool) or as a supplement to other methods of research, thus a secondary research tool (Morgan 1988). Indeed, the focus group technique is particularly useful as an support method when little is still known about the phenomenon but also can be used as a confirmatory method to test hypotheses [Stewart et al., 2007]. In our analysis focus groups will be used as a secondary research tool, supporting our iterative process of research. This choice is wide common in qualitative research and investigators' reasons for combining individual and group interviews typically point to the greater depth of the former and the greater depth of the latter (Crabtree et al., 1993). This strategy has the advantage of first identifying a range of experiences and perspectives, and then drawing from that pool to add more depth were needed (Morgan, 1996). In particular, when used as a preliminary to interviewing, focus groups offer the researcher a chance to develop an interview schedule which is grounded in participants understanding of the topic (Morgan, 1984).

Thanks to focus groups we will able to assess the assumptions we made through partial and preliminary knowledge of the phenomenon of business modelling by spin-offs having different parents and we will also get hints and suggestions on those elements of business model design that claim for an in-depth investigation through personal interviews. In our case we can look at focus groups as a tool providing a "useful guide" (Morgan and Spanish, 1984) for further exploration of our research questions with our key informants for each selected case study. Beside, this technique may also let emerge a sort of "shared model" (Morgan, 1988) that participants (in our case, the representative of biotech companies' stakeholders) may have on key issues that affect business model design and evolution.

With this purpose, we will be able to maximize the major advantage of focus groups that is the chance to observe participants engaging in the interaction on specific attitudes and experiences which are of our interest (or which should be).

Otherwise, to gather similar information and insights, this would take several rounds of preliminary interviews simply to get into the field. (Morgan, 1988) and, in any case, this would have prevented to benefit from the examination of a full stream of interaction.

Thanks to information gathered through interaction, in the remainder of the research we will also be able to deepen our analysis especially on those aspects of management of biotech spin-off companies, that the participants *choose* to present in groups, and on issues which are followed in the later discussion. Furthermore, we will also get valuable data also on the extent of consensus and diversity among the participants. Indeed as emphasized by Morgan and Krueger (1993) what makes the discussion in focus groups more than the sum of separate individual interviews is the fact that the participants both query each other and explain themselves to each other. The ability to observe the extent and nature of interviewees' agreement and disagreement is a unique strength of focus groups (Morgan, 1996).

Furthermore the analysis may be enriched by having recourse to multiple focus groups they allow for understanding of the range of opinions of people across several groups and provide a much more natural environment than personal interviews, since participants may interact. This, of course, preserves the interaction as the source of data, still allowing individual differences of opinion to be voiced (in different groups) [Krueger and Casey, 2000]. Even though the recourse to multiple focus groups was possible also in our research, however we decided to stop our data collection to a unique ad rich Focus Group, also because we had recourse to this tool to support our preliminary knowledge of the industry and the relevant issues in the filed we are going to analyse.

Based on Stewart et al. (2007) we contend that there are at least three key reasons focus groups are an appropriate evaluation technique for our research purposes:

a) *Flexibility*. Focus groups allow for an open format and are flexible enough to handle a wide range of topics.

b) *Large Amounts of Rich Data*. The focus group interactions produce a large amount of information in the form of qualitative and quantitative feedback. This rich data set allows for a deeper understanding of selected issues, and may shade a light on other issues that may be present in a business environment that would impact the design.

c) *Building on Other Respondent's Comments*. The group setting with its opportunities for interactions allows for the emergence of ideas or opinions that are not dealt with in individual interviews.

3.4.1.2 Evidences from a Focus Group Held with Academic Entrepreneurs, Managers and VC Managers

As suggested by scholars in research methodology, the illustration of evidences collected through focus group, is not sufficient to explain its value: information on group composition and steps which where followed to gather such data are needed as well. Interpretation of such data is not independent from the way data were collected (Morgan, 1996). In particular, according to Morgan, in order to maximize the research value of data gathered through focus groups, report should include information on how the panel was composed and why this choice, the relevant background of group participants, the degree of moderator and researcher involvement in governing the interaction among participants, and the summary of questions. Clearly, report should include how data were analysed and which are the fundamental issues that emerge.

For what concerns group size, in the literature, the recommended size group varies, as well as recommendations about the degree of standardization in its composition. Morgan (1988) talks about six to ten participants, as "moderate sized" groups. Moreover, other authors, such as Krueger (2000) suggest also not to expand too much the number of participants for discussion on complex topics, smaller groups with less than eight participants are frequently preferred. All those precautions are due to ensure productivity to discussion and hence to data gathering.

Consistently with those recommendations, seven participants composed the focus group in our research, all of them are executives in industry leader companies. All of those companies, over the past years were ranked in the list of best fifteen companies prepared by an international editor, specialized in analysing the biotech industry and the scientific and business advancements of involved companies. This editor is currently the premier news source for the industry in the world and daily provides a review of latest biotechnology articles on biotech industry leaders, emerging biotech companies, VC deals, regulatory decisions, and other biotech industry news.

Moreover, each year a panel of experts among the editor committee and staff ranks the fifteen best companies from reader and staff nominations. The criteria for being included in the shortlist require status as a privately held drug developer or platform biotech with high-

potential to come up with a scientific innovation having a huge impact on the treatment of human diseases. The final ranking is obtained evaluating individual companies based on their pioneering technology and innovative business models. The companies in this ranking are able to show great potential, cutting-edge technologies, brilliant executive teams, even in crisis period. Executives coming from some of those companies have participated to the focus group with the purpose to discuss the current landscape in life sciences and the successful drug development and partnering strategies that are important to successfully run a biotech company and that have proved to be relevant for them.

As already mentioned, since focus group in our research study is used as a tool to support our knowledge of the field and to assess the relevance of our assumptions based on literature, the standardization of the tool in terms of characteristics required to participants was minimum and most of the key stakeholders for a biotech company were represented. The only characteristics that participants shared was being executives at companies involved -at different levels and with respect to different activities- in the development of new biological drugs, with the potential to have a huge impact on human health. Of course, as for most of the people working in science-based industries these executives shared also a common education background, having been trained in medical and chemical and pharmaceutical schools. For them, as usual in biotech industry the development of managerial capabilities was subsequent to "technical" education and gained frequently having reached an MBA Program, but above all through multi-years experience. As already mentioned a wide range of roles were represented: CEO of a young and medium-sized start-up, Business Development Managers at both small companies and multinational ones; Acquisition and Licensing Director at a huge multinational; Manager at a Corporate Venture Fund, in charge of acting as a board member in small companies already acquired; Scientific Director at venture-funded company founded in 2005 and participated by both private and public investors[9].

[9] ID 2 is the CEO of a start-up, which has developed a molecule, currently in phase I clinical development, and as well has a unique discovery platform for developing targeted covalent drugs that treat rare diseases. Prior to joining this company, ID 2 served as vice president of business development and vice president of strategic operations at another start-up. Through the course of her career, ID 2 has had a fairly wide variety of role in business development, in regulatory affairs, in venture capital, in both large and small companies, in Europe and in the US.

ID 3 is the Head of Europe Strategic Transactions for a multinational pharmaceutical company. He is responsible for the acquisition and licensing of drug programs or companies. He has extensive experience in evaluating and negotiating transactions with small and large companies. Prior to this

The focus group was held as a part of a more comprehensive industry event, thanks to the help of one of key industry observer who acted as a moderator. The venue was at a flagship conference organized by a partnering firm for the global life science industry, which has a long tradition in facilitating the biotech-pharma partnerships. The aforementioned editor provided his support to our research, by letting us to present to mentioned panellists our questions during a more comprehensive debate on characteristics required to successful biotech firms. The role of the moderator was very active in controlling the topic but not the group's dynamics, letting the participants free to interact among themselves. The level of standardization and structuration of the procedure was, hence, not so high and the participants were encouraged to pursue their own interest in relation to the topic being

---

experience he was Head of Business Development for two European companies. He also served as responsible for worldwide licensing for two specific therapeutic areas for another multinational pharmaceutical company. He also advised as a consultant to biotechnology and pharmaceutical companies on business development strategies and execution.

ID 4 works at the corporate venture fund of a pharmaceutical multinational company. He covers all steps of the investment process for this fund, and also serves as board observer for the fund on the boards of recently acquired companies. Prior to joining this multinational, ID 4 was responsible for Investment Management at a boutique venture capital in Switzerland focusing on early stage investment in a variety of technological areas.

ID 5 serves as vice president of corporate development at an entrepreneurial pharmaceutical company with a large pipeline, based in the US, where he has also served as a leader in business development. Prior to joining this company, ID 5 was vice president of corporate development at a specialized family of funds, where he managed business development strategies and interactions for biotechnology and pharmaceutical companies.

ID 6 is Associate Director for Licensing and Corporate Development at European pharmaceutical company founded during the 40s. Previously, he has served for the same company as the Head of Licensing In. Before joining this company, he served as a Brand Manager for a well known Suisse-based Pharmaceutical Company and also as a Product Manager for a US-based pharmaceutical company.

ID 7 works for one of the largest pharmaceutical company where he has served for his entire career. By now he is the Head of Business Development, but he has served as Acquisition Manager, dealing with one of the biggest financial operation that was recently concluded. He also served as director for local business in the US and was in charge of closing several acquisitions projects and important in-licensing operations.

ID 8 is CEO a private, venture-backed therapeutic antibody discovery and development company for the treatment of infectious disease and cancer. Previously ID 7 served as Chief Business Officer at company, leader in developing innovative oral medicines, where he led the partnering and M&A processes. He has more than twenty years of experience in the biotech industry, including business and corporate development strategy and business practices. He led acquisitions and joint-venture activities as well as alliance formation, and deal making. He also worked in a team that developed and launched one of the blockbuster of recent years, he participated to one of the most important joint-venture in the pharmaceutical industry as well.

focused on. The moderator, of course introduced the setting and mentioned that the purpose of their conversation was to share their experience, mentioning also our research setting.

Consistently with the purpose of using focus group data to gather data for a better understanding of the dynamics that guide value creation and appropriation in the industry, also the questions shared with the moderator weren't so structured, being open-ended and allowing for the deepening of different perspectives by participants (Morgan, 1988).

The first question was to provide some personal information in order to get acquainted and to provide clues on the activities they were engaged in; each participant was hence asked to present himself specifying their current and previous work experiences together with information on their education and training. After this introductory question, another general question was asked on the main relevant dimensions to account for having success in the industry in these years. The aim of this question was to allow participants to select primarily those aspects that are more relevant in their own perspectives and to extent of activities each of their companies performs. Related to this question was the second one, for genting considerations on participants' expectations on the future of biotech ventures and more generally on evolution of the industry as a whole, in terms of scientific progresses as well. Finally, the last two questions were on the relevant changes that participants observed in investors' attitudes and the kind of partnerships they are looking for on the behalf of the companies they represent.

The focus group conversations were audio-recorded and verbatim transcribed. The conversations were in English and this helped in preparing notes for their analysis and interpretation and for their subsequent use in the remainder of the research. The analysis in the first place, has been built on what the participants have made available in the conversation, which means that analysis has been conducted on rather detailed transcriptions, though in the remainder of this chapter only some simplified excerpts are quoted. In a subsequent moment analysis has turned also on the interaction order and on the common content of the answers in order to have a better and more complex view of opinions and positions of group members -especially on dimensions of business model design- that may help a biotech company to survive and successfully compete and interact with other stakeholders in the industry. This analysis, moreover allows also to be sure that it is of the

highest quality, because we can show that we attended all the evidences collected and addressed the most significant aspects of our enquiry.

From extensive textual analysis of transcribed conversations, we detected recurrent themes in the words of participants: panellists from large companies together with Fund managers, involved in Business Development Activities, very frequently in their answers used the words strategy, plans, risk, and deals. On the other side, CEO and Directors of small and medium-sized companies very frequently used the words science, project, product, targets (for indicating particular disease they are working on).

Since Focus Group was conducted after having scanned through the relevant literature on companies' birth in the biotech industry, and relevant literature on the organization of activities by companies in the industry, a sort of predicted pattern of analysis already existed. The analysis of focus group answers, hence, followed this theoretically predicted pattern. In some cases the patterns coincided, in other cases didn't, thus providing insights on issues which need additional analysis and enriching the recursive approach that informs our research.

From some of the answers we derive that managers and executives that are differently engaged across the life science value chain, stress the necessity to have a clear and well-designed strategic vision for their companies and the products they realize, beside being at the hedge scientifically. This dimension matches our proposition that companies need to deliberately individuate strategy and above all the way they create and appropriate value.

Excerpt n. 1

" The success of a biotech company is all about the drug! Companies don't make drugs is the drug that makes the company, however you need to start thinking to have a market for your product. The worst that can happen to you is to develop a product, go through the whole process and then discover that there is non market for your product".

Excerpt n. 2

" A great biotech company is a company that has a sustainable business. It means that a sustainable company has the opportunity and knows how to make revenues and profits. Some biotech companies don't see the big picture,

don't see that competition is fierce and do not are aware that is important to have opened up different options for the company".

Excerpt n. 3

"Certainly being scientifically at the hedge is necessary, but invest consciously in scientific relationship is also a key to have success and letting people sharing knowledge and speed up the business".

From other passages, we derived also confirmation about the value of our twofold analysis which will attempt to compare corporate and academic spin-off, searching for differences in inherited genes, differences that may affect business model as well. Moreover, some declarations seem also to confirm that academic spin-offs are much more oriented to novelty, while corporate ones are more concentrated on efficiency.

Excerpt n. 4

"The possibility for the biotech companies to innovate is higher because of less formalized processes, especially when innovative ideas flow from companies nested in universities or public research institutions. This is the real game that biotech companies have to play. But especially academics, when confronted with business have to think about also business collaborations and not only research ones. We ask a lot of information, but we are not enemies and we do not ask immediately for rights, we believe that we are working with colleagues with their own rights and especially founders have to note that and build their strategy around this model".

On the other hand, we had also some insights on the fact that understanding the paths along which partnerships are signed and how relevant they are for the further evolution of business model is crucial for our analysis. In the patterned line of analysis probably the value of partnership has been underestimated and threated simply as one of the many dimensions that may characterize business model design and evolution both for academic and corporate spin-offs.

Excerpt n. 5

"Companies need to understand early that they need to sell the product to big pharma companies and my task is to transmit communications from biotech companies to pharma. I agree with the panel that when you have two entities coming together that are trying to jointly develop something it is really key to have a good alliance and a good relationship."

Excerpt n. 6

"We got the impression that we had a very professional team on the other side that was really anxious to give us a good sale, transparent and many good feedback which was something that also builds trust and confidence on both sides of the table."

Excerpt n. 7

"Many players from technology and space and what was really attractive to us when we were approached by our partner is that effectively the company had no prior experience in the field. It was very clear that it was sharing with us a long term goal of future growth and we were able to preserve the identity of the company, the arrangement and recognize for once the scientific and clinical potential of our pipeline. It was also something really important for us, this long term view and this willingness to preserve the identity".

3.4.2 How the Interview Protocol has been Prepared and Relevant Issues Have Been Detected

One of the most important sources for our the construction of our data set will be represented by interviews made to people involved in important phases of the spawning of the new venture and in its subsequent development. The choice of people to interview thus will fall on members of the founding teams, other stakeholders having a determining role in

the founding of the company, people in charge of managerial tasks during the founding but also subsequently, and whenever possible, investors.

Because of the importance to get data through interviews allowing to trace all the elements that may have been object of inheritance and in order also to detect also all the factors that may have influenced companies and especially business model evolution, we decided to run some preliminary interviews to test the interview protocol. Moreover the need to run preliminary interviews is also due to the inherent complexity of the field under investigation, which, as mentioned in previous sections, hinders also the comparison and the borrowing of models from the other sectors.

A first draft of the questionnaire for semi-structured interviews was prepared on the basis of the theoretical framework we presented. Questions, hence, were selected to trace elements of inheritance ascribable to the parent organization and to caught all the aspects referred to business model dimensions. In order to profit the most from the interaction with interviewee the questionnaire, even if semi-structured, is of capital importance especially for the understanding of how assumed deviation from the imprinted patterns unfolds, since those data are not easily acquirable from other sources.

The first version of our questionnaire, presented a section for acquiring homogeneous personal information on career paths of people interviewed, some questions to trace back especially career path into the involved parent organization and the network of relations here established. Another section was devoted to questions on the naissance of the spawned venture, personal involvement and on team composition and finally sections III and IV where devoted to business model design themes (content, structure and govenranace) and business model design themes (NICE).

This first version of the questionnaire was firstly reviewed with a former academic entrepreneur, tenured professor in Chemical and Pharmaceutical Synthesis at an Italian University, and with a tenured professor in General Management, who has done extensively research on bio-entrepreneurship. Thanks to their contribution, especially questions on the dimensions of the business model were revised and those sections were enriched with a larger number of questions, since the immediately understandable questions risked to flaw interviews because of the lack of specificity of the questions relating to particular research activities and management tasks.

A revised version of the question was then tested to another academic entrepreneurs, researcher to Italian University who together with a professor from the same university founded an academic spin-off whose purpose is to develop compounds to be sold to big pharmaceutical companies. The questionnaire was also tested to a manager of a foreign biotech company, founded with the consulting of tenured professors from leading European Universities. People who revised and tested our questionnaire was selected on the basis of the heterogeneity of their professional experiences and of the role they had in their respective companies.

The main advantage of those tests was to understand if now the questionnaire was complete and allowed interviewees to understand which are the issues we are interested in and also to understand how long the interview was supposed to last. The questions resulted exhaustive and also easily understandable and not too generic.

However some suggestions provided by those people proved to be very useful during the real data collection phases. First of all, interviewee suggested to introduce a fist open-ended question, allowing the founder to reconstruct the history of the company and especially its foundation, together with his/her personal interpretation on the evolution of events. This way the conversation could have been started recalling to memory all the relevant aspects of the inception, thus providing also insights to the interviewer on the aspects, which required a thorough analysis. Moreover, especially the manager advised on a different grouping and sequencing of questions referred to business model design elements. Finally they both suggested to carefully prepare interviews in advance, in order to delete those questions that were not directly pertinent to the case under investigation. This revised version of our semi-structured interview thus was ready to be used, with involved people.

3.5 Data Collection and Analysis

3.5.1 Sources

Data collection for case studies may rely on many sources of evidence: publicly available documentation, archival records, and interviews will be concerned in the present research due to the fact that they are highly complementary and for the purpose of producing a good case study research that uses as many source as possible. In fact an approach to the individual

source of evidence is not recommended for conducting case studies, while a major strength of a case study data collection is represented by the opportunity to use different sources of evidence (Yin, 1994). Furthermore, always according to Yin (1994; 2008) the most important advantage presented by using multiple sources of evidence is represented by the development of converging lines of inquiry, letting any finding or conclusion to be more convincing and accurate, following a corroboratory mode. The recourse to multiple sources of information, hence, allows triangulation of data sources thus addressing potential problems of construct validity.

3.5.1.1 Public Information

The use of contemporary information, sourced by press media and provided by all the organizations involved in the analysis is of primary importance. Gathering of detailed data from publicly available sources, in different phases of the research, will not simply help to understand all the features that shape the process of imprinting and may inform the design and evolution of the business models for spawned ventures, but also data from publicly available sources will help in highlighting main themes that deserve a thorough understanding during interviews to people directly involved in the origin of the spawned venture and its transition and hence useful to refine also interview protocol. The purpose is to draw a protocol for interviews that helps in catching all the crucial elements that inform firms' heterogeneity and choices. In order to collect all available information, also subsequent to changes in interview protocol on the basis of collected info from multiple sources, whenever possible the interview will be retrieved.

There is plenty of publicly available information on selected spin-offs and respective mother organizations and they have also received ample attention from economic and scientific press, and there are also other scholars that have thoroughly analyzed concerned case studies producing formal studies or evaluation of the same sites under study.

As already noticed by Yin the relevance and usefulness of this various documents is not based on their necessary accuracy (this holds especially in the case of press extracts), their relevance, instead, has to be found exactly in the possibility of corroborating and augmenting

evidence from other sources. More accurate sources will certainly be primary official documents collected, whenever possible in the concerned organizational contexts.

3.5.1.2 Interviews

Interviews are the preferred tool of this research design also because they allow respondents to provide ample motivations and to interviewer to emphasize the importance of the study for the understanding of roots of value creation in the firm they have founded and guide. This is consistent to which has been defined as a romantic perspective on doing research with interviews (Alvesson, 2003), this perspective believes in establishing rapport, trust, and commitment between interviewer and interviewee, in particular in the interview situation. Moreover significance and reliability of data are hence, accrued. Consistent with this approach to conducting interviews, the format of interviews must be a semi-structured one, allowing the informants to provide all the data he considers relevant, without letting the researcher being overwhelmed with too much information.

For what concerns gathering of primary data from key informants, to have a complete picture of factors determinant for the spawning we aim at interviewing the members of the founding teams, currently or not involved in the activities of spawned ventures.

Management board members of involved companies have also been interviewed, as well as current (and whenever possible, former) members of board of directors in order to catch their view about the content and nature of blueprints inherited from mother organization, the influence exerted on business model design and innovation and the elements that instead have been discarded. This information also be searched through interview to investors that decided to fund the involved company since its inception or later, also in this case the objective is clearly in understanding lineage properties and duration, but above all the interest has been in ascertaining reasons for their engagement (and eventually, reasons for their divestment choices) and their influence in eventually fostering a process of reimprinting, reflected in business model innovation.

The importance of having multiple sources of informants is consistent with the nature of research questions we want to investigate and is stressed also by Yin (1994, 2008), since it allows to have the interpretation of phenomena through the eyes of specific interviewees that

can provide important insights into the situations under investigation and can also provide shortcuts to the prior history of the situation, helping in identifying other relevant sources of evidence. Moreover collecting data with multiple informants within the same contexts and gathering contemporary information through press and internal documentation is also a sound means to reduce the risk of retrospective meaning imposed by key informants on past events, because of the knowledge of outcomes (Golden, 1992; Yin, 2008).

3.5.2 Coding and Data Analysis

In this section we will report on how the process of data examining, categorizing, coding and analysis unfolded. As methodologists require (e.g. Corbin and Strauss, 1990; Corbin and Strauss, 2007; Cassell et al., 2009; Yin, 2008), the description of the phases concerning analyses of case studies evidences is very important, since it shows how evidences have been recombined and, above all, how empirically based conclusions have been drawn. The purpose of this section is, thus, to make explicit canons and procedures used in our qualitative research work, since, as maintained among others by Corbin and Strauss (1990; 2007), this allows for the proper and systematic evaluation of the whole work. We will hence illustrate the general analytic strategies here adopted, together with the involved techniques.

Obviously, the analyses (and as a consequence also the presentation of evidences) have been made to guarantee the consideration of alternative explanations. This is consistent with the multiple case studies approach here adopted; indeed, since case studies have been selected under theoretical replication logic (each case is expected to show contrasting results from the others, but for anticipatable reasons), our general analytic strategy, clearly has to account for alternative explanations.

As recommended also by Yin (2008) the general strategy selected to "fairly treat evidence; produce compelling analytic conclusions, and rule out alternative explanations" (p: 130) is to follow the theoretical propositions. Therefore, this strategy already guided case studies selection and hence is the most suitable one to ensure that data will be analysable. Moreover, following theoretical propositions, which in turn reflected our research questions and literature review, it is also easier to organize case studies and to individuate the alternative explanations for collected evidences. The strategy of relying on theoretical

propositions was complemented by the examination of rival explanation. As noted by Yin (2008) those two general strategies are not mutually exclusive; on the contrary, they are highly complementary, since initial theoretical propositions already included rival assumptions, as testified also by the multiple cases design we decided to adopt for this research work. The whole process of data collection was informed by the combination of relying on theoretical propositions and examining rival explanation. It clearly has to be the same for data analysis.

In the remainder of this paragraph the steps of research analysis will be presented. However, as noted by different scholars (Strauss and Corbin, 2007; Yin 2008) it has to be mentioned that research analysis is mainly an iterative process, even if, also in this study, it is presented as a linear process, with subsequent well-defined steps. "Analysis is not a structured, static or rigid process. Rather it is a free-flowing in which analysts move quickly back and forth between types of coding, using analytic techniques and procedures freely and in response to the analytic task before analysts" (Strauss and Corbin, 2007: 58). In particular, the importance of interactivity in qualitative research and in particular in the analysis of data is regarded to as one of the main principle for testifying the "goodness" of the research study (Tobin and Begley, 2004).

Hence, also in our research study, some of the steps here presented were concurrently undertaken and information, after collection and first analytical manipulations were carefully reviewed before the undertaking of further analysis. Indeed, as Corbin and Strauss, already stressed in 1990, every concept that is brought into the study or discovered in the research process, at first has to be considered a provisional one.

As suggested by Miles and Huberman (1994) a helpful starting point for the analysis is to "play" with data, and begin a series of analytical manipulations, whose first step is represented by putting data into different arrays. In putting information into separate arrays, however the intent was to preserve meaningful units of text. In this way, we were hence able to make synthesis of relevant data and to individuate, for each unit of text, the relevant informative content and also some key words. Key words were supposed to be useful to briefly describe the content into that array and proved to be of relevant use to easily track down data afterwards, especially when the amount of data to retrieve was augmented.

The exercise of grouping data into separate and various arrays, assigning for each array one or more key words, moreover helped also in the subsequent process of the refinement of data collection. Indeed, because of the complexity of our research design and especially because of the variety of data for each of the five case studies, this step helped in analysing the first bits of data and in keeping track of the relevant information, thus preventing from missing anything, and alerting if in subsequent steps of data collection (mainly in other interviews) something else was to be considered and more evidence (related to specific issues) was to be collected. How important are firs data analyses, especially if considered as a guidance in adding supplementary evidences was already stressed, among other methodologists, by Corbin and Strauss (1990) and by Yin (1994).

Once data have been split into different arrays, as recommended by Miles and Huberman (1994) the subsequent step has been to develop a richer matrix, which included, besides key words we already individuated, also categories which reflected a certain phase in the lifetime of concerned spin-offs (e.g. Birth, Transformation into a Company, Renaissance, Growth). By performing this step, collected evidences, which already were separated in meaningful units of text and already had passed through a first classification procedure, was placed within such categories.

As long as our data matrix was made, some subunits of text were grouped again under the same lifetime category, in order to reduce, when necessary, data redundancy and possible noise without deleting information. Those steps may be regarded to, also as the result of a first inductive round of a provisional encoding procedure. Namely, the provisional encoding procedure we are dealing with is referred to as open coding. By this procedure, phenomena were hence named and, as suggested by methodologists, their names were assigned as an answer to the question "what's going on there?" (Strauss and Corbin, 2007). The key words assigned during first data manipulation helped in coming up with lifetime categories. The categories here emerged were really useful for the depicting of problems and issues that are important to those being studied in our research work, as required by our general strategy. Moreover, fresh and new insights emerged on how phenomena may be related, and in particular it is interesting to notice that some of those insights were new with respect to the expectations we had derived from literature review and also from preliminary interviews and focus groups.

We individuated those categories after a first round of information analysis, and during the on-going process of data collection, this shows that the process was iterative and was refined when new data were added to the whole set. This first round of information analysis concerned both data collected through some interviews and also data from all other sources (public data on selected companies, reports and info on newspapers, specialized periodicals).

This step was really important in the process of data analysis because it proved to be really useful during the subsequent and later detailed coding steps (Strauss and Corbin, 2009). Provisional categories, indeed, provided useful insights mainly for the answer to one of the key questions we are concerned about, namely the lasting of imprinting. The unfolding of analysis on the basis of those categories referred to a specific lifetime stage, facilitated the identification of dimensions along which imprinting and learning occurs, and also helped in the analysis of elements that may influence business model design.

Moreover since our research design involves the analyses of a plurality of case studies, the individuation of those spin-offs' lifetime categories, helped also in the comparison across cases. Subsequent coding was more fruitful coding along the same lifetime stage, since those categories allowed the individuation of subsets of data; along those subsets was easier to look for similarities and differences as long as the analysis unfolded, thus leading to achieve greater precision and consistency, helping to group similar events and eventually questioning why differences emerge. Indeed in the process of data analysis, looking for themes and thus searching for (or finding) patterns of regularities, assists also with integration (Corbin and Strauss, 1990).

The individuation of aforementioned categories moreover required the effort, and produced the advantage, of putting all the information in chronological order. Even if this may appear as the most obvious way to collect and organize information, it has to be mentioned that not all our information were already organized in chronological order. This was true especially for data collected through interviews and presentations: for instance during the unfolding of conversations, in different passages managers and founders referred to the same event, but with reference to different variables and dimensions and/or adopting a diverse focus in telling the story. The organization of those events, re-establishing their chronological order was hence needed, also as a mean to facilitate comparison across case studies.

According to Yin (2008) those first attempts in data manipulations are very useful and important, since they help in putting evidence in some preliminary order (p.129). Moreover conducting those manipulations also confirmed the validity of the aforementioned choice about broad general strategies to analyse data.

Only when the process of data collection was completed and all the audio-recorded materials where verbatim transcribed (without the assistance of any software developed to assist the transcription of audio-recordings and without the intervention of any transcriptionist) all data were imported in QSR NVIVO software, for a subsequent (and more structured) coding procedure. With respect to the audio-recorded data, It is particularly important to notice that the person who collected interviews (and to some extent, also accessible company presentations and institutional video-recordings) was the same in charge and responsible for their transcription; this is particularly important for a richer understanding of the meaning of data (Poland, 1995).

When transcription is made by the person who prepared and run interviews ensures active listening against touch-typing; as it may be the case when a transcriptionist is involved (MacLean et al., 2004); moreover the direct involvement of the researcher in the transcription process enriches data collection and strengthens interpretation: the person, indeed, may draw upon non-verbal utterances and verbal discussions, may capitalize on his/her own field-notes and instantaneous comments, thus preventing any problems related to the removal of the very details that qualitative inquiry is appreciated for (Oliver et al., 2005, Kvale, 2008). Having directly done transcriptions, the researcher was also able to take into account also interviewees interpretation of events, since the analyst has listened closely to what the interviewees were saying and how they were saying it; this helps also in interpreting certain events not jumping immediately to theoretical developed conclusions (Strauss and Corbin, 2009).

While uploading the textual files to QSR NVIVO software, the transcriptions of interviews and other recorded materials, collected during companies' institutional presentations, were imported in their integrity, and also field notes and instantaneous comments wrote down during interviews and presentations. However those latter data were not part of the original and extensive texts, but thanks to NVIVO properties were reported at margins. Other textual documents, instead, were not uploaded at all, or were uploaded only

partially, because during first manipulations their informative content was redundant and produced no new clues or insights for the deepening of the analysis. This was the case, for example of same information that was the object both of a company press release and newspaper item; this was also the case of some information on the history of the company collected on its own website, but which was also the object of conversation with one of the founder of the company, still in charge in its management.

The (more structured) line-by-line coding procedure clearly benefited from first and iterative data manipulations, as mentioned before, through information separation in meaningful and relevant subunits of text, synthesis and individuation of lifetime categories. One of the benefits, as already mentioned was to put evidence in some preliminary order, moreover first manipulations helped also in focusing attention on certain data, while ignoring others. First manipulations, furthermore, since they allowed the individuation of subsets of data proved also to be very helpful in identifying also the appropriate causal links to be further analysed. In particular, in a subsequent (and partially concurrent) step in data analysis, the interest was mainly in explaining how phenomena (described by first step categories) happened, why they happened and which are the consequences of some events for the phenomena under analysis.

Even when adopting an inductive approach for theory refinement and advancement, encoding of information may also require a "start list" of provisional codes before commencing a thorough analysis of data. This is of course required to increase the profitableness of the coding procedure, and according to Miles and Huberman (1994) their function is increased if the "start list" is prepared before going to fieldwork. Aforementioned authors, defend the opportunity of having a start list of codes, because it reflects the conceptual framework and research questions, and focus on properties and key variables that the researcher brings to the study (p. 58). Furthermore, it has to be mentioned that the choice of our provisional list of codes, is clearly and highly consistent with the general strategy for data analysis that relies on theoretical propositions.

Indeed, in order to come up to the most appropriate use of collected data and also to have stronger categorization elements on which draw our conclusions, the first operation we made on verbatim transcription of our data, and relative field notes, was to bring back all the responses collected during interviews under the codes we had already selected, and that were

also reflected in the different sections of our interview protocol. This procedure is highly recommended by methodologists, especially when interviews are semi-structured and hence there is a lot of data spurring out, from normal conversationally interaction with the interviewee (Yin, 2008).

Our coding "start list" was represented by the main phenomena we want to trace and process on which we are investigating: imprinting, genes modification, differences in imprinting. Our list however was also completed by codes exclusively related to business model literature and corresponding to dimensions identifying business model design elements and design themes, as described in the work by Amit and Zott (2010). With this respect adopted codes were, range of performed activities (or content), modus in which activities are organized, presence of complementarities, responsibility for the carrying on of performed activities and, finally, design themes.

As suggested by Miles and Huberman (1994), the list was held lightly, and applied to all the data set uploaded in NVIVO software. All the data grouped under those codes were examined closely "for fit and power" (p. 58). Also in our case, the conceptual orientation reflected also in codes, seemed to be fruitful and account well what was heard during interviews and reported on other sources. However, some codes were changed, especially for what concerns their dimensions and other were codes were added in a purely inductive manner, as the scanning of data went through. For example, the provisional code, labelled "presence of complementarities" used to individuate whether or not it was decided to complement internal resources and competences (especially with commercial ones) was changed into "extensive and multi-oriented search for complementarities" to better describe the likelihood of managers of using the large variety of their extant relations for the search of complementarities, not simply related to market knowledge".

Indeed, together with start categories, which might also be intended as a guide to being not overwhelmed with data, other codes were used, as the result of a mere inductive approach in the analysis. The provisional "start list" of codes was hence integrated with codes emerged in the process of data analysis. However, as outlined by Miles and Huberman (1994) having a provisional list of codes that will subsequently be refined, as in our case, or having codes emerging in a pure inductive manner as advocated by Strauss and Corbin (2007) is less important than the way codes are related one to another.

Categories are hence were linked one another, and especially changes in the original situations, along the different dimensions of adopted codes, were analysed in order to establish if those changes might be the result of a particular action or interaction among people and /or juridical organizations. During this phase of data analysis especially the causal links individuated among different categories (and partially reported in the case studies narratives presented in the next chapter), the comparison of one piece of data (referred to a certain case study) to another (referred to the same case study) was constant.

The constant reference to other data in assigning a code to a specific subunits of text, helped in reducing possible distortion of meaning, due to the over-imposing of a certain interpretation on some data, when data inductively tell something else (Strauss and Corbin, 2007). In particular this step in the analysis convinced the researcher to relieve the emphasis assigned to the code "differences in imprinting" as the central code for theory development, thus focusing more on the dichotomy expressed by the codes "entrepreneurial experiments" or "grounded entrepreneurial experiments" to describe to what extent academic spin-offs are different from corporate ones. Indeed, as recommended by Corbin and Strauss (1990) "no matter how enamoured the investigator may be of a particular concept, if its relevance to the phenomenon under question is not proven through continued scrutiny, it must be discarded".

3.5.3 Case Studies Reporting

In this section, we briefly describe the choice we have made to report our case studies. This description is aimed at showing that the choices relative to case studies reporting are highly consistent with the general analytic strategy and the analysis techniques.

Since a relevant part of the data analysis consisted in individuating the chronological order of events for each one of the selected spin-offs, we decided to report case studies first in the form of narratives. We will hence have five different sections, for each of the case studies we analysed. The choice of different narratives will help in in showing the completeness we sought in our analysis and in grasping the evidence of each case study and their own sufficient evidence. Moreover, as noted also by methodologists (e.g. Yin, 2008), this reporting form is also very useful since it allows to understand which causes may have led to a certain event, thus providing answers to "how" and "why" questions. Finally, following the rendition of the events it will also be easier to cover many different types elements that

conditioned business model innovation and that may vary from case to case and also from (theoretical) expected patterns (Yin, 2008).

However, since for each case study and across them, we have many elements and dimensions under analysis, besides composing narratives, we will also devote some sections to cross-case syntheses prepared with the purpose of making manifest the answers to our research questions. Hence, we will have sections devoted to imprinting pervasiveness, business model evolution, and finally sections in which cross-case comparison is reported for the purpose of understanding to what extent academic spin-offs differ from corporate ones, and which are those (presumably inherited) differences.

Chapter 4:

Evidences from the Empirical Setting

4.1 Previous studies on business models in the Biotech Industry

The choice of the construct of business model, instead of an analysis of strategic choices by companies in the field is not casual. Indeed our preliminary investigation on selected case studies, already showed that in this field players are not concentrated on competition, some of them are so unique in terms of competences they have that competitors aren't perceived at all. Companies, especially small companies in such a field have to been much more concentrated on the business model, and in particular in designing (or simply copying with) how the pieces of a business fit together. Maybe entrepreneurs and managers, when the companies already exist, especially if they are small companies, they do not have to factor competition in the business arena. This is consistent with the distinction introduced by Magretta (2002), who tried to explain how business model do matter and which are the links with strategy.

The nature of our inquiry is particularly important in this field since in the past scholars have concentrated their attention mainly on the final characteristics that business models assume, e.g. trying to establish relations with performance (measured in terms of revenues, dimensional growth, number of patents, richness of pipeline) but not often have researched how the process of business model evolution unfolds and along which dimensions.

4.2 Business Models in the Italian Biotech Industries

4.1.1 Review of Previous Studies and Taxonomy

The growing importance of biotechnologies and the variety of business models adopted by the involved firms, has led several authors to provide taxonomy of biotechnology

industry based on the type of good/service produced and their innovative process. According to Bigliardi et al. (2005) it is possible to sort out five categories:

- young small companies characterised by high level of scientific knowledge working in the applied research. Given their dimension, these firms usually sell their research output out to other enterprises or establish partnership with bigger companies capable of producing and commercialising their products;
- vertically integrated companies, able to develop the product since the research phase throughout its commercialisations. Provided with an inner department specialised in the development of biotechnological outputs, these firms can produce their own products or can set up partnership with other smaller companies aiming at reduce failure risks and, primarily, to extend their knowledge base;
- companies involved in the latter stage of the biotechnological product cycles, that are mainly focused on the industrial development, production and commercialisation. Generally, these are manufacturing enterprises that buy the research outputs of the first category that are the young small business companies. There aren't a wide number of these firms, since they have to cope with continuous developments of the production processes and the respect of severe technical safety-oriented regulations, as decided by regulatory Bodies;
- recent constitution companies that produce and sell services, offering, in particular, research outputs, such as cloning and sequencing or chemical synthesis, to other enterprises. This category can be considered particularly convenient as the capital required to run them is minor then the other companies described above;
- integrated companies, whose activities are concentrated on production processes, for example the production of monoclonal antibodies, thought the use of biotechnologies. These new product development, that often are conducted in collaboration with their customers, are sold to other companies.

Following a deeper literature review, it appears to be particularly interesting another categorisation of the biotechnological companies' business model, that divide them into "born biotech", "diversified company" and "service and commodities biotech" (Sorrentino, 2009).

The born biotech companies, correspond to the first category of the abovementioned classification, and include those young medium-small firms that have been established to

operate in the biotechnological business. As a matter of fact, this category refers to the bigger companies or academic spin-offs created with the specific intent to develop biotechnological outcomes.

The diversified company, on the other hand, represents medium and large enterprises that even though operate in other fields, have decided to enter into the biotech sector investing resources and organizational capacity to this aim. The most common example are the large pharmaceutical or chemical companies that have invested substantial resources in biotech R&D participating *de facto* to the medicine and biotechnological products business.

Finally, the service and commodities biotech category concerns companies that offer goods and services at a minor added value in support to biotech R&D activities without being directly involved into research activities.

Given the features of the "born biotech" companies, it is worth to deepen their analysis, as the research capabilities of these companies enhance technological and innovative development in the different application fields of biotechnologies. These companies can be called "core biotech company" or "dedicated biotech firm" (hereinafter DBF), having in mind the intent to underline the efforts made in the field of biotechnological research.

The DBF may adopt different business models, depending on the level of organizational integration and the degree of focus chosen. Nevertheless, it is possible to identify two extremes business models, ranging from sales and marketing of products (applications, devices, final products) to transfer to other companies the "upstream" research results concerning a specific segment or phase of the R&D process on which the DBF have chosen to focus its activities. In the first case, that is not widespread among biopharmaceutical companies but, at the same time, is more present in other areas of biotech, the business model needs more or less relevant investments necessary to manage the production activities, distribution and commercialisation of the outputs. This requires the possession of complementary resources and the implementation of activities aimed at developing the market. In the second case, enterprises, focusing on several technology fields or phases of the biotech research, give their R&D results, participating in this way in the so-called "market knowledge" (Arora et al, 2011; Gans and Stern, 2003; Hicks and Hedge, 2005).

Once one of these two models has been chosen, companies define the activities to focus on and which to outsource to external partners. It is, indeed, often that DBF companies

establish external collaboration, since is the way through which companies compete in the industry. The business model choice is than completed with localisation, in other word how the company articulate at local and cross-border scale its wide collaboration network that companies create for further develop their scientific and technological knowledge, as well as, to access to resources critical for development, including financial resources. Empirical evidence shows, in fact, that many DBF organize in several countries partnerships network with universities and research centres, with business partners, potential users, as well as with suppliers of specific resources (venture capitalists, financial markets, business incubators).

The variety of business models adopted by biotech companies is particularly clear in the of health care biotechnologies field. In this sector is evident the difference between the companies engaged in the drugs identification and development and those firms focused in providing technologies and technological platforms to support the R&D process of biotech drugs. The first type includes two kinds, the companies defined "Drug Agent" and those named "Product Biotech". The first one sell or sublicense the molecules discovered but not yet experience; while the latter are also involved in clinical trials, production and commercialization of drugs on the final market. Then there are, those companies that provide technologies and technology platforms defined "Platform Companies".

Drug Agent firms have small dimension, both in terms of revenues and number of employees, they are involved in "discovery" activities and preclinical development: rarely they concede their compounds after passing the Phase I and II necessary for the development of new drugs. Consequently, the revenues derived primarily from the licensing of the active ingredients and royalties on sales, limited to those molecules that arrived in the final market.

The Product Biotech represent a minor share of DBF companies operating worldwide. These are large enterprises, often of first generation, being born in the late seventies or eighties.

Finally, the Platform Companies sell solutions and technology platforms to companies engaged in research and development of new drugs. Given the type of service provided, this kind of firms are less exposed to the risk of failure in comparison to those focused on the R&D of new compounds and, at the same time, allows to obtain a greater continuity of revenues. Therefore, it is possible to find DBF involved in the research of new molecules and in providing to other companies technologies and technological platforms.

The taxonomy proposed so far is the result of purely academic studies, it is, therefore, important to provide the classification developed by specialized professionals in the biotech sector (Ernst & Young 2012). According to the 2012 Report of Ernst & Yong, it is possible to distinguish three types of strategic models chosen by the industry of biotech drug:

- Centric pipeline: pipeline development characterized by expensive and long time consuming. They aims at producing outcomes that can create a significant source of revenue and increase incomes from other products and services in a significant way;
- Centric technology: proven technology applied to develop a wide range of products and services and to accelerate basic research and early clinical development;
- Expertise centric: deeper use of research, development, regulatory, manufacturing and/or commercialization skills in order to offer services to third parties.

4.3 Main Characteristics of Selected Case Studies

The purpose of this section is to present the reasons for which our cases studies have been selected among all the the spin-off ventures active in the biotech sector in Italy. The descriptions which follow have been prepared when the knowledge of companies was still underdeveloped and based mainly on a preliminary analysis of companies websites and summary scanning of press releases, no interviews were made at that time, neither precise and careful public information was collected and consulted. However we decided to present main characteristics of selected case studies in this form, in order to allow the reader to grasp immediately relevant differences and similarities among the cases, without the presentation being biased by the effect of information over-loading and data interpretation. Since no real case identities will be showed, to identify each case study we will have recourse to fictional labels that have been identified during the analytical process and not at the beginning of data collection, as the brief descriptions we provide in this section.

The first involved corporate spin-off is *Indications for Rareness* an integrated biopharmaceutical company, publicly owned and focused on research, development and manufacture of active ingredients derived from natural sources as potential therapeutic agents. This spin-off was originated in 2001 from another private company (founded almost 50 years before) focused on developing compounds to correct coagulation and thrombotic

disorders. This company may count on relevant collaborations with primary research institutes and with other companies to maximize the commercial opportunities for all parties involved in the venture and to potentially move drugs to the market faster.

Second corporate spin-off we consider is *Alii discovery, synthesis and follow up.* The company was spawned off in research laboratories of a large multinational pharmaceutical company. Nowadays it is specialized in developing research programs for and in collaboration with other companies in the entire life science industry. The activities performed by *Alii discovery, synthesis and follow up* are to be considered a service for its own customers wanting to support them in respective drug discovery programs. Moreover the company, by the time has begun to perform proprietary lead discovery programs for some selected therapeutic areas.

Involved corporate spin-offs have been selected because of the supposed presence of lineage efficiency-based traits that have informed business model innovation, the two involved spin-offs indeed seemed to look for most appropriate sources of financing, consistent with a sound orientation to economic profit inherited from the parental organization context. Also the recourse to alliances and collaborations with major resources institutes and industry players may be considered as blueprints factors whose presence and evolution we want to assess trough a thoroughly and rigorous analysis.

The other two selected case studies are spin-offs that, on the other side, have been developed in an academic context. The main traits that distinguish those ventures from the corporate spin-offs mentioned above are mostly represented by financing choices and the extent of licensing activities and we want to assess if those peculiarities are traceable to a diverse and persistent lineage, rooted in a private context and how the effects of this lineage evolved during time.

The first academic spin-off we refer to is *Best in class antagonist* an academic spin-offs active in the discovery and development of fully proprietary therapeutics for well-defined therapeutic area with an huge potential market. This company went across two VC funding rounds and is now engaged in the development of its first research product. There is no evidence of licensing choices and the reason why this spin-off has been included in the analysis is that it seems to have lost lineage attributes: the purpose of activities is not simply research, but has become also the performing and management of development activities to complete clinical trials and development activities. It seems that this spin-offs and its business

models have significantly evolved: the academic nature and lineage that informed its inception is no more prevailing and hence it is a good case study where to investigate properties and elements of an evident assumed reimprinting process.

The forth case we will consider is *Compounds et alia*, it was founded in 2003 within a Science Department at an Italian University, located in central Italy. This case study is worth to investigate, since it the spin-off is supposed to have mixed inheritance. Indeed beside the University, also a well-established pharmaceutical company participated to its constitution. Moreover this company may count on a relevant number of partnerships with primary players in the pharmaceutical industry, and by the time, its mission has changed: outstanding research services to other companies are combined with first proprietary research activities. All of those aspects claim for an in-depth analysis in order to uncover which has been the role of the University in the imprinting process and how relevant it was.

In order to corroborate our findings and have another test field for the validity of our assumption we decided also to introduce in the analysis a fifth case study. Reasons why this choice has been made have to be found in the particular conditions that characterized the inception of this spin-off, fruit since the moment of inception of the joint venture between a big pharmaceutical pharma and a research institution, located in an existing and well-known science park in northern Italy. In this case, that we named *Park molecules,* localization seemed to have a central role in conditioning the founding and development of the company. Nowadays *Park molecules* is a biotechnology drug-developing company, with a primary focus on novel cancer therapies; it covers all functions, from discovery to proof of clinical activity. Moreover service activities are provided also to other companies.

In such a case, the evolution of the business model has been evident, different milestones have been crossed and it is hence interesting to look for the causes that have fostered business model innovation and if they have a lineage component or not.

We are aware that because of the characteristics at inception two cases are not immediately comparable to the others here presented but it is their uniqueness that claims for further investigation since it may help in explaining unanswered questions and provide new links for connecting ideas and assumptions.

4.4 Narratives of Business Model Design and Innovation

In this section a more structured presentation of each of selected case-studies will be made. In particular, we will be concentrated in illustrating how business model innovation unfolds and hence, consistently also with one of the techniques we used for data analyses, case studies will be presented as the compiling of chronological events, thus referring to time series analysis (Yin, 2008).

In this section, hence, we decided to report on case studies using as a pivotal element to illustrate events, the chronological sequence they have passed through. This presentation in the form of chronologies will help in showing the completeness we sought in our analysis and in grasping the evidence of each case study and their own sufficient evidence. Moreover, this reporting form is best suited also because it facilitates cross-comparisons among case-studies; following the renditions of the events it will also be easier to cover many different types of variables and elements which conditioned business model innovation and that may vary from (theoretical) expected patterns and from case to case. Finally, this presentation form will not prevent to highlight causal inferences in explaining phenomena and in particular change phenomena, it will help, even better, in immediately capturing the response to "how" and "why" questions about the relationship of events over time (Yin, 2008).

As already mentioned the case studies will be reported in the anonymous form: no evidence will be found on the real name of involved companies, their parent organizations and past and present managers and partners; also the names of interviewed people will be disguised. For this reason we decided to identify our different case studies using some labels that have been selected with reference to the main characteristics of the business model each company adopts.

The choice of the fictional labels to each case study follows the analytical process that has characterized the study, and that has lead to a cross comparison among the case studies, this cross comparison is clearly reflected also in the labels we decided to use. Indeed, even if in some circumstances we observed similarities in the characteristics of the various business models, at the inception and also during the change phases, we decided to evoke by the use of labels the variety we have observed in analysing different paths trough the five case-studies.

The following table must be regarded at, as a tool for synthesis and schematization to take immediate account for the evolution of business models in concerned companies and to immediately grasp the link with extant literature on business models in the biotech (meta)industry, and to benefit from their work in providing a taxonomy.

Case Study	Origin	Business model Adopted at inception, following existing taxonomy	Business model Innovation, following existing taxonomy	Length of time necessary for main change	Main change, following our design dimensions
Best in class antagonist	Academic	Product Biotech	Drug Agent	4 years	Content, Structure and Governance
Compounds et alia	Mixed	Drug Agent	Drug Agent Service Platform	4 years	Content, Structure and Governance
Alii discovery, synthesis and follow up	Corporate	Service Platform	Service Platform Drug Agent	3 years	Content and Governance
Indications for Rareness	Corporate	Product Biotech	Product Biotech	3 years	Governance
Park Molecules	Mixed	Service Platform	Service Platform Drug Agent	3 years	Content and Governance

No similar schematization will be provided to present the panel of interviewed people during the data collection, for the sake of preserving their identities anonymous as requested. A simple list will testimony the variety of encountered people, the differences of involved perspectives, and above all, the relevance each of them had (and has) during the phases of foundation and evolution of his own company business model (See Appendix for the list).

In the remainder of this section, five stories will then be presented, the first two refer to companies which partially share their genesis, in the sense that they have both been originated in an academic context, with the university playing an important role in promoting the venture. Nevertheless, in the second case study we will present, the emergent company was participated since the beginning also by a corporate organization, with a long experience in the pharmaceutical industry. Furthermore, the involvement of University professors in the daily management of research activities was not so compelling.

The chronological narrative form we choose to present evidences on business model innovation in these two companies will, hence, also account for the examination of rival explanations on the expected paths of the two case studies, especially for certain phases of the business model evolution in the second company, the one identified by the label "Compounds et alia". The other three case studies, instead, are about companies who were spawned by corporate organizations. Actually, as well as for aforementioned academic spin-offs, one of the companies analysed below, has a genesis that is partially different in comparison to the other two case corporate spawns. Indeed, the genesis of the company that is identified by the label "Park Molecules" is mixed, since it was born as a joint venture signed by a prestigious research centre and an established pharmaceutical company. Even in this case, the unfolding of our narratives will show also alternative paths and rival explanations for the assumed diversity in business model evolution with reference to company that presents mixed origin and hybrid business model.

4.4.1 Best in class antagonist

One of the cases in which we observed a more pervasive imprinting is *"best-in-class antagonist"*, one of our two academic spin-offs, which have developed in a well renowned university in Northern Italy, in a department of Pharmaceutical Sciences whit a strong and solid research tradition, as acknowledged by the high number of scientific publications by its tenured people. Indeed, with reference to the number of scientific publications made at this Department in comparison to the number of publications made at a dimensional comparable structure with the same specialization, the publications by people at the concerned university were 2,1 times the publications made at the other department, during the period 1995-2003 [10]. Moreover, beside the strong research tradition, the research activity of this department were also highly appreciated by the business counterparts and, by the time, many

[10] Those data come from a specific query made via Web of Knowledge SM, using as key words the addresses authors specified in publication together with their complete affiliation. Clearly the query was repeated two times, for the two concerned Departments. The query was performed consulting tenured professors affiliated to each Department in order to be sure that the name of the Department was correctly specified and allowed for comparison between the two, thus preventing the risk of missing results.

of tenured people served as consultants for pharmaceutical companies or received grants for the development of research activities using the facilities and obviously the competences developed in the academic context we are referring to. Moreover, this consulting and granted research activities maybe also had a role in fostering academic entrepreneurship by the founders of the concerned spin-off, but also in contributing to give birth to other ventures in the Department during the same period.

In a time when pharmaceutical companies invested a lot in getting consultancies from established and well renowned academic Departments. Professors frequently acted as scientific consultants and at some stages they realized entire research projects for pharma companies, using University facilities. The financial resources collected by professors were obviously transferred to the Department.

This contact with external partners was of fundamental importance not only for the financial resources that were gathered, but also because it triggered the choice of protection of our intellectual property. The choice to apply for patents, was made thanks to their advice and suggestions and patents represented the initial endowment of two important spin-offs that have been developed at the Department. One of those spin-off is our focal case study and the other is a spin-off that is still more tied to University, since his main managers are still tenured professors at the Department[11].

During the 1990s the laboratories were transferred to a new location and facilities and labs instrumental equipment were renewed, this contributed also to the attraction of one the founder of our spin-offs in the Department and moreover it turned to be also an advantage for the constitution of the firm since there was room even for the company's labs. The choice to locate "Best in class antagonist" in the building of the Department seemed almost natural, not only because people who begun to work in the firm didn't have to change its habits and loose colleagues, but also because those labs in the past were already used to perform third-parties research activities. Moreover, in the history of our spin-off the labs' renewal plays an important because it was also a factor of attraction to one of the founders of the company that decided to join (again) the Department for the possibility to perform top-level research activities, in highly equipped facilities and with well-known colleagues that had similar research interests.

[11] From interview with one of the founders

The spin-off hence inherited a pure urge for well-done research activities by its founders, as it is common in academic spin-offs. But it inherited also a sense of community that fostered and enhanced collaboration and enthusiasm among founders, and enhanced young researchers' involvement in the spin-off activities. Founders report of many meetings during which they discussed and exchanged perspectives on the endowment of the spin-off, the advancement of research activities, the criteria to select and correctly motivate people to work for this "strange" organizational entity. At this level founders report also of a certain resistance, that is clear signal for organizational imprinting, when explaining that working for the new organizational entity required compliance to new rules and the changing of some habits.

According to some scholars, that have already investigated this case-study, in order to understand the effectiveness of industrial policies and the relevance of fostering cooperation between universities and corporate big pharma, this company represents undoubtedly a success story. Its history, indeed, illustrates how important it is to benefit from a favourable environment and wise university policies. This way, scientist are free to explore their own "entrepreneurial soul", together with gaining visibility and acquire financial resources to be used for the stages of drug development.

This spin-off benefited from the support of the Chancellor of the University, who fostered also the constitution of TTO and facilitated with dedicated resources the constitution of many academic ventures. His contribution was of capital importance for changing the traditional approach of Professors to academic ventures. Many of them indeed, always considered the new organizational entity as a new and exciting toy. The interaction with third counterparties and with University's TTO was of capital importance for the development of the structure and governance of the activities performed by the firm.

For the moment we have dealt with inception phase of our spin-off, but its subsequent evolution shows how determinant have been the entry of external and business counterparties in the capital of the firm. This circumstances in fact changed not only the prevalent business model design them that was focused on novelty into efficiency, but produced also significant changes to the structure of activities.

This case-study from this point of view represents an interesting case of expertise hybridization: a strong partner with solid industry and business experience takes a stake in a

small biotech, thus complementing its scientific expertise, with managerial competences. The phenomenon is illustrated in an exemplary manner in this case study, revealing the path of organizational evolution of a spin-off generated in academic space that was turned into a managerial one and evolved to operate in a complex market.

This way the company at the moment of foundation was described simply as a company with a unique expertise in "*Pharmacological evaluation and selection of leads compound*" [12] *and that now is a "private biopharmaceutical company based on a unique ion channel technology platform that brings together strong expertise on [X] area and industrial competences in research & development process applied to small molecule therapeutics*[13]*".* The mission of the new company is to play a leading role in the discovery and development of fully proprietary high affinity and selective X channel therapeutics for the treatment of neuropathic pain, overactive bladder and other X-mediated diseases.

In order to produce this change, and hence in order to reduce the range of activities (content) the company ought to perform, a huge role has been played by the an external subject, mainly the corporate venture fund that financed all the financing rounds the company went through. A key role was played also by other funds that by the time invested their resources in the company. Some of them are international players in the biotech specialized VC arena and proposed some changes and also relations that have been crucial to get into subsequent clinical experimentation phases. Above all, after having reduced the range of activities and persuaded founders and other shareholders that the development of internal drug candidates couldn't be carried by integration on activities into the company, they fostered also the change in business model theme from novelty to efficiency and complementarities.

4.4.2 Compounds et alia

Partially different is the history of another spin-off which was born still in an academic context and that still benefits also from geographical proximity with its parent institution. In this second case, that we will call "*Compounds et alia"* the genesis of the spin-off has to be

[12] From a company presentation, one of the first, produced by founders after having received a small round of financing by a corporate venture capital fund.
[13] From the company presentation during 2012, 9 years after foundation

found in the joint initiative by the Science Department of a young and expanding university, located in central Italy and a well established company, specialized in coordinating applied research projects, in coordinating also base research projects granted by public institutions and in boosting technological transfer activities as well. Accordingly with institutional mission of promoting partners, "Compounds et alia" was birth to realize research activities but also to elaborate advanced educational programs in the field of life sciences. The university got company's shares together with its private partner, who already had a wide array of industrial and scientific partners and possessed the ability to manage this ample network of universities, pharmaceutical companies, public institutions and research centres.

In spite of we are used to observe when confronted with the phenomenon of academic spin-off, no tenured professor was involved in the spawning process for the purpose of commercializing a technology developed during his/her academic career. The university decided to invest in a company whose purposes and values were aligned with its own.

Since no professor was involved in the spawning process with his/her own innovations and privileges on them, human capital for the neo-constituted company was selected among young researchers who have proved elsewhere, and by different means (e.g. out-standing publications, applied patents) to possess competencies to do research in respecting high-quality standards as it should be at University. Moreover, probably due to corporate contribution by the University Partner, those people were probably selected also to respect efficacy and efficiency selection requisites in leading projects. This choice, at a first glance, may be seen as a manifestation of a week imprinting by the academic parental organization, but it is not the case: even if people in charge of company's and labs' managerial tasks was not affiliated to (one of the) parent organization(s), blueprints however were still transmitted, thanks not simply to share control, but also through the involvement of University representatives in Scientific and Governance activities. The mission the company ought to fulfil reflected this imprinting: proprietary research activity was the reason the company was crated for. This consideration is partially in contrast with findings in the aforementioned case study, where the transferring of imprinting was mainly due to the moving and constant, presence of people from the parent organization to the spawned one. In our perspective, this means then that parental involvement, influence on progeny activities and on its business model may indeed take several forms.

However, promotion of the business idea, business models' seeds (or constraints) and a first corporate partner weren't the only contribution made by the University. The new organizational entity, indeed was also endowed with essential facilities to conduct research and was hosted in the scientific park, promoted by the University itself and participated also by the industrial partner.

People selected to run proprietary research projects and to collect grants for this purpose were young researchers with international experiences in prestigious academic laboratories and/or with industrial experience at leading pharmaceutical companies. Research ability was hence coupled with orientation to applied research and maybe also effectuation capability[14].

The initial and immediate insertion in labs' management team of people with industrial expertise may have provoked effects not only on effectuation capabilities that the company by the time proved to have developed, but also contributed in the acknowledgement by personnel, shareholders and partners of an organizational leadership in one of the members of labs' team. By the time, indeed, this manager succeeded not only in activating partnership and contract research activities with one companies this person formerly had worked for, but also, in accordance and with the support of colleagues, persuaded other people on Board on the opportunity to modify the content and structure of their original business model to add a new customer segment, thus enriching the value generation process.

Moreover, a subsequent enlargement of shareholder members, due to the good reputation that the company had acquired by the time, accrued the legitimacy for the process of business model innovation under a discovery-driven approach and a pronounced trial-and-error learning process began. The auspices of a new shareholder, with strong expertise in the pharmaceutical industry helped in backing the trial-and-error process, providing effective support in the opportunities diagnosis phase and in fostering the urge for change, together with backing the internal organizational leader in promoting change.

The learning process was not characterized by manifest and severe errors, in fact they were mainly revealed through the modification of some subsequent decisions concerning for example a change in the initial economical offer; the beginning of negotiations with old (and

[14] For the explanation of this concept and how it relates to business model change, see Chapter 2.

new) customers for a new array of services which used new analytical techniques; the subsequent recruitment in order to sustain competencies development.

Hence, the entrance of a new and strong shareholder during one of the financing round the company went trough, surely contributed to change the business model by accruing the value generation processes toward the market, but also contributed to the amelioration of existing connections among the activities that the company performed. New procedures and routines were introduced since they were not the object of endowment from the academic institution that promoted the birth of the company.

Nowadays management has succeeded in obtaining a business model that acts also as a narrative and cohesive tool, toward possible partners and investors on the outside of the company and especially toward people working for it, who may express their own competencies at the best and who are attracted to be part of that story.

Today the company looks forward to further enrich its own outstanding research capabilities, in order to respond also to new instances coming from main customers/partners. It may count on a wide range of possibilities ranging from the proprietary research projects it is involved in, the contract research projects it has succeeded in finding on the market.

The idea of developing educational programs, as a part of the institutional activities performed by "Compounds et alia", by the time has been dismissed, even though it was considered a strong tenet of the endowment which the progeny received from one of its parent organizations.

4.4.3 Alii discovery, synthesis and follow up

"Alii discovery, synthesis and follow up" is the name used to indicate a corporate spin-whose roots are built upon years of experience as part of the Research and Development Department of a big pharmaceutical company, that actually had more than 100 years of experience in drug discovery. "Alii discovery" initiated its activity first by renting a branch of the parent company where activities were performed having as a main purpose to serve parent company as a service provider, then founders decided to acquire facilities from the parent company. Thirty people moved to the child company, all of them having matured a consistent research experience at the parent company, acquiring lead research competences,

coupled with a widespread attention to efficiency and, in some cases, as in the cases of founders, with managerial competences developed also in other industrial contexts.

At the beginning of activities the two founders hold more than the 70% of the shares and the parent company hold a minority stake. For more than two years the parent company was the only customer to the new-born one and only in 2004, after almost three years of activity "Alii discovery" began to provide services also to customers alii than the parent one.

In this case, the effect of imprinting on business models is manifest via the transfer of research and managerial competences nurtured in an industrial context, where also the balance of the two distinct competences was evident to ensure to the child company out-standing research quality coupled with an attention to market requests and a proper use od resources in place, without engaging in earliest proprietary research activity, as the achieved autonomy from the parent company and the prevailing model adopted by spin-offs would have suggested.

The main difference with the aforementioned two cases is that the process of learning by doing began immediately in this case, thus reducing the length of time of experimentation marked by errors. Moreover, the learning process at the base of business model innovation didn't need the intervention of an external force to begin, but was nurtured from people inside the company.

Beside the choice to begin research activities also on the behalf of other companies, the cautious learning and experimentation process was marked by a subsequent choice to hybrid the original business model, by adding also the performing of proprietary research activities and projects granted by public institutions in Italy and outside the country and privately held institutions, especially from the US.

From interview with managers we had the feeling that this experimentation and the subsequent business model change, was not the result of a discovery driven approach to business model innovation, but was mainly the result of a process of scientific experimentation, where business models adopted by other small companies across Europe acted as recipes or benchmarking maps against which plan experimentation to innovate business model. Content of activities was not the only dimension which was affected by this change, the change affected also the governance of activities and determined also a urge to accrue the search for complementarities, in order to accrue research competencies to satisfy

the diverse requests to apply for grant. Clearly also the time-horizon for the whole population working for the company was changed: the old short-term activity horizon was coupled with a longer one, were the relevance of novelty theme began to play its role.

These evolutions of business model, with respect to the enlargement of complementarities and the relevance of novelty was also the object of a subsequent and relevant change that interested the company since 2007, when the company began also to provide services also in research fields it had not yet explored and for this sake enlarged its partnerships with other big players in the pharmaceutical industry.

Surely in this case, we do not observe a cognitive bias that prevents management to engage in business model innovation or that prevents to individuate which model best suits the company existing activities and the linkages between them, business model change is hence faster and organizational leadership is played from the inside, by the founders.

4.4.4 "Indications for Rareness"

The case study we decided to label "Indications for rareness" relates to a corporate spin-off that was founded in 2001. The corporate parent organization was an established pharmaceutical company founded in northern Italy in 1944, this company was highly integrated as it was for most of the pharmaceutical companies till the late 90s and hence performed under its direct control and in its facilities most of the activities of the pharmaceutical cycle: from research and experimentation to marketing and distribution. While covering, with its products, a relatively wide range of therapeutic indications, by the time the parent company acquired a specialization in the production of compounds that were highly effective to correct coagulation and thrombotic disorders whose main characteristics was having a greater safety than available alternative treatments.

The specialization that the parent organization acquired is really important in understanding what the spawned venture inherited from parent organization and how relevant this heritage was especially in terms of conditioning the inception and the subsequent evolution of spawned venture's business model.

Indeed, at the beginning of 2000 some activities and business of the parent organization were re-organized and some of them were dismissed. A German company

acquired all the marketing activities related to the promotion and distribution on the market of all the specialties the parent company developed and produced; all the activities related to the research and development and manufacturing of over-the-counter products; moreover most of the remaining production activities not related to the high scientific specialization in the field of blood pathologies were reorganized and transferred to a fund which transformed the business unit it acquired into a service manufacturing company, making production on the behalf of other pharmaceutical companies. Finally, all the valuable research activities in the field of preventing and treating some blood coagulation related pathologies were transferred to the new venture that we labelled "Indications for Rareness".

The spawned venture is currently an affirmed bio-pharmaceutical company specialized in the research, development, production and distribution of active ingredients for the treatment and prevention of blood diseases mainly connected to cancer and oncology treatments. Specifically, in these days the company is much more involved in the development and distribution of its main compound all over the world, accrued research activities that have contributed to the advancement company products and allowed for their trials were financed via share emission, admitted to listing on a foreign Exchange Market in 2005.

The spawned venture inherited research activities linked to the most promising market niche the parent company served and was pursuing research on. To a certain extent, we may affirm that this heritage was consciously and deliberately transferred to the spawned venture, in the sense that the manager in charge of allocating resources of the parent company decided that the spawned one, should have been endowed with those assets and not others, even if disposable. Nevertheless, the process of imprinting, even if to a certain extent was deliberate, produced more pervasive effects on the spawned venture and its business model, probably also because the person who managed change and promoted the constitution of a new venture with this endowment was directly involved in subsequent daily activities as chief executive officer, assuming less engaging roles at the other company whose activities were still referable to the parent company.

Clearly the new venture inherited also some patents that the parent organization developed in this field. The pervasiveness of imprinting transferred from the parent company produced its effects beside the simple (and deliberate) transferring of research activities. As

the parent company did, also the spawned venture do perform also some production phases beside research ones, and moreover, by the time, as we will see, began also to directly manage clinical experimentation and distribution of the concerned compounds.

Hence, what is relevant in this spawning process is the transferring of research activities and specific competences to the progeny via the people who decided to follow the parent company's main shareholder and management in the new venture. Indeed, in pursuing research activities at the parent company, whose research and development processes were established and had led to the successful filling of a significant number of patents, the team of researchers matured deeply rooted rigour in science and transferred this feature to the progeny, as acknowledged by its Chief Executive Officer. People involved in the founding of the company individuate this outstanding rigour in science as the main heritage that "Indication for Rareness" received from its parent organization. This statement partially contrasts with our expectancies on the main source of value generation that progeny may inherit from a corporate parent organization, since as seen also in the case of "Alii discovery, synthesis and follow up" we assumed that in such cases spawned ventures may be much more concerned on efficiency rather than novelty.

Efficiency is obviously a concern for any newly founded companies whose human resources had already worked in industrial research organizations, nevertheless the inheritance of the capabilities in setting up efficient processes does not necessarily prevent also the nurturing of other themes that will represent sources of value generation. In this present case study, not only efficiency was not indicated as the most relevant dimension of heritage from the parent organization to the spawned one, but according to the founder and to other people who participated in the venture, efficiency and above all efficiency in procedures and operational tasks needed to be accrued, since there were very few people in charge of organizational and managerial tasks. Indeed, after a period when the inheritance of valuable research competencies was maximized and research activities in the new venture begin to get backed by wider and widespread administrative and legal competences, coupled with the accretion of people in charge of managerial tasks, recruited on the external market job.

In the passage from the parent organization to the spawned one, the twenty researchers and the few people in charge of (research) management tasks, clearly

acknowledged that their decision to remain within the spawned company was made because the new venture was operationally guided by the Chief Executive Officer at parent organization (where this person, a medical doctor with a specialization in pharmacology, was even Research Director). Any resistance to change was overcome and the large majority of highly-skilled people involved in research activities didn't consider the possibility to go abroad getting another job, even if, this eventuality was not so remote, because of the geographical proximity of the firm to a well-renowned international biotech cluster.

The emphasis on the role exerted by the former Chief Executive Officer, we have just mentioned is not casual and clarifies that since the beginning the arising and the evolution of business model of the spawned venture was deeply conditioned clearly by an organizational leader with well-known managerial capabilities and high trustworthiness. The combination of a sound scientific background and executive education in general management allowed the person who guided the change to select (explicitly or not) the design elements and themes without being affected by any cognitive bias produced by the dominant logic of the previous company she worked for.

The assumed absence of cognitive bias was reflected in a faster pace of change at which the company evolved, in particular with respect to the governance dimension of spin-off's business model. This is particularly evident especially when considering decisions on the financing of the company and decisions relative to selection of partners for the subsequent development of the main product are selected. Indeed, as already mentioned, almost three years after foundation the company was listed to an important foreign Exchange Market, where dealers have well-known competencies in high-tech industries and are prone to invest in high-risk projects.

The focus on this fundamental innovation in company business model is important with reference to two aspects of our inquiry: the first is reversibility of imprinted patterns and the second is on the assumed ex ante deliberateness of business model design decisions. Parent company was typically an Italian SME where the founder and his family had the control and (majority) property of the company and managed all the activities. In that company the sources of financing, also for research activities were provided, besides initial equity injection, by the revenues the company obtained selling its (pharmaceutical and para-pharmaceutical) products to the market. Hence the decision to go to an Initial Public Offering to get financial

resources for the sake of fostering the development of their main drug candidate, is clearly a sign that imprinting is not irreversible and that also when main managers move from a company to its spawned venture, it may also happen that they change the architecture of the business model they have already implemented at the parent company, via the changing of its governance.

Furthermore, the decision to go to the stock market and list the company, as already mentioned, contributes also to provide additional evidences to such studies in which scholars maintain that business models are not designed in a deliberate manner, but are much more the result of a discovery-driven approach. Indeed, as reported by concerned people the decision to list the company was not considered at the time the company was founded and decisions on its business model were made, even if, already then, the choice to raise founding by share emissions would have been the best suited one, since the nascent company, because of the activities it began to perform, was certainly in urge for considerable financial resources.

Moreover this crucial passage in the company evolution highlights also another element of difference among corporate and academic spin-offs, which is the variety in the nature and quality of complementarities and in particular complementary relations they inherit, the willingness to enact them and also the active initiative in faster individuating what is missing and how to catch it. In this sense academic spin-offs and corporate ones are different because the latter inherit and have at their disposal a wide range of complementary relations they may activate both in crafting initial business model for the spawned venture and during its subsequent evolution.

Evidences in willingness to enact relations to complement its competencies and enhance its activities and also their efficiency are provided surely with reference to the decision on the selected stock market: the choice was for the market of the nation of advanced clinical trials were already in place and renowned medical doctor carrying on the experimentation were prone to endorse for the company in front of investors. Moreover the company boldness in refreshing inherited relations and in enacting them is also proved by the constant participation to its activities of an industrial partner, a corporate big pharma, that was already a partner to the parent company. This partnership for our focal company was of fundamental importance since its inception: at a first moment the big pharma immediately signed a license agreement obtaining exclusive rights to distribute, market and sell main and

most advanced compound in the US. After for years this agreement was strengthened and extended to all the American continent. By the time, the partnership evolved again and comprised also cost sharing agreement to reimburse the focal company for 50% of certain developments costs relating to our Phase III clinical trials. Moreover the partner participated also to all the financing rounds the company went through.

The emphasis and faster pace of change on business model innovation made through change in governance of activities, and not through other design elements such as content is mainly due to the fact that the new venture, once spawned continued to perform the same range and kinds of activities the mother companies performed, thus reflecting a certain tendency to replicate the same selection of activities the mother company performed inside its boundaries: basic research, subsequent development of compounds to put forward along the phases across which a new drug is supposed to go trough, manufacturing of active ingredients and finally also distribution activities.

With reference to the selection of distribution activities it has to be acknowledged that the decision to distribute directly the product, and not licensing it to external partners (with the exception of one single partner only for the US market) is due to heritage on the content of activities from the parent company, but it has to be acknowledged that it depends also on the product's characteristic and to its severe indication. Since the product, at the moment, is targeted directly on the single patient, the company benefits from directly distribute it, above all if we consider that it began to sold the product and not free dispense it, as it was in the past. In other words, this is also a matter of company's external communication: having revenues helps in giving assurances to foreign shareholders.

Till present the most relevant and remarkable business model change for the company was its listing, by the time however other changes began to appear and were driven by the constant quest for rigour and research that the spin-off inherited from the parent company, that, in terms of business model design theme, we could also identify as a quest for novelty. At the company indeed, under the guidance of international managers who changed by the time, researchers have also began to work on other compounds, and to research on them, whose therapeutic indications are wider than indications of their main products. The business model, hence, is more likely to be characterized by other changes in terms of its governance, structure and themes. Probably, the rely on external partners will be accrued because of an

augmented need for complementary competencies and activities to develop products whose indications are potentially different from the one the company, at present, fully masters.

4.4.5 Park Molecules

The last case study we will present is about a company that is by now, one of the biggest in the Italian biotech panorama, with shares listed to an important European Stock Exchange Market since 2008 and whose business model went through significant and relevant changes both in terms of design elements and themes. By now this company is a medical biotechnology company focused on research, development and clinical validation of innovative therapies to treat cancer. The company hence presents a high level of integration on the activities it performs, ranging from research service activities performed on the behalf of other companies, to proprietary research and internal clinical trials. However it has to acknowledged that those activities and the connected degree of integration varies from product to product.

The birth of "Park Molecules" is connected with the history of the gene therapy. This company was primarily established as an academic spin-off in 1989, and then as joint venture between its parent academic organization, via the control exerted by the society managing the scientific park where academic institution was located, and a big and well renowned pharmaceutical company whose motto at the time was "value through innovation". The corporate partner was well-known not only for the wide range of products he brought to the markets and its rich and forefront research tradition, but also for being a company that has always been characterized by a widespread spirit of cooperation, firmly rooted in the company.

The company was born thanks to the entrepreneurial initiative of a scientist who has been for the entire history of the spin-off its undisputed organizational leader, promoting its founding, and its subsequent growth. The company's birth is due to a high specialization and best in class personal knowledge and competencies in gene and cell therapy. Those competencies, of course were developed and accrued in a fertile research and treatment environment, thanks to the interaction with high-experienced and skilled colleagues. The company has undoubtedly benefited from those competencies, since the crucial components

of its core technologies derive from founder's expertise in the clinical validation of several successful gene therapy protocols for both genetic and acquired disorders, founder's scientific publications and patents he contributed too.

Clearly, the founder is still actively engaged in managing the company after being the promoter (sometimes alone and sometimes with the help of inspired people who in the meantime joined the company) of all the relevant changes in business model architecture the company went through.

As already mentioned, the company was founded with the specific purpose of providing cell therapy services to other companies, mainly located in the scientific park whose controlling society participated our focal company. But the content of activities changed rapidly in coincidence with the exit from the joint venture of the corporate partner, because of the acquisition by another pharmaceutical multinational company, that decided to dismiss some investments and participations. By the way, the company, beside its potential, still unexplored was still a small company and maybe this circumstance did not fit with the new course at the corporate parent.

The analysis of what happened after the exit of the corporate partner which participated to the founding, helps in understanding how imprinting process and subsequent reimprinting one unfold. The effects of the contribution of the corporate company to the founding of the new one, didn't disappear and in fact a subsequent change in the business model happened, and it was in the direction of beginning "new activities" closer to activities performed by the corporate parent, in spite of a re-orientation of activities toward basic research activities for the sake and the specific needs of the academic structure of reference. Our focal company, hence, added to research services activities, changed to become a company concentrated also in the research and development for the discovery of new treatments.

This change in the business model hence, in a certain sense certifies that an imprinting process exists and has long-lasting effects. Indeed, even if the presence of the corporate parent was no more in charge, to address company evolution, probably a transfer of competences and a also an industrial orientation had been transmitted to the team and has been nurtured by a new manager that joined the company, who had more than 20 years of experience in managing the economic aspects of product development in the pharmaceutical

industry. The new manager, beside leveraging on the industrial blueprints that have been transmitted form the corporate parent, fostered also a mush more flexible organization of activities. Surely in fostering this change, also helped previous industrial experiences that the new manager had as R&D controller, coupled with knowledge and competencies acquired attending educational programs in business administration.

The pace of change imposed by the second organizational leader to the company was high: the company evolved into a biopharmaceutical development company, with a primary focus on novel cancer therapies and begin to elicit new relationships with the academic organization it was controlled by, and with the partners the mother organization had. The variety of complementary competences that were available was relevant, such as the national and international network of partners that our focal company could easily access to.

Indeed, the Institution that participates the company manages also a Scientific Park which comprises 1.6 million square meters of fully equipped space, whose residents include academia, non-profit institutions and industrial research enterprises. The organization that is in charge of managing the Park, succeeded in fulfilling its institutional purposes, eliminating the boundaries between these groups of organizations having different nature and strategic objectives.

According to a subsequent study, that highlighted the width of relations available through the park, our focal company could have had access to almost 200 international links with other pharma and biotech to complement its internal research capabilities and to market the services it provided. Moreover, the wideness of this network was augmented by the scientific and industrial relations, which the two organizational leaders matured in their previous experiences.

As already mentioned, first of all, the content of business model architecture changed and this change was obtained strengthening the relationships the company had with one of its parent organizations, under the thrust of a new organizational leader. The pace of change in this direction, had in the subsequent period also a huge thrust thanks to an extraordinary operation our focal company made. A biotech company hosted and controlled by the parent organization was acquired, this company had the purpose to develop novel therapies by demonstrating proof of concept in small, well-defined patient populations with high unmet medical needs and then expanding the therapies to additional indications after clinical efficacy

has been demonstrated. The acquisition hence, brought to our focal company a wide range of competencies in performing the new activities it was engaged in. Moreover also governance of activities changed since, after the acquisition our focal company concentrated more on reducing boundaries with other companies installed in the Park, obtaining wider access to the departments of Infectious Diseases, Haematology and Bone Marrow Transplantation, Neurology, Oncology, and to the Internal Medicine School for the experimentation and validation of therapies and treatments developed inside our focal company's boundaries.

Another important step toward the change of the business model content and governance was made also the following year, when the company's laboratories obtained validation and certification for clinical production of cell therapy products that presented genes modifications. Moreover, in the same year, because of its well-known reputation, a new strategic alliance was signed with an international partner not hosted at the Park. The alliance is still in place, and has been enriched by the time; the partner is the largest public Japanese biotech company (by market capitalisation) and has specific expertise in the field of gene and cell therapy, and has affiliates in China and South Korea.

The type of alliance our focal company signed was different form the ones already in place, mainly, within the scientific Park; the main object of the agreement was the co-development and licence agreement for specific cell therapies in Asia.

The radical change in business model and the focus on research activities of proprietary projects required new funds and the company hence went trough three big financial rounds, the first taking place in 2004 during which 20 million of euros were raised. The second and the third rounds of financing took place in 2006 and 2007 and reflected again the impellent urge to gather money to finance internal research and development activities to bring to FDA and EMA approval some compounds.

Furthermore, in order to acquire new financial resources in 2008 the 25% of shares were listed through an IPO at an European Stock Exchange Market. Partially in contrast to what happened in the case labelled "Indications for Rareness" the decision to list the company didn't produce a radical change as in that case. Probably this happened because the other financing rounds had occurred in the meantime, all of consistent financial dimensions and already the company had the possibility to get used to the presence of external investors,

and internal procedures and also a strengthening in efficiency were compliant with investors' requirements.

The advanced development stage of a drug under development and the registration as orphan drug, coupled with the patent protection until 2030 asked for the definition of distribution activities by the company. In contrast with the academic blueprints he received by the Park and in line with the corporate afflatus solicited by the second organizational leader, the company added also distribution activities to the list of activities to be performed in house and directly controlled. This choice s similar to the one made in the case "Indications for Rareness", and as in that case, is probably due also to the characteristics of the concerned product; only our focal company knows extensively product characteristics and hence the willingness to market it directly arises.

During recent years the number of partnerships augmented, both on the side of development partners to enhance the results of research activities performed of the company, both on the side of acquiring new knowledge via in-licensing agreements. Some of the partners are from the same Park, the company is hosted in and hence will collaborate above all for co-development & clinical-grade manufacturing of gene therapies, and clinical-grade manufacturing of a cell therapy for a severe indication. Other (desirable) partners are industrial counterparties external from the Park, the top 20 pharmaceutical companies around the world to discover of some the compounds discovered at centre's laboratories may have wider therapeutic indications and profit from their sectorial expertise also in projecting the future clinical trials sessions, thus, eventually, leveraging also on counterparties' business relationships.

The company hence has (and has planned to develop) partnerships that assure constant additions to its development product portfolio and continual progress of its technology platforms both through in-house activities and co-funded partnerships with major international research organisations and through the acquisition of licences covering product and technology opportunities suitable for the company's clinical R&D portfolio.

The business model the company adopted hence is highly flexible and it is consistent with its strategic purposes who wants to focus on oncology indications that require new therapy options, diversifying its products' portfolio and efficiently improve clinical and pharmaceutical development, independently or with partners. The flexibility that this model

shows, according to the product's characteristics allows also to make a consideration on the assumptions that companies could manage at he same moment a portfolio of different business models, each one being a recipe of the same dinner menu and each one being separable from the others. Our case study shows that having a hybrid business model, where the hybridization is defined mainly with reference to an extant taxonomy where categories may have been designed for the sake of typization and not for the sake of analysis, does not necessarily implies to have a constellation of business models. The business model is unique even if some of its components (or building blocks) may vary, after all the competencies at the basis of the value generation process are still the same and activities needed to a certain customers' segment are highly complementary to activities in other segments.

4.5 Differences in Spawned Ventures Endowment and their Effects (found in Selected Case Studies)

As mentioned below, in this section of the chapter case studies reporting, will not follow the chronological unfolding of events, but will be treated in an aggregate manner, in order to highlight differences which arise along cross-cases comparison and provide insights for the a deeper understanding of the phenomenon under investigation.

Concerned cases studies have provided evidences that blueprints have an effect on spawned-ventures and have also showed a certain heterogeneity in the endowments of academic and corporate spin-offs. In order to clearly report on the differences we have assessed we decided to distinguish among differences in physical and relational assets and also to trace differences in business model design elements and themes.

4.5.1 The Differences in mid-term Objectives as reflected in Managers' Language

In collecting and analysing data on the concerned spin-offs one of the differences that immediately was noticed was in the language interviewee adopted, and those differences

were more evident when talking to founders. In particular, academic founders, both professors directly involved in the foundation and managing of first life-cycle stages of the spin-off and both academicians who promoted the venture (and financed it through university structure) without being involved in daily activities, they were both immediately prone in dealing with expected final results that the spin-off was supposed to produce. Their main interest, surely affected by the characteristics that guided their professional career, was in the new knowledge the company would have produced and in the treatment that it would introduce on the market, to meet unresolved caring needs.

Even if almost then years have passed since company foundation, and by the time the companies have passed through relevant growth phases (in terms of number of patents, products in pipeline, grants received), founders appear to be still concentrated on the ultimate result normally expected for a pharma-company, without taking into account the mid-term objectives that both the companies already obtained and without questioning the issue that probably the best and most convenient final purpose for the companies they founded is to sell most promising compounds to industrial counterparties for further development and (hopefully) distribution. It seemed that academicians, doing research in this field, are not so prone to set and also acknowledge the possibility for mid-term objectives, being concentrated only on a specific and (ill)defined long term objective.

Especially in one of our case-studies this (mis)perception transmitted from parent organizations to the spawned one, at the beginning produced its effects in the new company, even when a corporate counterparties begin to rule the company: people working in the spin-off continues to work as they are still working on a (meta)project, which has many possible outcomes, no matter if those outcomes are not precisely identified. Moreover, but this applies specifically to national context, it also possible that the initial business plan has been prepared with the help of somebody who knows how a business plan ought to be, but it is not in the position to tailor that plan on the specificities of the nascent company, thus contributing to the misperceptions of real and cogent needs in the middle term.

Because of this inheritance, even when managers from industrial contexts try to make changes in content and course of activities performed by the spawned venture, new objectives and new strategic indications are not immediately grasped from people already

working for the organization and hence the pace of change is slower, and the motives for which the change is necessary are not immediately seen.

Cross case comparisons among corporate and academic spin-offs showed, on the other hand, that corporate spin-offs, on the contrary, inherit the capacity to set realistic mid-term objectives, both in terms of research activities to be performed and managerial actions to be carried on. Moreover people immediately acknowledge the importance to set up control procedures in order to monitor advancement or eventually deviations from plans.

Of course, in the case of corporate spin-offs it is less likely that plans are ill-defined since they are prepared by people who master specific industry knowledge and has no difficulties in recognizing priorities and in establishing realistic deadlines to complete efficiently some activities. Finally, people working in spin-offs with corporate endowment are more apt in understanding (and often also foresee) changes. Probably this is due to the fact that they have already worked closer to the final market and moreover, for the extent of certain and specific activities are also more aware of competition.

4.5.2 The Differences in Initial Physical and Relational Assets

Cross cases comparison allowed also for understanding that a critical dimension that is transmitted from parent organization to the spawned one is the extent of the relational assets they receive as a blueprints, while no significant differences were assessed for what concerns physical endowment, except from the case of the spin-off hosted in a scientific park. At the moment of inception, indeed they both are endowed with satisfactory and well-equipped facilities that allow almost immediately companies' effectiveness. This is due to the fact that if already in place, instruments and facilities have been installed to guarantee out-standing research activities in a specific area of investigation, on the other hand, if instrumentation has to be installed, the parent organizations, no matter their nature, will provide the spawned one with the needed assets, consistent with the range of activities it is expected to perform.

Partially different is the case of also the physical endowment which is transmitted to a spawned venture located in scientific park, that is mainly linked to the benefits coming from the spatial concentration and that is also evident in one of our case study, the one labelled "Park Molecules", were the scientific park effectively works and the physical proximity of

counterparties provides also an advantage in speeding up research efficiency and the overall process.

A difference in the endowment of spawned ventures, as already mentioned, is represented by the variety of relational assets they inherit that is wider in the case of corporate spin-offs. This is due to the fact that people normally participating to a corporate spin-off have a professional career matured in different organizational contexts and have hence wider connections, also in terms of variety and complementarities of competences they can bring to the company. Professors on the other hand may transmit to the spin-offs mainly top research connections and also industrial ones for what concerns the first stages of setting up a research project. If a technology transfer office is not active at the parent academic organization it will be more likely that the legal and administrative competencies necessary to protect intellectual property and to guarantee the processing of daily activities have to be acquired by people working for the new company by a trial-and-error process.

The nurturing of relational competencies however is easily possible, also for an academic spin-off thanks to the new perspective brought as a consequence of the recruitment of industrial researchers or managers coming from industrial context. As a natural consequence of the new relational assets possessed and accrued by the cross-fertilization of previous experiences, by this means a process of reimprinting is activated and fostered.

4.5.3 The Effect of Different Endowment on Business Model Design as reflected in BM Content and Governance.

Something that emerges from our inquiry and that was expected is clearly the difference in lineages across corporate spin-offs and academic ones. However we have to acknowledge that we expected this inheritance to be more pervasive and to allow for clear cut distinctions between the companies having spawned from so different contexts. In order to better understand this finding we will refer to our construct of inquiry, distinguishing among its system activity constituting components: design elements and themes.

Our case studies allow the identification of the elements and in particular the design elements of business modelling through which lineage is transmitted from parent companies to progeny. As mentioned in Chapter One, previous studies demonstrated that a certain

lineage is present, but it is also of interest to understand how and along which dimensions effectively this inheritance is transmitted. The introduction of business model construct is useful because it helps in having a system activity perspective and in capturing the blueprints.

In particular if we consider the elements that describe the architecture of a business model, our case studies comparison show that in the case of academic spin-off the process of imprinting unfolds along all the concerned dimensions: content, structure and governance. This means that the reimpriniting process, that normally starts with the entry in the company of a new investor or manager ought to be carried on with respect to the selection of activities the company performs, the modus in which this activities are performed and the modification of people in charge for performing them.

The fact that imprinting unfolds along all the elements of business model design is due to the fact that academic founders do not acknowledge and recognize alternative paths for selecting and organizing activities and tend to replicate in the new company the ones they more confident with. The interaction with a business counterparts is the first step to start the reimprinting process, first of all via the changing of the selection of activities the new company ought to perform to survive. The business counterparty, indeed, is in the place to acknowledge if the selection of activities that has been transferred from the mother organization allows for company's fit with the market characteristics or if something needs to be changed.

Thus the business model began to change: certain activities will be (or will planned to be) externalized since the company has not the competences and the financial resources to carry them autonomously. On the contrary, it may also happen that other activities that once were planned not to be performed by the new venture, since the mother organization was not used to, will be then introduced in the overall selection. The modification in the content of business model architecture may also carry out and claim for the modification of structure and governance. In the case we labelled "Best in class antagonist" content of business model architecture changed because investors clearly viewed that it was not possible for the company to perform all the activities that will have led to drug distribution and hence, planned to focus on research ones, giving clearer guidance to the research group on the effort to be made, with other effects on the governance of business model architecture.

On the contrary, in the case of our second academic spin-off the change in the selection of activities determined mainly their addition than their removal. This happened because in the company there was the competencies to perform also additional research activities for other counterparties that needed specialized and out-standing research services. The addition of new activities claimed for a change also in structure since a proper organization of activities was needed to cope with new markets' needs.

In the case of corporate spin-offs, the imprinting is still transferred thanks to remarkable blueprints on the side of content of business model architecture, also in these cases spawned ventures tend to replicate the same activities that were performed at the parent organization. The difference with academic spin-offs however is that the selection of activities has already been tested again markets. Changes in governance, moreover are more likely to happen suddenly, since is on those architectural elements that managers can immediately concentrate if changes are needed.

Thus, consistently with our field of inquiry, we may affirm that academic spin-offs inherit from their parent organization a set of structured activities that has passed simply *in vitro* tests: heritage has a scientific prestige and usefulness but has only been tested in a controlled environment, in isolation from their usual biological/business surroundings. On the other hand we may also affirm that corporate spin-offs inherit form their corporate organization a set of structured activities that has passed *in vivo* tests, with the trial of overall effects on a living subject/market that has already been made by corporate parent organization.

4.5.4 The Effect of Different Endowment on Business Model Design as reflected in BM Dominant Themes (Novelty vs. Efficiency)

With reference to design themes, the sources of value generation of the business model adopted by the company, differences are less than expected and are not so compelling and strong. In particular the assumed prominent relevance of novelty theme for academic spin-offs in contrast with the prominence of efficiency theme for corporate spin-offs, was not so evident. It is true that academic spin-offs are much more concentrated in novelty rather than efficiency as a source for value generation, however the contrary may not be true at all.

Also corporate spin-off show, as the fruit of their heritage, a tension and quest for novelty. Especially when novelty is the challenge to be achieved as the result of an outstanding and rigorous research process.

Hence, our assumption on the prominence of those design themes among the other two has to be modified, in particular our case studies show how relevant is the theme of complementarities and especially the aspect of soliciting and enacting relations to get proper and more suited complementarities. This aspect has been well addressed in the previous section of the chapter, to which we refer for an in-depth analysis.

4.6 Imprinting Pervasiveness

Our cases studies show that the metaphor of transferring genes also from an organization to another has its relevance. In particular, in our study, this is testified by the fact that some activities and the way to perform them do not change also when the parent organization do not directly exert any influence anymore.

Imprinting pervasiveness varies across case studies, and can be measured by the length of time that is necessary to observe a relevant and disruptive change in the business model architecture or theme. However as already observed the change in business model is not only more likely, but also more important and is hence particularly on that aspect that we will concentrate. Or better, we will concentrate on the possible drivers that may help in encompassing imprinting and that prevents business model evolution.

For instance, the presence in the spawned venture of the same people in charge of managerial tasks at the parent organization may have a deeper effect on the pace at which design elements (and hence business model) change, thanks to a longer or shorter organizational learning process. The pervasiveness of imprinting is surely being conditioned by the elements along which heritage is transferred form the parent organization to the spawned one, but it depends also on the characteristics of the learning process that unfolds as soon as a demand for change has arisen.

In subsequent sections will try to analyse how this pervasiveness varies and along which of our concerned dimensions is more intense and when an external force is urged to speed up the process of deviation from imprinted pattern.

4.6.1 Cases of a More Pervasive Imprinting and the Urge of an External Force for Business Model Innovation

In two of our concerned case studies we observed that imprinting was more pervasive and that an external force was urged to produce change in imprinted dimensions of business model architecture, thus determining business model evolution. The two case studies we are dealing with are the two academic spin-offs which needed an external force to fully understand why a change in the business model was needed and along which dimensions this change ought to happen. In the aforementioned case studies, moreover, also the length of time needed to operationalize a change in the business model (and/or in one of its dimensions) is higher than in the case of corporate spin-offs.

In such cases, significant change in one of the business model dimensions, especially content and governance, was observed when an external force pressed to change the activities composing the prevailing model, whose dimensions were inherited from the parent organization. Interviewees in both cases acknowledged how important was the external force to produce that change. Accordingly to insights coming from previous studies (particularly McGrath, 2010), we may conclude that the external force introduced into the company a commitment to experimentation and this was possible because its intervention allowed surmounting the cognitive bias on the characteristics that the model ought to possess.

The external force that foster business model innovation, moreover introduces or represents also an organizational leader who is supposed also to have more success in being followed by other people in charge of managerial tasks and operational ones, already working for the organization.

In particular this was much more evident in one the two academic spin-offs, where it was the lead investor fund which financed the company that introduced an experienced manager to drive the change. This manager surely, thanks to his knowledge of the industry and having also guided other companies in the sector, had no cognitive bias on the future business model of the company. A more urgent tension for efficiency was introduced in the company, and also a new selection of activities was proposed, however he had to work daily

with researchers and the few administrative people to confirm his role as the organizational leader that would have lead to the growth of the company.

In the other case study, we may recognize the presence of two organizational leaders, one was already in place and already had tried to overcome fears from main shareholders to add to proprietary research activities also the third-parties projects. The academic representatives in the board of directors probably viewed the change of main activities performed by the company as a radical change from the purposes of knowledge increasing and diffusion that the spin-off was meant to perform. Even if, also in this case, no cognitive bias was present in the manager to commit to experimentation, especially for what concerns the change in the activities performed, but the trial and error learning process did not take place immediately, because of some internal resistances. The intervention of a new partner and the installation of a new member of the Board of Directors was really important in supporting the organizational leader already in place. Thanks to the authoritativeness of his expediencies, resistances to change were definitely overcome and it was also possible for the external organizational leader to help the internal one to partially modify the structure and organization of activities, helping in the definition of mid-term objective and the to settle down procedures.

4.6.2 Cases of a Faster Business Model Innovation

In narratives for our case studies we provided also some insights on faster processes of change of some dimensions of the business model construct, along which reimprinting started at a faster pace. In our interpretation this change happened faster because the experimentation and learning processes encountered less internal resistances. The reduced level of resistances is surely ascribable to the presence of an organizational leader who already benefits for high trustworthiness and legitimacy, since he was also the same who drove company foundation.

First of all, no cognitive bias seemed to be present in individuating the future path that involved companies and their business models would experiment and assume; moreover their commitment to experimentation was also reinforced by a deep knowledge of their companies

characteristics and activities already in place. In addition, it has also to be acknowledged that the degree of trustworthiness by other people was higher and that the elements that urged for a change were less and

Part III: Theoretical Advancement and Managerial Implications

Chapter 5:

Contributions of the Present Study

5.1 Overview

We started assuming that spin-offs, inherit different genetic endowments showing similar (technological, organizational and cultural) traits depending on the nature of parent organization, whether it is a public research institution or a private company. We also assumed that this inheritance is reflected in spin-offs' business model first design and may exert an influence on its subsequent evolution, unless a (learning) process starts, during which some endowment elements are discarded on the behalf of new ones. Indeed, as found in previous studies the process during which the spin-offs begin to develop their idiosyncratic trajectory modifies the business model (design) of the progeny.

However a rich and sound theorization on how and why the progeny business model distinguishes itself from its parent is still missing, together with a process and holistic comparative analysis on how the change in business models happens, especially among companies which are generated in such different organizational contexts.

The case studies we selected, have provided relevant evidence for the understanding of how business models come into being, to what extent "parental mold" is significant for their rise and development (Ferriani et al., 2012); which are the (business model design) elements and the forces which trigger business model innovation and along which dimensions business model innovation unfolds. The biotechnology field, tor its relative youth and the presence of a high number of research-intensive companies, especially SMEs, prouved to be a

very interesting context in which conduct our research, as requested by the holistic and process nature of questions under investigation.

Since biotechnology firms develop along the lines of several models (Mangematin et al., 2003; Bigliardi et al, 2005; Pisano, 2006; Onetti and Zucchella, 2008; Sorrentino, 2008; Onetti et al., 2012), at present we still need contributions which allow to describe and understand the process that leads companies' evolution, how relevant are the relations (in place and to be created) among the actors involved, and also the effects and drawbacks produced by public policies.

In the following section, we will hence discuss separately and summarize the main contributions of this study for theory advancement (especially with reference to business model construct) and managerial practice in such a vital and relevant field.

The relevance of this research study is accrued by the fact that it has been conducted in the Italian biotechnology field, where companies show a high vitality and change is frequent. We hence benefited from the richness of insights coming from our field of inquiry, however, even if the narrow definition of the research field is fruitful from the stand point of the analysis of modes of development, since it shows a variety of choices and related effects that vary from case to case, it clearly prevents results generlizability. This is the reason why at the end of this chapter we will deal with some cautions and provide insights for a possible extension of the present study.

5.2 Theoretical Advancement

One of the purpose we had when starting this research work, was to understand -as suggested by a growing number of scholars (e.g. Phillips, 2002; Chatterji, 2009)- the extent to which the characteristics of blueprints inherited from the parent organization, help in explaining "post start-up performance" and in particular its organizational strategies (e.g. Ding, 2006, Ferriani et al., 2012). The investigation on this issue, as already mentioned, covers two different topics in entrepreneurship and management literature. First of all, as recently claimed by scholars, our investigation aims to contribute to literature on the imprinting process, with the purpose of ascertaining if the object of inheritance is truly supposed to last forever (e.g. Lorenz, 1970; Boeker, 1989; Milanov and Fernhaber, 2009); and in the second

place, if imprinting is found to have not an irreversible influence (Sherer, 2006; Chatterji, 2009). Our investigation helps in understanding which characteristics of the genetic heritage are most likely to be discarded as long as the spawned venture undertakes its idiosyncratic path (Baum and Rao, 2004; Garnsey et al., 2008; Ferriani et al., 2012) and how organizational strategies are conditioned (Ding, 2006).

In order to shed a light on the tension between inherited patterns and the new trajectory that may characterize spawned ventures' development, we have built on a very recent contribution by Ferriani et al. (2012) who proposed a process model of intergenerational learning and spin-off performance. Authors in their work explicitly refer to a clear distinction between spin-offs' business model and parent organization one, but their conceptualization, even if the business model construct is clearly evoked, the analysis and conceptualization of a framework to acknowledge along which dimensions business model is shaped by inherited blueprints and eventually changes. As claimed also by Baum and Rao (2004), our investigation was intended to investigate on the structure of organizational inheritance that implies persistence and may eventually require transformation over time of organizational processes and forms.

Our work makes hence a contribution both to management and organizational literature on the issue of imprinting, shading a light on the characteristics and nature of transmitted heritage, on the way the subsequent learning process put in place in spawned ventures may influence post start-up performance and in particular the business model of biotech companies in the pharmaceutical industry.

Our study will also contribute to literature whose purpose is investigating the effects of imprinting given by varied mother organizations and assessing differences between spawned ventures originated in a public research context and new science-based firms which, instead, originated in a private one. This issue is particularly important since, to our knowledge, most of the studies on the effects of blueprints, transmitted by a mother organization to its spawned ventures, considered homogeneous samples of spin-offs generated from a given institutional context whether private (e.g. Ding, 2006) or public (e.g. Shane and Stuart, 2002). Only recently scholars have began to investigate the differences among the characteristics of firms created by academicians and other technology-based firms (Colombo and Piva, 2008a, Colombo and Piva, 2008b; Colombo and Piva, 2012). In particular our study, based on the

heterogeneity between universities and corporate organizations in terms of research focus and orientation in performing marketing, production and distribution activities (Zahra et al., 2007), contributes to shade a light on the differences in the overall endowment of different spawned ventures.

Since the assessment of differences in genetic heritage and the effects on spawned ventures evolution has been conducted trough the analysis of selected components of business model construct, in order to preserve a holistic approach, and have a set of deeply interconnected dimensions to analyse, instead of single inherited factors, the present study contributes also to theoretical advancement of literature on business model (design). Our study, as it will be argued in the following paragraph represents also a contribution in generating accretive knowledge on the theoretical and practical relevance of this construct and in particular in shading a light on the deterministic nature of business model planning as confronted to a discovery-driven approach (McGrath, 2010).

5.2.1 Are Corporate and Academic Spin-Offs Truly Different?

The literature on spin-offs has identified two types of parent organizations: higher-education institutions and well-established industrial firms, which represent the two major sources of new high-technology firms (Oakey, 1995). As already mentioned, in the previous section, prior research has mostly investigated separately the phenomena of the effects of inherited blueprints, considering homogeneous samples of spin-offs generated from either academic context, or corporate ones. Only few and recent studies, have engaged in a twofold inquiry, in order to investigate peculiarities in initial endowment between new high-tech entrepreneurial ventures originated in academic (or more broadly public-research contexts) and other high-technology new ventures, (e.g. Heirman and Clarysse, 2004; Ensley and Hmieleski, 2005; Moray and Clarysse, 2005).

The issues under investigation have been various both in terms of causal dimensions and in terms of effects produced by specific genes on new ventures' creation, survival and post start-up performance. Scholars investigated how differences in team composition may prevent adequate funding for research-based spin-offs (Clarysse and Moray, 2004); how the

differences in the initial resource base and firms' market strategy affected growth expressed in terms of revenues, total assets and number of employees (Heirman & Clarysse, 2005); how genetic differences may affect the likelihood of financing by venture capitalists (Munari and Toschi, 2011); how differences in team composition shape the strategy that firms adopt after foundation to enrich their competencies' base and to establish sound partnerships (Colombo and Piva, 2012, Colombo, Piva and Rentacchini, 2012).

To our knowledge, the richer study in terms of the number of variables they account for is represented by the analysis of Colombo and Piva (2012). Estimating ten econometric models authors confirmed "the evidence provided by previous studies (e.g. Ensley and Hmieleski, 2005) suggesting the existence of genetic differences between academic and non-academic new technology-based firms associated with the composition of their founding teams". Authors, thus, thanks also to the robustness of their model, demonstrate that the peculiar genetic characteristics of academic new technology-based firms "shape the strategies they adopt to enlarge their initial competence endowment with respect to other new technology-based firms". Differences in founders' team composition were measured across ten variables and their effect on competencies enlarging strategies proved to be statistically significant for what concerns the higher propensity to engage in technological and commercial alliances mainly with public research organizations, to get consultancies from them and also to collaborate for obtaining grants. No (statistical) significant difference instead was found in the likelihood to establish alliances with other firms.

Our evidences, partially contrast with those results, since they let us induce that genetic differences are less evident, when a holistic approach is adopted and a large number of dimensions describing heredity (and its effects) is considered. Moreover, if the assessment of differences in genetic endowment is made adopting also a dynamic approach, thus observing also companies' evolution along the dimensions used for the operationalization of business model construct, the pervasiveness of blueprints influence is also found to be diluted since no huge resistances to change seem to be in place at both academic and corporate spin-offs.

Three aspects are important in estimating the value of our research study: the first one is represented by the choice to conduct a twofold inquiry that compares strictly academic and corporate spin-offs (excluding other start-ups), in the same industry and normative context,

mainly at the same life-cycle development and having started activities with comparable dimensions as expressed by the number of employees. All those criteria in selecting our case studies were intended to reduce any possible bias due to other contextual dimensions, in tracing blueprints heterogeneity, incidence and pervasiveness.

The other important aspect that distinguishes the present study is represented by the adoption of a holistic approach, thanks to which we may trace assumed initial heterogeneity and its evolution along a set of dimensions that is wider than the number of dimensions or variables previously considered by other (both qualitative and quantitative) research studies. As already observed, for the number of dimensions they accounted for, the study by Colombo and Piva (2012), may be considered as the richest one and the robustness of their model seems to definitely confirm that genes are relevant and academic spin-offs are truly different from other companies. However in their statistical matched samples, there were also companies that may not be defined truly corporate spin-offs and moreover the study do not account for other elements that may elsewhere characterize the genetic endowment of the ventures, such as the incidence and pervasiveness of cultural norms and values shared by founders and the employees who were engaged at first; the initial funding conditions and especially the possible participation of the parent (academic) institution to the new venture as a shareholder (and hence the likely conditioning in competencies enlargement strategy as well).

Finally, our study, allows also for the possibility to trace any modifications that might have intervened and diluted inherited blueprints, since data are not referred to distinct points in time, but cover, instead, the development trajectory of each of concerned companies.

Overall, as noted in the previous chapter, and consistently with our field of inquiry, we may affirm that at the inception academic and corporate spin-offs differ in the sense that the former inherit from the parent organization a set of structured activities that has passed *in vitro* tests: heritage has a scientific prestige and usefulness but has only been tested in a controlled environment, in isolation from its usual business (biological) surroundings. On the other hand we may also affirm that corporate spin-offs inherit form their corporate organization a set of structured activities that has, instead, passed *in vivo* tests, with (members of) parent organization having made also the trial of overall effects on a living (biological subject) market.

We are not maintaining that this difference is not important for the involved companies; we are simply providing insights on the fact that the dimensions to be considered to demonstrate the effect of inherited blueprints are wider than founders' team composition and when the range of dimensions under observation increase, the relevance in differences may result less evident. Moreover, we are also providing insights on the fact that genetic differences, observed across business model dimensions of academic and corporate spin-offs, may not be clear cut and disruptive, especially when companies have been founded by people who have matured previous outstanding work experience in both academic and/or corporate domains. When the (research) projects and activities that inform the business idea of the new venture are of outstanding value (as first *in vitro* trials proved), a learning process will shortly be in place, in both kinds of spin-offs, to select those blueprints perceived as more likely to ensure company survival and growth, thus further diluting the initial differences. The blueprints dilution effects, namely the reimprinting (Ferriani et al., 2012), in academic spin-offs may be engendered by an external agent, while in corporate ones it may began also thanks to the action of an internal organizational leader.

However, even if this study suggests that overall considered, genetic differences in academic and corporate spin-offs may not be considered disruptive, there are also some insights which are provided in the remainder of this chapter and that could be useful in speeding up the passage of academic spin-offs from entrepreneurial *in vitro* tests, to *in vivo* grounded ones.

5.2.2 Imprinting Is Not Irreversible, At Least Not For All The Genes That Are Transmitted

One of the purpose we had when starting our research work, was to investigate on the effects of conditions existing at company's birth, and especially if those conditions may have or not a lasting imprinting on a company's subsequent evolution. In addition we also assumed that the nature, relevance (and length) of imprinting might vary according to the nature and type of mother organization that is involved in the spawning process.

In the review of literature that has been the object of the dissertation in Chapter I, we have shown that, at present, most of studies dealing with the notion of imprinting have

contributed to reinforce the tenet that imprinting is highly enduring. Those studies, as already mentioned (e.g. Boeker, 1989; Marquis, 2003; Milanov and Fernhaber, 2009) were in line with initial theorization by Stinchcombe (1965) and Lorenz (1970) and confirmed that prior history has a great and deep role in influencing "organizational inventions that can be made at a particular time".

Our research work, on the contrary, provides additional evidence to more recent contributions where this tenet of the imprinting argument is questioned and evidence is provided on the subsequent phases spawned ventures go trough, setting their idiosyncratic development trajectory (Garnsey et al., 2008; Ferriani et al., 2012). Aforementioned authors theorise about the existence of internal processes during which the new venture assimilates only certain inherited elements, thus discarding some others. Another interesting finding in the contribution by Ferriani et al. (2012) is represented by the role of crises and new entrepreneurial agents as triggering mechanisms for the starting of the internal selection processes.

First of all, our findings add evidence to previous contributions as well, showing that imprinting is not irreversible. By adopting the inherent dimensions trough which business model construct is operationalized by Zott and Amit (2010), namely business model design elements and themes, we have evidences that some of them change as a long as the spawned venture stays on its market. Indeed, in analysing data on our spin-off companies, for each of them we traced-back all relevant information – such as information concerning significant changes in terms of activities the spin-offs perform, the way they are financed and the people in charge of management tasks- as a descriptor of a specific design element or design theme. Since design elements and themes in our perspective are the constituent dimensions of any business model, a change along one of this constitutive dimensions implies also a change in business model and hence testifies a deviation from the pattern imprinted by the parent organization that at the moment of inception conduced to the emergence of a given business model.

Moreover, by looking at the inherent dimensions trough which business model construct is operationalized by Zott and Amit (2010), some evidence is provided also on the cultural factors, procedures and systems present at the parent company that, because of their transmission to progeny, may affect learning and new process, such as experimentation,

through which reimprinting occurs. The focus on those aspects was one of the questions that drove our research work since the beginning and the operationalization of business model construct along the aforementioned dimensions helped in individuating the genes which are supposed to be more pervasive than others and also helped to operationalize the constructs of cultural factors, procedures and systems inherited by parent organizations. By the way, this was also an area of further investigation for the theory advancement on spin-off performance solicited as a future research direction also by Ferriani et al. (2012).

Content is supposed to be the more pervasive one since our findings show that in corporate spin-offs this dimension changes very slowly or, it doesn't change at all, thus testifying that the selection of activities that a corporate spin-offs performs autonomously do not need to change fast because the selection was made on the basis of extensive market knowledge developed at the parent company. On the other hand, even if the following statement may appear counterintuitive, the faster change of business model content in academic spin-offs confirms the interpretation of content as the most pervasive imprinted gene, since this change occurs as an effect of a new entrepreneurial agent, sometimes also an organizational leader, joining the company (an investor, or a partner, or a manager), who is personally endowed with a previous industrial experience, additional to his strong research capabilities.

With respect to design themes, the dimensions identified by Zott and Amit (2010) as the value creation drivers, we may look at them as the signs of the cultural forms in place at the parent organization. As already mentioned also with respect to design themes, we traced-back all relevant information to those dimensions, thus observing, thanks to cross case comparison, that the most pervasive theme is to be found in the prevalent quest for novelty, shared both by founders and managers of academic spin-offs and corporate spin-offs. This gene doesn't change as long as the spawned ventures grow. On the other hand, our findings show that the gene that is most likely to be modified (and clearly not completely discarded or erased), especially in academic spin-offs is represented by complementarity. In particular in academic spin-offs, by the time, we found evidence of a growing importance assigned by founders still in place and managers in charge to the searching for the most suitable partner to enrich company resources and provide outstanding new technological opportunities.

On the subject of the search for complementarities, a special attention as to be paid to the role of new entrepreneurial agents who, as suggested by previous studies, may exert an influence in fostering the spin-off's idiosyncratic learning and reimprinting process and drive business model evolution process. Our findings, moreover, partially integrate findings in ARM-Acorn case study. In particular cross case comparison show that the new entrepreneurial agent triggering experimentation and learning in the spawned venture, may be an investor, or could be also a new manager and, above all, not always comes from the external market environment. Some experimentation, especially in corporate spin-offs may also be triggered by an internal organizational leader who by the time, had the chance to envisage in the market or in a new partnership an opportunity to revise (mostly by addition) the selection of activities internally performed, or to put in place a better redistribution of activities.

Finally, for what concerns the content and nature of inheritance, our case-studies show also that there is no radical difference in the endowment of academic spin-offs when compared to academic ones. Shortly we may conclude that academic spin-offs need a longer time to engage in business model experimentation, and that the change is triggered often by an external agent. This finding may be considered an enrichment of Chatterji (2009) contribution on the prominence of less-technical knowledge in the spin-off processes. Chatterji (2009) found evidence that the parent-progeny relationship is shaped not by technological endowment, but by other non-technical and less apparent forms of knowledge. In the author's perspective, hence, it seems that the transfer of "less apparent forms of knowledge" is the only characteristic that matters in shaping the parent-progeny relationship and in conditioning the progeny subsequent evolution. Our findings show that it is partially true, since our interviewees engaged both in academic and corporate ventures, explicitly stressed the relevance of technological heredity they received from the parent organization, especially if it takes the form of a high maitrise in running specific research processes and sequencing.

We are aware that it is no possible to generalize our results, not only because our cases have been selected on a theoretical base and do not represent a sample, but also as the frame of reference for our research is different from the previous ones. Altogether, since we adopted a holistic perspective to assess the differences in inherited dimensions between academic and corporate spin-offs, we are confident that especially the insight on the dilution

of initial difference, represents a contribution for further research on organizational inheritance. Indeed, it claims for a higher use of holistic approach in understanding spawned ventures heterogeneity both at birth and especially when analysing their development trajectories. Business model construct is very useful in providing this perspective, but measurable variables to measure its constitutive dimensions have to be found.

5.2.3 Business Model Design is not (only) the Result of a Deliberate Choice by Entrepreneurs and Managers

In the present research work, we are confronted with a thorough reflection on the business model construct, reviewing the most prominent literature on the topic and addressing thanks to cross-case comparison the main issues concerning the forces (or barriers) that drive business model generation and renewal and the dimensions along which business model innovation unfolds as well. In reviewing the literature on business model we found many motives for which the construct is relevant to scholars as well as for practitioners; in case terms, we provided evidence of the soundness of chosen business model definition (Amit and Zott, 2007; Amit and Zott, 2010) to keep a system activity perspective (Amit and Zott, 2010) and also to take into account the dynamism that pervades the business model construct itself.

In our study we experimented that this definition has a sound applicability in individuating and depicting all the dimensions of the business model construct: design elements and themes, indeed, are easily detectable when analysing case studies, and in the attempt to observe their evolution, the researcher is not overwhelmed with information and data concerning the renewal of ill-defined (or too much detailed) dimensions. According to us, thus, the definition provided by Amit and Zott (2010) represents a useful starting point for conducting other case study inquiries on the business model construct, surely in hi-tech industries, as life science, and in other rapidly evolving industries as well.

One of the main contribution of this research work is represented by the fact that it provides evidence to the proposition that business models do not emerge fully formed and as a result of an overarching imprinted representation of the reality (to be) of the spawned

venture, created following deliberately the recipe or map provided by the mother organization[15], even if it is a well-established corporate.

Even if we assume the existence of "business model heredity", and affirm that people in charge of management tasks are aware of how the ideal business model should be, scholars already denounced (Chesbrough and Rosenbloom, 2002) that this ideal form may not be implemented given the presence of limits which hamper the possibilities to organize the whole set of activities as managers should have done on the basis of the characteristics adopted previously for a similar technology (Amit and Zott, 2001).

Hence, as we have reported in the previous section the genetic endowment of a spawned venture is composed mostly by specific genes and not necessarily by complete set of them. Moreover, even if assuming that the whole set of genes was transferred from the parent organization to the spawned one, we found evidences that some of those genes are early modified by the progeny, even when the modification was not foreseen and prescribed at the moment of inception. Business models, hence are not the result of a planned and detailed design activity, but are instead the product of extensive experimentation as already proposed by Chesbrough (2010) in his reflection on business models as the fruit of a discovery-driven approach.

Among our interviewees, founders and managers at companies we analysed for our cross case comparison, even if written plans existed to guide the founding, thus codifying also the organization of activities and the link between them, no one referred to those plans as the representation of the whole business model, and no one affirmed to have compiled that plan for the sake of coming up with the future representation of the reality (to be) of the company. In no case study the plan used to present the company to potential investors and/or to get authorizations by public authorities were perceived as a tool to "paint" precise pictures of the business model of the new company. However, those plans have to be considered as the result of both deliberate and serendipitous paths, which determine the characteristics of the business model adopted by the emergent company and that as long as companies' activities

[15] The idea of business model as a "map" or "recipe", namely as a representation or description of the (future) reality of a firm, has been stressed by various scholars (e.g. Afuah and Tucci, 2001; Chesbrough and Rosenbloom, 2002; Teece, 2010). Some of them recognize to this recipe a prescriptive role, in the sense that it may represent the benchmark for designing (thus imposing) the business model of the focal firm; others instead intend the business model representation as a road-map to follow to come up with a solid architecture for value generation and appropriation, without overlooking any aspect.

are structured, governed and performed or as long as new entrepreneurial agents come to the company trigger experimentation and business model innovation.

Business model, hence, is not to be considered as the result of a well-defined deliberate choice by the founders and management team in charge and not even as a consequence of deliberate decisions, made at different levels at the moment of enterprise foundation and precisely interrelated, as posited by Osterwalder and Pigneur (2010) in one the most recent contribution on the business model construct, that has also received a good appreciation especially by practitioners.

5.2.4 Does Modification in Imprinted Patterns Allow Deliberate Choices in the case of Business Model Innovation?

The absence of a moment during which business model is carefully and precisely designed, as if it was a paint whose main dimensions have already been individuated, is confirmed even when business model innovation is concerned. In our case studies we found evidence that even innovations on the business model that alter the initial models created during start-up phases are not the result of a plan, but are instead the fruit of an experimentation process, characterized by trial-and-error learning (McGrath, 2010; Sosna et al., 2010) along some of the dimensions that describe business model and not necessarily along all them. The accretive contribution of the present study to business model literature has to be found in the fact that the experimentation and trial-and-error learning process is decomposed and observed along the descriptive dimensions of the business model construct and thoroughly analysed along them, instead of considering the process referred in general to the business model construct.

As already mentioned, this trial-and- error learning process unfolds through those dimensions and by this mechanism some of them are changed from the way they were transferred by parent organizations to spawned ventures. Thus, even if imprinted patterns have been modified and changed, there is no room for a deliberate and planned change in business model. Even in academic spin-offs, were new entrepreneurial agents, especially managers, may have fostered reimprinting and triggered dismission of imprinted dimensions

for the sake of new venture's growth, the planning activity is not conceived to radically and expressly change business model.

The changes are again the result of a deliberate and serendipitous activity referred to the single dimensions, which describe business model. And, consistently with findings by Mangematin et al. (2003) each change in any dimension is the expression of experimentation and has to be considered as gateway in the establishment of the subsequent (and not necessarily final) business model.

Finally, our study contributes also the recent debate on the nature of business model as a recipe and, in particular, it shows that business model innovations which are not radical, and which interest simply few dimensions along which the construct is operationalized, are not considered as different recipes of the same dinner (Sabatier et al, 2010), they are instead variants of the same model that is passing trough experimentation phases.

The idea that variations to one of the dimensions of the business model constructs, implies the concurrent design and management of two or more different models of a bigger business model portfolio, was not reflected in the data we collected through interviews. Even when companies we analysed were confronted with two (as in the case of *Alii discovery, synthesis and follow up*) or more (as in the case *Park Molecules*) different markets simultaneously, each requiring also adjustments in terms of business model governance, no one seemed to conceive this heterogeneity in market segments as a plurality of business models. Moreover, our data, collected in similar field as the one analysed by Sabatier et al. (2010), show that even when our concerned firms, increased their dependence on external actors, such as venture capitalists, or scientists and universities for long term collaborations (both for research activities or clinical trials) the coherence of companies' resources and capabilities was maintained, without evidence of an additional business model to a bigger portfolio. Managers simply considered the opportunities to add new activities to the ones already performed, thus modifying the concerned dimensions (namely content and governance) of the existing business model, thus fostering its innovation, but no purposely managing parallel business models.

Managers purposely don't plan the precise design of a single business model, it is hence difficult to find evidences that there may be the planning of business model portfolio. The presence of a business model portfolio, in our perspective may be seen as a scholars lens

to analyse business model innovation, but not as construct that will help managers to maintain coherent vision along the different activities the company performs to generate and appropriate value.

5.3 Managerial Implications

First, the study will contribute to imprinting literature reinforcing arguments on the possibility for spin-offs to deviate from imprinted patterns, adding insights on the elements along which the process of deviation may occur. In this way it is also possible to shed a light on processes leading to the emergence of new organizational forms and structures and on the dimensions of inheritance that may foster or hamper transformation over time, as requested by Baum and Rao (2004). Indeed, as stressed also by Baum and Rao (2004) little is known about how differences in the kind of (imprinted) know how effectively constitute the element that drives the persistence of organizational structure, or, on the contrary, if differences in the kind of (imprinted) know how foster transformation of new venture structures over time, hence affecting performance.

The study will also contribute to business model design literature, letting emerge the components that seem to be most prominent in addressing business model innovation choices (especially in the biotech industry) showing how the organization may change and to what extent business model design may represent a key task of the entrepreneurial manager.

Moreover as we are dealing also with the phenomenon of academic entrepreneurship, findings from this study may be of use for policy makers or local universities institutions. The relevance of certain (inherited) business model dimensions conducive to successful performance may be of use in designing policies intended to foster academic entrepreneurship only in such contexts where certain conditions are supposed to exist.

5.3.1 Managerial Implications for Academic Spin-offs

Our study adds evidence to the relevance of imprinting process that unfolds when people from Academia are involved in the process of company creation, and participate

directly and daily, (or even indirectly) to the managing of company, thus contributing to determine companies strategic orientation, the range of activities it is supposed to perform in order to attain its research and development objectives, the way those activities are performed and the selection of actors in charge of performing them (namely the collaborations that the company admits to perform some activities). Also in our data, we have evidences that people tend to replicate the dominant logic they have been permeated by in running similar technologies (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010). In our perspective, hence, since founders of academic spin-offs have developed competencies in running similar technologies mainly at the academia, we have evidence that the spawned venture may be permeated by the dominant logic of the parent organization.

In our data, we have also evidences on how this replication unfolds. This transfer is reflected, first of all, in the tendency to replicate in the spawned venture the same range and sequence of activities that were performed in parent organization laboratories. The focus will hence be in endowing the new entity with people to perform basically pure research activities, for the purposes of advancing knowledge and, at a second stake for the purpose of making this knowledge available for industrial applications.

Moreover, the business model adopted by the spawned venture, resents of imprinting not only on the side of the activities selection the new company performs, but also on the side of structure and governance of activities. This means that the new company will perform the same range of activities the parent institution performs, nevertheless this will be made with the same *modus operandi*; besides the repartition of activities among different actors will follow the acquired dominant logic as well.

Those managers who operate in those ventures many times, especially if recruited after its foundation, have to make an effort to activate a reimprinting process and change first of all the content of the business model, in order to render it more apt to stand autonomously on the market, thus fostering the transformation of the inherited entrepreneurial *in vitro* tests into *in vivo* ones. We observed that this requires a longer length of time for the learning process to start, together with the pressure exercised by an external force, that may be a (more) new investor(s), new manager(s), new partner(s).

For those reasons, academic entrepreneurs (to be), are demanded to look early on how to speed up the manifestation of their learning process, and above all be sure that their

entrepreneurial *in vitro tests* are reliable. We add evidence, to earlier studies that focused on the characteristics of networks by academic entrepreneurs (e.g. Ensley and Hmieleski 2005; Mosey and Wright, 2007, Clarysse et al. 2007) and thanks to comparison across case studies, we may provide indications to founders mainly with reference to the possibility of asking for consultancies not simply to protect the intellectual property in their laboratories (a request that in our data was recorded as the main important for founders), but also to assess the range of activities that the new venture will perform, and to individuate the counterparties responsible for performing the other activities. Initial consulting, moreover, are to be requested also in order to assess the purpose to be pursued and also to evaluate and foresee a possible exit strategy for the company when the amount of financial results needed to develop products will be too high for the extant shareholders, and consequently draw the company's statute.

Under the assumption that the outstanding value of the research projects has already prove its validity, all those recommendations, emerged from the conversations we had with academic founders and with managers which were involved in guiding the new venture, and in setting up internal procedures, in line with previous findings (e.g. Bjornali and Gulbrandsen, 2010) also suggest to founder of academic spin-offs, to immediately enlarge the variety in the board composition of their ventures in order get advices and evaluation on business idea sustainability by people truly involved in the project both for scientific prestige and contribution of the venture and also for its value generation potential. Moreover this also represents the safer way to enlarge the variety of the connections they can have access to.

5.3.2 Implications for Officers in Public Research Organizations for Enriching the Managerial Endowment of Academic Spin-offs

As mentioned before, the analysis of the overall business models to trace any differences between corporate and academic spin-offs does not show any radical difference in the endowment they receive from parent organization. In fact, when companies are observed in their growth paths most of initial differences are diluted. Moreover as already observed in the previous section, also when considering differences in imprinting with reference to the dimensions of a holistic construct as the business model is, those differences are not

prominent. And basically they relate to the likelihood of (and the time necessary to) engaging in a learning and experimentation process during which deviation from imprinted patterns occurs and business model is innovated.

We have observed that corporate spin-offs are endowed with the possibility to engage in grounded entrepreneurial experiments, whether those experiments are not grounded for academicians, even when they may count on some basic consultancy activities from external specialized firms, or assistance by concerned universities. This happens because consulting activities basically concerns involved on daily administrative issues, instead of concerning also company's long-term development and perspectives

Since our study focused on the cases of three different companies that were born in academic contexts, and considering that in those companies the change in dimensions inherited from the parent organization was observed, we can make also a contribution with respect to policy indications for the enriching of spin-offs genetic endowment, thus letting them initiate in vivo, (grounded) entrepreneurial experimentations. As recently claimed by Gilsing et al. (2010) policy indications here presented, focus on the chances of success for academic spin-offs (and not on principles that serve the creation of academic spin-offs). Moreover indications here presented can be considered of particular value for the Italian context, since they were derived from a comparison among spawned ventures being generated by diverse parent organizations.

In line with some of Gilsing et al. (2010) policy design indications, our research work provides evidence that public policies must promote conditions under which dedicated offices care not simply in facilitating company creation, but also in promoting company survival in an un-known arena, the business one.

In particular, during our study we found some evidences useful to improve the effectiveness of technological transfer offices. Extant research studies, rooted in Italy, already denounced the marginal contribution by TTOs due, among other factors, also to the lack of business orientation by TTOs managers (e.g. Muscio, 2010). During our interviews, especially founders reported on the role performed by TTOs to back the new venture and hence we could provide some insights on what is really needed by academic entrepreneurs. Moreover as already mentioned those insights benefited also from comparison with corporate spin-offs.

Overall, from our evidences we derive that founders, especially in high-tech contexts require support to their activities not simply in speeding up the process of the legal constitution of the new venture, in transferring assets to it, or in drawing initial (formal) plans; spawned ventures, instead, need a true interface service provider in order to have access to competencies and networks of relations that are larger from the ones, which academicians may individually enact.

The importance of the TTOs' network of relations for academic spawned ventures, has already been highlighted by different scholars (e.g. Lockett et al, 2003); our data, however, with particular reference to the Italian context, provide some insights on the properties of a desirable network and the desirable skills acquirable via TTOs and managers. First of all, from our data, we derive additional evidence to the literature that already stresses the importance of having non-academic managers (and not scientists) at the guide of TTOs (e.g. Siegel et al., 2003). Academicians need to be helped in their "entrepreneurial experimentation" by people who are surely able to manage intellectual property, but also who are capable of indicating solutions for the most appropriate funding choices to sustain long-term development.

Moreover, TTOs should have links with managers with a strong industrial experience in R&D functions that will help in evaluating the sustainability of the venture, thanks to the coupling of outstanding technical knowledge and competencies needed to understand if the concerned business idea may generate value on its final market. Scientists are often enamoured of their research results and are not in the condition to estimate if the scientific contribution may also have an economic valorisation on the market. Moreover even when scientists understand if the research has the potential to generate (economic) value, they are not able to individuate on which market segment it could be sold and hence which are the activities that the new venture has to perform.

The relation with tenured external manager is hence necessary for the refinement of the original business idea and especially may orient also the process of selection of activities to be performed, together with their structure and governance. This will help in transferring to the new venture not only outstanding research projects, but also to back the new venture with the needed efficacy in individuating the range of activities that have to be performed and the ones that are not likely to generate real value for the new venture. Moreover, the

likelihood of subsequently assist to a faster learning process that, if necessary leads to business model innovation, is accrued.

TTOs are particularly relevant for the spawned ventures, whose entrepreneurial projects and company products are subject to regulatory approval, as in the case of biotech companies: they might also provide spawned ventures with relations to consultants who already are confident with all the steps required for institutional approval, in order to carefully estimate as well the length of time needed to eventually come up with the imagined product. Finally, TTOs are expected also to foster the development of scientific and, if the case occurs, of commercial relations among the departments across the same academic institution.

Overall, we hence add evidence to extant literature that, especially with quantitative data on TTOs effectiveness, claims for a redesign of their management and tasks. The advantage of our study is that we provide some insights on minor changes that, to some extent, might be implemented by the single office already in place.

5.4 Further Extensions

Further development of research is aimed at extending it to other industries with the objective of performing a cross-industry analysis to assess regularities and/or highlight critical differences in factors that link spin-offs' business models to parent organization features and other (industry) factors that influence business models innovation. Possibly the analysis must be pursued on cases of parent organizations and their spin-offs belonging to other industries, and the comparison should be made, again, across companies that were spawned off during the same period and with comparable initial dimensions, in terms of personnel engaged within the venture. Otherwise it will not be possible to control for the effect of notable technical developments that may occur in the concerned industries, thus fundamentally altering the strategic landscape of further analysis. In particular, the aim of the extension of inductive studies to other industries should also be to derive other insights on the assumed genetic differences among academic and corporate spin-offs. In our study, indeed, for outstanding research projects, the genetic differences appear not to be that not clear-cut and disruptive in affecting subsequent spin-offs development and growth. However, it has also to be acknowledged that our results may have been altered by survival bias and hence, also a

replication of the present study, including in the case studies panel spin-offs (in particular academic ones) that did not survive may be fruitful, in order to assess if genetic endowment may instead have a disruptive effect in determining company's survival.

Other industries that may be considered for the extension of the research are, for instance, semiconductors, lasers industry and medical device. Furthermore in those industries, related issues have already been investigated, in order to assess the rate at which firms spawns spin-offs and the performance of the spin-offs, but always considering simply the perspective of the endowment of the new venture and not the process of transmission and persistence of genes. Moreover, the extension of the study to another industry shold also be made at confirming if the operationalization of the business model construct, across the dimensions outlined by Amit and Zott (2010) and used in the present study, still shows to be fruitful in understanding the factors along which business model innovation occurs and which are the traits that are most likely to be changed.

Appendixes

Appendix A: Protocol for Conducting Interviews

The interview protocol is intended to be used when talking to founders and managers of the spin-offs and when talking to managers and researchers who used to work in the parent organization and didn't participate to the new venture. This semi-structured protocol is aimed at raising the same themes in order to keep track of elements that have been the object of lineage and influenced business model design at the time of founding and furthermore, the dimensions along which business model changes over time.

Section 1: Personal data

- Name:
- Position:
- Age:
- Time in current position:
- Position at the time the spin-off was founded:
- Prior experience
- Years of experience

Section 2: Reconstruction of Activities

Team composition

- People in the team at the parent organization when the spin-off was founded
- People in the founding team of the spawned venture
- People involved in research activities at the parent company and in the spawned one
- People in charge of managerial tasks

Scope of Activities:

- Customers served by the company
- Product or service orientation
- Main source of revenues, if any

- Main application for technology developed within the parent organization's boundaries
- Alternative applications for the knowledge/technology embodied in firm's offer

Resources and set of relations

- Resources (kind and amount) identified as the most valuable to the organization
- Nature of resources easily acquired in the market
- Nature of resources that could be employed in externalized activities
- Value of tangible assets
- Incidence of R&D costs
- Likelihood of bringing in new participants to better complement and exploit organization's resources
- Integration of value chain's activities performed by the organization
- Difficulty in setting up transactions in order to get inputs and provide outputs
- Amount of transactions afforded and related perceived efficiency

Section 3: Searching for Complementary Assets

People

- Person (manager or technician) who individuated possibilities for spawning
- People (manager or technician) immediately involved
- People at first active in pursuing the objective of spawning
- Kind of resources and competences put in place by involved people

Framework for new connected activities

- Kind and amount of transactions between the spawned venture and the corporate one
- Kind and amount of transactions with parent organization's partners put in place by the spawned venture
- Connections with the same business and research counterparties of the parent organization
- Alliances eventually put in place, both by the parent organization and the spawned one after the spawning

Financing

- Sources of monetary incomes and difference with the source of monetary income by the parent company
- Extent of financial autonomy in performing main activities for the purpose of final (eventually long-term) value creation
- Interest toward the control of the new venture by parent organization's owners
- Financial involvement by the parent organization in the new venture
- Financial involvement by some of the shareholders of parent organization

Section 4: Evaluation of spin-off decision by key informants

- Factors on which was based success of involved production when performed by the parent organization?
- Factors on which is based the (eventual) success of involved production, performed by the spawned venture
- What is appreciable in the choice of letting the spin-off emerge
- What is not appreciable in the choice of letting the spin-off emerge
- Which are the traits that parent organization and spawned venture share with respect to performed activities
    - Profit orientation
    - Research Orientation
    - Markets they serve
    - Products they realize
    - Connections they activated
    - Production process sequence of activities
    - Source of financing
- On which traits spawned venture is perceived as different from the parent organization.
- Reasons for engaging in the spin-off activities

Reasons for not having engaged in spin-offs activities

Appendix B: People which contributed to different stages of the Research Process

Table 1: People who were involved in preliminary steps of the Research, for field preparation

ID	Position	Contribution
1	Editor for a industry newsletter, with worldwide diffusion among industry players	Focus Group
2	CEO of start-up, which has developed a molecule, currently in phase I clinical development, and as well has a unique discovery platform for developing targeted covalent drugs that treat rare diseases	Focus Group
3	Head of Europe Strategic Transactions for a multinational pharmaceutical company. He is responsible for the acquisition and licensing of drug programs or companies	Focus Group
4	Works at the corporate venture fund of a pharmaceutical multinational company. He covers all steps of the investment process for this fund, and also serves as board observer for the fund on the boards of recently acquired companies.	Focus Group
5	Vice president of corporate development at an entrepreneurial pharmaceutical company with a large pipeline, based in the US, where he has also served as a leader in business development.	Focus Group
6	Associate Director for Licensing and Corporate Development at European pharmaceutical company	Focus Group
7	Head of Business Development for one of the largest Pharmaceutical company in the world	Focus Group
8	CEO of a private, venture-backed therapeutic discovery and development company focused on novel antibodies for the treatment of infectious disease and cancer.	Focus Group
A	Member of the Board of Directors of the Italian Association of Biotech	Industrial Presentation, contributed to the understanding the main features of the Italian Biotech Industry
B	President at a leading Italian pharmaceutical company, with a business unit specialized in R&D activities in the field of biotechnology.	Industrial Presentation, contributed to the understanding the main

	He served also as a President of the Italian Association of Pharmaceutical Companies	features of the Italian Biotech Industry
C	Member and Coordinator of the business division dedicated to Biotech industry and companies at the Italian Branch of a leading consultancy company.	Industrial Presentation, contributed to the understanding the main features of the Italian Biotech Industry
AA	Tenured Professor in Chemical and Pharmaceutical Synthesis at an Italian Southern University. Member of the Scientific Board of a Small Pharmaceutical Company, to which it consulted since its foundation.	Developing and Reviewing Interview Protocol
AB	Researcher in Pharmacology at an Italian Northern University. Together with a Tenured Professor of their Department, founded an Academic Spin-off whose purpose is to develop compounds to be sold to pharmaceutical companies	Developing and Reviewing Interview Protocol
AC	Manager at a Canadian-based biotech company. Medical Doctor with a specialization in pharmacology and an MBA. The company he manages was founded with the consulting of tenured professors from leading European Universities	Reviewing and Testing Interview Protocol
AD	Tenured Professor in Management, with a high number of publication on Italian Biotech Companies	Selecting Case Studies Reviewing Interview Protocol
AE	Responsible for Investments at a Bioscience Technology District, whose purpose is to promote technical and scientific collaboration between industry and research, strengthen the competitiveness and visibility of the bioscience sector at the international level	Selecting Case Studies

Table 2: People interviewed and/or people who provided relevant information during company presentations and during participation to industry meetings. All of them were directly involved in the foundation, management, financing of the five concerned case-studies.

ID	Position
1	CEO at one of selected case study, with more than twenty years of experience as Executive for pharma R&D activities in different multinational pharmaceutical companies. He may count on an extensive global network in life-sciences.
2	Managing Director at a Corporate Venture Fund at an pharmaceutical established company. Previously he served as a researcher and project manager for the company in two different therapeutic areas. He served also as Business Development manager for another European Company.
3	Co-founder and Chief Executive Officer of one of concerned case studies. He is also the founder of another successful biotech start-up and served as Director of Biotechnology Transfer at well-renowned Science Park.
4	Member of the Board of Directors at one of selected case study, promoted the founding of the company and served as President and CEO.
5	Business Development Manager at one of selected case studies. Joined the company, after some experience in academic research laboratories across Europe. After a Master in Business Administration he moved to industry.
6	Executive with more than 25 years of experience in the pharmaceutical industry with a strong scientific background. ID 6 served as a manager in several areas of management for four multinational Companies including three FORTUNE 100 ones. At one of selected companies, ID 6 served as General Director.
7	General Manager and Member of the Board of Directors at a company listed to an European Stock Exchange. Has over 30 years of experience in managing the economic aspects of product development in the pharmaceutical industry.
8	Director of the Research Center, responsible for Technical Management and the coordination of Medicinal Chemistry Projects. ID 8, with a proven experience in managing research projects, has given relevant contribution to the development of the company.
9	Business Development Specialist, ID 9 is a key-person in promoting research platform activities among new partners.
10	Tenured Professor and Dean at an Italian University. He promoted the founding of one of the company to foster technological transfer.
11	Tenured Professor, founder of one of concerned case study. For a short period, ID 11 directly managed the spin-off and then decided to stay within the Academia. Together with other colleagues, ID 11 has actively contributed also to the founding of another Italian-based biotech company.
12	Tenured Professor, founder, Chairman and CEO of one selected companies. ID 12 served also as Scientific Director of the Scientific Institute where the company was spawned off; ID 12 held positions as Director of Department, and Head of the Gene Therapy as well.

Appendix C: Examples of matrixes prepared during preliminary data scanning and codes used for Documents, transcription of Interviews and other audio-recorded materials (such as corporate presentations, conferences speech, journalistic interviews)

Case Study	Data	Key Information	Type of Info	Key Words	Spin-off life stage	Codes: (I round)	Codes: (Final)
Best in class antagonist	X is a private biopharmaceutical company based on a unique channel technology platform that brings together strong expertise on TRPs area and industrial competences in research & development process applied to small molecule therapeutics.	Unique channel technology platform. Strong Expertise in a certain therapeutic area and Industrial competences in R&D	General Information about the Company	Strong Expertise	Development	Range of activities performed Imprinted Pattern	Experiment Quest for excellence Imprinting Pervasiveness
Best in class antagonist	On January 2007 *Best in class antagonist* closed a € [omissis] million Round, A financing with Y as lead investor and W SGR, Z SGR as co-investors.	New shareholders	Company Financing	Lead investor Corporate Venture Fund	Evolution into a company	Governance of Activities Learning trough an External Force	Intervention of an External Force to drive the change
Park Molecule	This location offers crucial advantages, allowing the company to complement its own R&D resources with the cutting-edge scientific, technological and clinical resources of its host institution, also through its option right on research results.	Type of relationships Partnering	Company Network	Host institution Option rights	Evolution into a company	Imprinted Pattern Governance of activities Search for complementarities Quest for Novelty	Imprinting Pervasiveness Grounded Experiment
Indications for Rareness	My company and its mother organization have a lot of differences, even if they perform the same range of activities. The mother company was typically Italian and this one is not, even if we are located in Italy, our shareholders are mainly foreigners, our management is truly international	Internationalization of the company New North-American Shareholders	Company Management Company Financing	Shareholder Patronal International	Development and Growth	Governance of activities Learning through External Forces	Intervention of an External Force to Drive the Change Grounded Experiment

References

(Eds.), *Cluster Genesis: Technology Based Industrial Development*, Oxford University Press, New York, NY

AFUAH A (2004) *Business Models: A Strategic Management Approach*, McGraw-Hill/Irwin, Boston; New York

AFUAH A, TUCCI CL (2001) *Internet Business Models*, McGraw Hill, Boston, MA

AGARWAL R (2001) University-to-industry Knowledge Transfer: Literature Review and Unanswered Questions, *International Journal of Management Reviews* 3 (4): 285-302

AGARWAL R, ECHAMBADI R, FRANCO AM, SARKAR MB (2004), Knowledge transfer through inheritance: Spin-out generation, development, and survival, *The Academy of Management Journal*, 47, 4: 501-522

ALDRICH H (1999) *Organizations Evolving*, SAGE Publications USA, Thousand Oaks, CA

ALDRICH H, ZIMMER C (1986), Entrepreneurship through Social Networks; in SEXTON D, SMILOR R (Eds.), *The Art and Science of Entrepreneurship*: 3-23. Cambridge, MA: Ballinger

ALDRICH HE, KIM PH (2007) Small Worlds, Infinite Possibilities? How Social Networks Affect Entrepreneurial Team Formation and Search, *Strategic Entrepreneurship Journal*, 1: 147–165

AMIT R, ZOTT C (2002) Value Creation in e-business, *Strategic Management Journal*, 22 (6-7): 493-520

AMIT R, ZOTT C, CENTER EA (2002) Value drivers of e-commerce business models in *Creating value: Winners in the new business environment*, Wiley-Blackwell: 15-47

ASPELUND A, BERG-UTBY T, SKJEVDAL R (2005) Initial Resources' influence on New Venture Survival: a Longitudinal Study of New Technology-based Firms, *Technovation* 25 (11): 1337-1347

AUDRETSCH DB, STEPHAN PE (2001) Biotechnology in Europe: lessons from the USA, *International Journal of Biotechnology*, 3(1/2): 168 - 183

BADEN-FULLER C, MORGAN MS (2010) Business models as models, *Long Range Planning*, 43 (2): 156-171

BAMFORD CE, DEAN, TJ, MCDOUGALL PP (1999) An Examination of the Impact of Initial Founding Conditions and Decisions Upon the Growth of New Bank Start-ups. Journal of Business Venturing 15 (3): 253–277

BARON JN, BURTON MD, HANNAN MT (1996) The Road Taken: Origins and Evolution of Employment Systems in Emerging Companies, *Industrial and Corporate Change* 5 (2), 239-275

BARON JN, HANNAN MT, BURTON MD (1999) Building the Iron Cage: Determinants of Managerial Intensity in the Early Years of Organizations. American Sociological Review 64 (4): 527

BAUM JAC, RAO H, Evolutionary Dynamics of Organizational Populations and Communities, in POOLE MS, VAN DE VEN HS(eds.), *Handbook of Organizational Change and Innovation*, Oxford University Press: New York, NY

BETTIS RA, PRAHALAD CK (2006). The dominant logic: Retrospective and extension, *Strategic Management Journal*, 16 (1): 5-14

BHIDE A (2000) *The Origin and Evolution of New Business*, Oxford University Press, New York, NY, US

BIGLIARDI B, NOSELLA A, VERBANO C (2005) Business models in Italian biotechnology industry: a quantitative analysis, *Technovation*, 25 (11): 1299–1306

BIRLEY S (1984) Finding the New Firm. *Proceedings of the Academy of Management Meetings* 47: 64-68

BJØRNÅLI ES, GULBRANDSEN M (2010) Exploring board formation and evolution of board composition in academic spin-offs, *The Journal of Technology Transfer*, 35 (1): 92-112

BOATENG W (2012*),* Evaluating the Efficacy of Focus Group Discussion (FGD) in Qualitative Social Research, *International Journal of Business and Social Science*, 3 (7)

BOEKER W (1988) Organizational Origins: Entrepreneurial and Environmental Imprinting at the Time of Founding. In CARROLL G (ed.),Ecological Models of Organizations,, Ballinger Publishing, Cambridge, MA: pp. 33-51.

BOEKER W (1989) Strategic Change: the Effects of Founding and History, *Academy of Management Journal* 22 (3): 489-515

BORGATTI SP, FOSTER PC (2003) The Network Paradigm in Organizational Research: A Review and Typology*; Journal of Management*, 29: 991-1013

BORGATTI SP, MEHRA A, BRASS DJ, LABIANCA G. (2009) Network Analysis in the Social Sciences; *Science*, 323: pp. 892-895

BOYATZIS RE (1998) *Transforming qualitative information: Thematic analysis and code development*, Sage Publications

BRAY MJ, LEE JN (2000) University Revenues from Technology Transfer: Licensing Fees vs. Equity Positions, *Journal of Business Venturing* 15 (5–6): 385–392

BRUDERL J, PREISENDORFER P, ZIEGLER R (1992) Survival Chances of Newly Founded Business Organizations; *American Sociological Review*, 57: 227-242

BRUDERL J, SCHUSSLER R (1990), Organizational Mortality: the Liabilities of Newness and Adolescence; *Administrative Science Quarterly*, 35: 530-547

BURKHART T, KRUMEICH J, WERTH D, LOOS P, (2011) Analyzing the Business Model Concept — A Comprehensive Classification of Literature, *ICIS 2011 Proceedings*, Paper 12

BURT RS (1992) *Structural Holes. The Social Structure of Competition*, Cambridge, MA: Harvard University Press

BURT RS (2000) *The Network Structure of Social Capital* in *Research in Organizational Behavior*, edited by SUTTON RI, STAW BM; Greenwich, CT: JAI Press

BURT RS (2002) The Social Capital of Structural Holes; in GUILLEN MF, COLLINS R, ENGLAND P, MEYER M. *The New Economic Sociology: Developments in an Emerging Field*, New York: Rusell Sage Foundation: 148-190

BURT RS, RAIDER HJ (2002) Creating careers: women's paths to entrepreneurship. Unpublished manuscript, University of Chicago

BURTON MD, SORENSEN JB, BECKMAN CM (2002) Coming from Good Stock: Career Histories and New Venture Formation, in LOUNSBURY M, VENTRESCA M (eds.) *Social Structure and Organizations Revisited* 19: 229-262, JAI/Elsevier, New York, NY

CARROLL GR, HANNAN MT (1989) Density Delay in the Evolution of Organizational Populations: A Model and Five Empirical Tests, *Administrative Science Quarterly* 34 (3): 411-430

CASSELL C, BISHOP V, SYMON G, JOHNSON P, BUEHRING A (2009) Learning to be a qualitative management researcher, *Management learning*, *40* (5): 513-533

CAVALCANTE SA (2012) Preparing for business model change: the "pre-stage" finding, *Journal of Management and Governance*, 1-21.

CHATTERJI AK (2009) Spawned with a Silver Spoon? Entrepreneurial Performance and Innovation in the Medical Device Industry, *Strategic Management Journal* 30 (2): 185-206

CHEMMANUR TJ, YAN A. (2004) A Theory of Corporate Spin-offs*; Journal of Financial Economics*, 72 (2): 259-291

CHESBROUGH H (2007) Business model innovation: it's not just about technology anymore, *Strategy & leadership*, 35 (6): 12-17

CHESBROUGH H (2010) Business model innovation: opportunities and barriers, *Long Range Planning*, 43 (2): 354-363

CHESBROUGH H, ROSENBLOOM RS (2002) The Role of the Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation's Technology Spin-off Companies, *Industrial and Corporate Change* 11 (3): 529-555

CHIESA V, PICCALUGA A (2000) Exploitation and Diffusion of Public Research: the Case of Academic Spin-off Companies in Italy, *R & D Management* 30 (4): 329-340

CHUNG SA, SINGH H, LEE K (2000) Complementarity, Status Similarity and Social Capital as Drivers of Alliance Formation, *Strategic Management Journal* 21 (1): 1-22

CLARYSSE B, MORAY N (2004) A process study of entrepreneurial team formation: the case of a research-based spin-off, *Journal of Business Venturing* 19 (1): 55-79

COLOMBO MG, PIVA E (2008a) Strengths and Weaknesses of Academic Startups: A Conceptual Model, *IEEE Transactions on Engineering Management*, 55 (1): 37-49

COLOMBO MG, PIVA E (2008b). Firms' Genetic Characteristics, Competence Enlarging Strategies, and Performance: A Comparison of Academic and Non-Academic Start-Ups, *Working paper*, Politecnico di Milano, Department of Management, Economics and Industrial Engineering.

COLOMBO MG, PIVA E (2012) Firms' genetic characteristics and competence-enlarging strategies: A comparison between academic and non-academic high-tech start-ups, *Research Policy*, *41* (1): 79-92

COLOMBO MG, PIVA E, RENTOCCHINI F (2012) The effects of incubation on academic and non-academic high-tech start-ups: evidence from Italy, *Economics of Innovation and New Technology*, *21* (5-6): 505-527

CONNER KR, PRAHALAD CK (1996), A Resource-based Theory of the Firm: Knowledge Versus Opportunism, *Organization Science* 7 (5): 477-501

CORBIN JM, STRAUSS A (1990) Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative sociology*, *13* (1): 3-21

COROLLEUR CD, CARRERE M, MANGEMATIN V (2004) Turning scientific and technological human capital into economic capital: the experience of biotech start-ups in France, Research Policy, 33 (4): 631-642

CRABTREE BF, YANOSHIK MK, MILLER WL, O'CONNOR PJ (1993) Selecting individual or group interviews, *Successful focus groups: Advancing the state of the art*: 137-149.

DAMANPOUR F, DAMANPOUR JA, (2001) E-business e-commerce evolution: perspective and strategy, *Managerial Finance*, 27 (7): 16 – 33

DEEDS DL, HILL CWL (1996) Strategic alliances and the rate of new product development: an empirical study of entrepreneurial biotechnology firms, *Journal of Business Venturing*, 11(1): 41 - 55.

DEMIL B, LECOCQ X (2010) Business model evolution: in search of dynamic consistency, *Long Range Planning*, 43 (2): 227-246

DI GREGORIO D, SHANE S (2003), Why do Some Universities Generate More Spin-offs than Others?; *Research Policy*, 32(2): 209-220

DI MAGGIO PJ, POWELL W (1983) The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields, *American Sociological Review*, 48: 147-60

DING W (2006) Why Do For-Profit Firms Adopt Open Science? Assessing the Impact of Founder Imprinting, Niche Crowding and Competitive Influence, Paper presented at the *Annual Meeting of the American Sociological Association*, Montreal Convention Center, Montreal, QC, CA

DJOKOVIC D SOUITARIS V (2008), Spinouts from Academic Institutions: a Literature Review with Suggestions for Further Research, *The Journal of Technology Transfer*, 33 (3): 225-247

DOWNING S (2005) The social construction of entrepreneurship: Narrative and dramatic processes in the coproduction of organizations and identities. *Entrepreneurship Theory and Practice,* 29 (2): 185–204

DRUILHE C, GARNSEY E (2004) Do Academic Spin-outs Differ and Does it Matter? *Journal of Technology Transfer* 29 (3-4): 269-285

DURAND RR, BRUYAKA O, MANGEMATIN V (2008) Do science and money go together? The case of the French biotech industry, *Strategic Management Journal*, 29 (12): 1281–1299

EDEN C, ACKERMANN F (2000) Mapping distinctive competencies: a systemic approach, *Journal of the Operational Research Society*, 51 (1): 12-20

EISENHARDT KM (1989) Building Theories from Case Study Research, *Academy of Management Review* 14 (4): 532-550

EISENHARDT KM, GRAEBNER ME (2007) Theory building from cases: opportunities and challenges, *Academy Of Management Journal*, 50 (1): 25-32

EISENHARDT KM, GRAEBNER ME (2007) Theory building from cases: Opportunities and challenges. *Academy of management journal*, *50* (1): 25-32

EISENHARDT KM, SCHOONHOVEN CB (1990) Organizational Growth: Linking Founding Team, Strategy, Environment, and Growth Among U.S. Semiconductor Ventures, 1978-1988. *Administrative Science Quarterly* 35 (3): 504-529

ENSLEY MD, HMIELESKI KM (2005) A Comparative Study of New Venture Top Management Team Composition, Dynamics and Performance between University-Based and Independent Start-ups, *Research Policy* 34 (7): 1091-1105

ERNST & YOUNG (2011) *Italian Biotechnology Report 2011*

ERNST & YOUNG (2012) *Rapporto sulle biotecnologie del settore farmaceutico in Italia 2012*

FELDMAN M (2003) The locational dynamics of the US biotech industry: knowledge externalities and the anchor hypothesis , *Industry and Innovation*, 10 (3): 311-329

FEREDAY J, MUIR-COCHRANE E (2008) Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development, *International Journal of Qualitative Methods*, *5* (1): 80-92

FERRIANI S, GARNSEY E, LORENZONI G (2012) Continuity and change in a spin-off venture: the process of reimprinting, *Industrial and Corporate Change*, *21* (4): 1011-1048

FERRIANI S, GARNSEY E, LORENZONI G Imprinting, Deprinting, Reimprinting: A Process Theory of Intergenerational Learning and Spin-off Entry, *Working Paper*, SMS Mini Conference (Catania, May, 23-25, 2007)

FREEMAN J (1986) Entrepreneurs as Organizational Products: Semiconductor Firms and Venture Capital Firms. In LIBECAP G (ed.), *Advances in the Study of Entrepreneurship, Innovation and Economic Growth*, Greenwich, Conn: JAI; 33- 58

GARNSEY E, LORENZONI G, FERRIANI S (2008) Speciation through entrepreneurial spin-off: The Acorn-ARM story, *Research Policy*, 37 (2): 210-224

GEORGE G, BOCK AJ (2011) The Business Model in Practice and its Implications for Entrepreneurship Research. *Entrepreneurship Theory and Practice*, 35: 83–111.

GEROSKI PA , MATA J, PORTUGAL P (2010) Founding Conditions and the Survival of New Firms, *Strategic Management Journal* 31 (5): 510-529

GHAZIANI A, VENTRESCA MJ (2005) Keywords and cultural change: Frame analysis of business model public talk, 1975–2000, *Sociological Forum*, 20 (4): 523-559

GLADSTEIN D, QUINN JB (1985) Making Decisions and producine Action: The two Faces of Strategy in PENNINGS JM and Associates (eds.), Organizational Strategy and Change:198-216, Jossey-Bass, San Francisco, CA

GLESNE C, PESHKIN A (1992) *Becoming qualitative researchers: An introduction*, White Plains, NY: Longman

GLICK JL (2008) Biotechnology business models work: Evidence from the pharmaceutical marketplace, *Journal of Commercial Biotechnology*, 14 (2): 106-117

GOLDEN BR (1992) The Past is the Past--or Is It? The Use of Retrospective Accounts as Indicators of Past Strategy, *Academy of Management Journal* 35 (4): 848-860

GRANOVETTER M (1973) The Strength of Weak Ties*; American Journal of Sociology*, 78: 1360-1380

GRANOVETTER M (1985), Economic Action and Social Structure: The Problem of Embeddedness*; American Journal of Sociology*, 91: 481-510

GULATI R, NOHRIA N, ZAHEER A (2000) Strategic Networks, *Strategic Management Journal* Special Issue 21 (3): 203-215

HACKETT SM, DILTS DM (2004) A systematic review of business incubation research

HANNAN MT, BURTON MD, BARON JN (1996) Inertia and Change in the Early Years: Employment Relations in Young, High Technology Firms, *Industrial and Corporate Change* 5: 503-536

HANNAN MT, FREEMAN J (1977) The Population Ecology of Organizations, *American Journal of Sociology* 82 (5): 929-964

HANNAN MT, FREEMAN J (1984) Structural Inertia and Organizational Change, *American Sociological Review* 49 (2): 149-164

HANNAN MT, FREEMAN J (1989) *Organizational Ecology*, Harvard University Press, Cambridge, MA

HEIRMAN A, CLARYSSE B (2004) How and Why Do Research-Based Start-ups Differ at Founding? A Resource-Based Configurational Perspective, *Journal of Technology Transfer* 29 (3-4): 247-268

HELLMANN T (2007) When Do Employees Become Entrepreneurs?; *Management Science*, 53 (6): 919-933

HITT MA, IRELAND RD, CAMP SM, SEXTON DL (2001) Strategic Entrepreneurship: Entrepreneurial Strategies for Wealth Creation, *Strategic Management Journal* 22 (6-7): 479-491

HUBER GP (1991) Organizational Learning: the Contributing Processes and the Literatures, *Organization Science* 2 (1): 88-115

HYDEN LC, BULOW PH (2003), Who is talking: drawing conclusions from focus groups – some methodological considerations, *International Journal of Social Research Methodology*, 6 (4): 305-321

INKPEN AC, TSANG EW (2005), Social Capital, Networks and Knowledge Transfer, *Academy of Management Review*, 30 (1): 146-165

JENSEN DG, DOUGHERTY E (2004) Converting biotech scientists into managers, *Nature biotechnology*, 22 (3): 357

JONG S (2006) How organizational structures in science shape spin-off firms: the biochemistry departments of Berkeley, Stanford, and UCSF and the birth of the biotech industry, *Industrial and Corporate Change*, 15 (2): 251-283

JUNKUNC MT (2007) Managing radical innovation: The importance of specialized knowledge in the biotech revolution, *Journal of Business Venturing*, 22(3): 388–411

KERLINGER FN (1973) Foundations of Behavioral Research, 2d ed., Holt, Rinehart and Winston, New York, NY

KIRZNER I (1997) Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach; *Journal of Economic Literature*, 35: 60-85

KLEPPER S (2001) Employee Sart-ups in High-tech Industries, *Industrial and Corporate Change* 10 (3): 639- 674

KLEPPER S, SLEEPER S (2005) Entry by Spinoffs, *Management Science* 51 (8): 1291-1306

KLEPPER S, THOMPSON P (2006) Intra-industry Spinoffs, *Working Paper 0605*, Florida International University, Department of Economics

KOGUT B, ZANDER U (1996) What Firm Do? Coordination, Identity, and Learning, *Organization Science* 7 (5): 502-518

KRUEGER RA, CASEY MA (2000) *Focus Groups: A Practical Guide for Applied Research*, 3rd edition, Thousand Oaks, CA: Sage Publications.

KVALE S, BRINKMANN S (2008) *Interviews: Learning the craft of qualitative research interviewing*, Sage Publications, Incorporated

LANDRY R, AMARA N, RHERRAD I (2006) Why Are Some University Researchers More Likely to Create Spin-offs Than Others? Evidence from Canadian Universities; *Research Policy*, 35 (10): 1599-1615

LEE C, LEE K, PENNINGS JM (2001) Internal Capabilities, External Networks, and Performance: a Study on Technology-based Ventures; *Strategic Management Journal*, 22: 615-640

LEE CS, (2001) An analytical framework for evaluating e-commerce business models and strategies, *Internet Research*, 11 (4): 349 – 359

LEENDERS RTA, GABBAY SM (1999) An Agenda for the Future; in LEENDERS RTAJ, GABBAY SM (eds) *Corporate Social Capital and Liability*, Kluwer: New York; 483–494

LI J, HALAL WE (2002), Reinventing the biotech manager, *Nature Biotechnology,* 20, BE61 - BE63.

LIEBESKIND JP, OLIVER AL, ZUCKER L, BREWER M. (1996). Social networks, learning, and flexibility: sourcing scientific knowledge in new biotechnology firms, *Organization Science*, 7 (4): 375 – 387

LIEVROUW LA, ROGERS EM, LOWE CU, NADEL E (1987), Triangulation as a Research Strategy for Identifying Invisible Colleges Among Biomedical Scientists; *Social Networks*, 9 (3): 217-248

LOCKETT A, SIEGEL D, WRIGHT M, ENSLEY MD (2005) The Creation of Spin-off Firms at Public Research Institutions: Managerial and Policy Implications, *Research Policy* 34 (7): 981-993

LONG C, The future of biotechnology: promises and problems, *The American Enterprise*, 9 (5): 55–58

LORENZONI G (1998), Dove Studiano gli Imprenditori, *Economia & Management* n.6: 63-72

LOUNSBURY M, GLYNN MA (2001) Cultural entrepreneurship: Stories, legitimacy, and the acquisition of resources*, Strategic Management Journal,* 22 (6/7) 545-564

LOUNSBURY M, VENTRESCA M (2002) Social Structure and Organizations Revisited in LOUNSBURY M, VENTRESCA M (eds.) *Research in the Sociology of Organizations* 19: 3-36, JAI/Elsevier, New York, NY

MACLEAN LM, MEYER M, ESTABLE A (2004) Improving accuracy of transcripts in qualitative research, *Qualitative Health Research*, *14* (1): 113-123

MAGRETTA J (2002) Why Business Model Matter, *Harvard Business Review,* 80 (5): 86-93

MAHADEVAN B (2000) Business Models for Internet-Based E-Commerce: an Anatomy, *California Management Review,* 42 (4): 55-69

MANGEMATIN V, LEMARIE S, BOISSIN JP, CATHERINE D, COROLLEUR F, CORONINI R, TROMMETTER M (2003) Development of SMEs and heterogeneity of trajectories: the case of biotechnology in France, *Research Policy*, 32 (4): 621-638

MARQUIS C (2003) The Pressure of the Past: Network Imprinting in Intercorporate Communities, *Administrative Science Quarterly* 48 (4): 655-689.

MARSDEN PV (1990) Network Data and Measurement; *Annual Review of Sociology*, 16: pp. 435-463

MCEVILY B, ZAHEER A (1999) Bridging Ties: a Source of Firm Heterogeneity in Competitive Capabilities, *Strategic Management Journal* 20 (12): 1133-1156

MCGRATH RG (2010) Business models: a discovery driven approach, *Long Range Planning*, 43(2): 247-261

MCGRATH RG, MACMILLAN IC (2000) *The Entrepreneurial Mindset*, Business School Press, Boston, MA

MERTON RK, FISKE M, KENDALL PL (1990) *The Focused Interview: A Manual of Problems and Procedures*, 2nd edn. Free Press, New York

MERTON RK, KENDALL PL (1946) The Focused Interview, *The American Journal of Sociology,* 51 (6): 541– 557

MILANOV H, FERNHABER SA (2009) The Impact of Early Imprinting on the Evolution of New Venture Networks, *Journal of Business Venturing* 24 (1): 46-61

MONTPETIT E (2011) Scientific Credibility, Disagreement, and Error Costs in 17 Biotechnology Policy Subsystems, *Policy Studies Journal*, 39 (3): 513-533

MORAY N, CLARYSSE B (2005) Institutional change and resource endowments to science-based entrepreneurial firms, *Research Policy* 34 (7): 1010-1027

MORGAN D (1996) Focus groups, *Annual Review Sociology*, 22: 129–152

MORGAN DL (1988) *Focus Groups as Qualitative Research*, Newbury Park, CA: Sage Publications.

MORGAN DL (1996), *Focus Group as Qualitative Research*, SAGE, Thousand Oaks, California

MORGAN DL (1997) *The Focus Group Guidebook*, SAGE, Thousand Oaks, California

MORGAN DL, SPANISH MT (1984) Focus Groups: A New Tool for Qualitative Research, *Qualitative Sociology*, 7 (3): 253-270

MORGAN DL, KRUEGER RA (1993) *When to use focus groups and why*, Sage Publications

MOWERY DC, SHANE S (2002), Introduction to the Special Issue on University Entrepreneurship and Technology Transfer; *Management Science*, 48 (1): v-ix

MUSCIO A (2010) What Drives University Access To Technology Transfer Offices? Evidence From Italy, *Journal Of Technology Transfer*, *35* (2): 181-202

MUSTAR P, RENAULT M, COLOMBO MG, PIVA E, FONTES M, LOCKETT A, WRIGHT M, CLARYSSE B, MORAY N (2006) Conceptualizing the heterogeneity of research-based spin-offs: A multi-dimensional taxonomy, *Research Policy*, 35 (2): 289-308

NELSON RR (1991) Why Do Firms Differ, and How Does It Matter?,*Strategic Management Journal* 12 (S2): 61-74

NELSON RR (1995) Recent Evolutionary Theorizing about Economic Change, Journal of Economic Literature 33 (1): 48-90

NICOLAU N, BIRLEY S (2003) Social Networks in Organizational Emergence: the University Spinout Phenomenon, *Management Science* 49 (12): 1702-1725

NONAKA I (1994), A Dynamic Theory of Organizational Knowledge Creation, *Organization Science* 5 (1): 14-37

NOSELLA A, PETRONI G, VERBANO C (2005) Characteristics of the Italian Biotechnology Industry and New Business Models: the Initial Results of an Empirical Study, *Technovation* 25 (8): 841-855

OECD (1989) *Biotechnology: Economic and Wider Impact*, OECD Publishing

OECD (2009), *The Bioeconomy to 2030: Designing a Policy Agenda*, OECD Publishing

OLIVER DG, SEROVICH JM, MASON TL (2005) Constraints and opportunities with interview transcription: Towards reflection in qualitative research, *Social Forces*, *84* (2): 1273-1289

ONETTI A, ZUCCHELLA A (2008) *Imprenditorialità, internazionalizzazione e innovazione: i business model delle imprese biotech*, Carocci

ONETTI A, ZUCCHELLA A, JONES M V, MCDOUGALL-COVIN PP (2012) Guest editor's introduction to the special issue: entrepreneurship and strategic management in new technology based companies. *Journal of Management and Governance*, 1-4.

ONETTI A, ZUCCHELLA A, JONES M V, MCDOUGALL-COVIN PP (2012) Internationalization, innovation and entrepreneurship: business models for new technology-based firms, *Journal of Management and Governance*, 1-32.

OSTERWARLDER A, PIGNEUR Y (2002), An Ontology for E-Business Models in CURRIE W (ed, 2003) *Value Creation from E-Business Models*, Butterworth-Heinemann

OWEN-SMITH J, POWELL WW (2006) Accounting for Emergence and Novelty in Boston and Bay Area Biotechnology. In: BRAUNERHJELM P, FELDMAN M

OWEN-SMITH J, RICCABONI M, PAMMOLLI F, POWELL WW (2002) A comparison of U.S. and European University-industry relations in the life sciences, *Management Science*, 48 (1): 24 - 43

PATRO S (2008) The Evolution of Ownership Structure of Corporate Spin-off;. *Journal of Corporate Finance*, 14 (5): 596-613

PHILLIPS DJ (2002) A Genealogical Approach to Organizational Life Chances: The Parent-Progeny Transfer among Silicon Valley Law Firms, 1946–1996, *Administrative Science Quarterly* 47(3): 474- 506

PINCH S, SUNLEY P (2009) Understanding the Role of Venture Capitalists in Knowledge Dissemination in High-Technology Agglomerations: a Case Study of the University of Southampton Spin-off Cluster; *Venture Capital*, 11 (4): 311-333

PISANO GP (1991) The governance of innovation: vertical integration and collaborative arrangements in the biotechnology industry, *Research Policy*, 20 (3): 237-249

PODONLY JM (2001) Networks as the Pipes and Prisms of the Market; *American Journal of Sociology* 107(1): 33–60

POLAND BD (1995) Transcription quality as an aspect of rigor in qualitative research. *Qualitative inquiry*, *1* (3): 290-310

POWELL W, DI MAGGIO PJ (1991), *New institutionalism in organizational analysis*, University of Chicago Press

POWELL WW (1998), Learning from collaboration: knowledge and networks in the biotechnology and pharmaceutical industries, *California Management Review*, 40 (3): 228 - 240

PRAHALAD CK, BETTIS RA (1986) The dominant logic: A new linkage between diversity and performance, *Strategic Management Journal*, *7* (6): 485-501

RAYPORT JF (1999) The truth about Internet business models, *Strategy and Business*, 5-7

RENZULLI LA, ALDRICH H, MOODY J (2000), Family Matters: Gender, Networks, and Entrepreneurial Outcomes; *Social Forces,* 79: 523–546

ROMANELLI E (1989) Environments and Strategies of Organization Start-up: Effects on Early Survival, *Administrative Science Quarterly* 34 (3): 369-387

ROSIELLO A, ORSENIGO L (2008) A Critical Assessment of Regional Innovation Policy in Pharmaceutical Biotechnology, *European Planning Studies*. 16 (3): 337-357

SARASVATHY SD (2008) *Effectuation: Elements of entrepreneurial expertise*, Edward Elgar Publishing

SARASVATHY SD, VENKATARAMAN S (2011) Entrepreneurship as method: Open questions for an entrepreneurial future, *Entrepreneurship Theory and Practice*, 35 (1): 113-135

SATHE V (2003), *Corporate Entrepreneurship. Top Managers and New Business Creation*, Cambridge University Press, New York, NY

SAXENIAN AL (1996) *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press, Cambridge, MA

SCHILLING MA, PHELPS CC (2007), Interfirm Collaboration Networks: The Impact of Large-Scale Network Strucuture on Firm Innovation, *Management Science* 53 (7): 1113-1126

SCHWEIZER L (2005). Concept and evolution of business models. *Journal of General Management*, 31 (2), 37-56

SHANE S (2003) *A General Theory of Entrepreneurship*, Edward Elgar Publishing Inc., Northampton, MA

SHANE S, STUART TE (2002) Organizational Endowments and the Performance of University Start-ups; *Management Science*, 48 (1): 154-170

SHERER J (2006) Entrepreneurial Innovation: Evidence from the American Laser Industry, Manuscript, Carnegie Mellon University

SHRADER R, SIEGEL DS (2007) Assessing the Relationship between Human Capital and Firm Performance: Evidence from Technology-Based New Ventures; *Entrepreneurship Theory and Practice*, 31 (6): 893-908

SORENSON O, STUART TE (2001) Syndication networks and the spatial distribution of venture capital; *American Journal of Sociology*,106 (6): 1546–1590

SORENSON O, STUART TE (2008) Entrepreneurship: A Field of Dreams?; *Academy of Management Annals*, 2 (1): 517-543

SORRENTINO F, GARRAFFO F (2012) Explaining performing R&D through alliances: Implications for the business model of Italian dedicated biotech firms, *Journal of Management and Governance*, 1-27

SORRENTINO M (2008) *Le imprese science-based: strategie di ricerca e imprenditorialità*, Carocci

SORRENTINO M (2009) *Le imprese biotech italiane: strategie e performance*, Il Mulino

SOSNA M, TREVINYO-RODRÍGUEZ RN, VELAMURI SR (2010) Business model innovation through trial-and-error learning: The Naturhouse case, *Long range planning*, 43 (2): 383-407

STARUSS A, CORBIN J (2007) *Basics of qualitative research: Techniques and procedures for developing grounded theory.* Sage Publications, CA.

STEWART DW, ROOK DW, SHAMDASANI PN (2007), *Focus Groups. Theory and Practice*, SAGE, Thousand Oaks, California

STINCHCOMBE AL (1965) *Social Structure and Organizations* in MARCH JG *Handbook of Organizations*, RAND McNally & Co., Chicago, IL

STRAUSS A CORBIN J (2007) *Basics of qualitative research: Techniques and procedures for developing grounded theory*, Sage Publications

STUART TE, DING WW (2006) Why do Scientists Become Entrepreneurs? The Social Structural Antecedents of Commercial Activity in the Academic Life Sciences; *American Journal of Sociology*, 112(1): 97–144

STUART TE, HUANG H, HYBELS RC (1999), Interorganizational Endorsements and the Performance of Entrepreneurial Ventures, *Administrative Science Quarterly*, 44: 315 - 349

STUART TE, SORENSON O (2007) Strategic Networks and Entrepreneurial Ventures; *Strategic Entrepreneurship Journal*, 1: 211-227

SWAMINATHAN A (1996) Environmental Conditions at Founding and Organizational Mortality: a Trial- by-fire Model, *Academy of Management Journal* 39 (5): 1350-1377

TEECE DJ (2010) Business Models, Business Strategy and Innovation, *Long Range Planning*, 43 (2-3): 172–194

TIMMERS P (1998) Business models for electronic markets, *Electronic markets*, 8 (2): 3-8

TOBIN GA, BEGLEY CM (2004) Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*, *48* (4): 388-396

UZZI B (1996) The Sources and Consequences of Embeddedness for Economic Performance of Organizations; *American Sociological Review*, 61(4):674-698

VAN RIJNSOEVER FJ, HESSELS LK, VANDEBERG RLJ (2008) A Resource-Based View on the Interactions of University Researchers; *Research Policy*, 37: 1255-1266

VELD C, VELD-MERKOULOVA Y (2004) Do Spin-offs Really Create Value? The European Case; *Journal of Banking & Finance*, 28 (5): 1111-1136

WALKER G, KOGUT B, SHAN W (1997) Social Capital, Structural Holes and the Formation of an Industry Network, *Organization Science* 8 (2): 109-125

WILKINSON S (2004) 10 Focus group reseach, *Qualitative research: Theory, method and practice*, 177

WILLEMSTEIN L, VAN DER VALK T, MEEUS MT (2007) Dynamics in business models: An empirical analysis of medical biotechnology firms in the Netherlands, *Technovation*, 27 (4): 221-232

WRIGHT M, HMIELESKI KM, SIEGEL DS, ENSLEY MD (2007) The Role of Human Capital in Technological Entrepreneurship; *Entrepreneurship: Theory & Practice*, 31 (6): 791-806

YIN RK (1994) *Case Study Research: Design and Methods*, Sage.Publications, Thousand Oaks, CA

YIN RK (2008) *Case study research: Design and methods (Vol. 5)*, Sage Publications, Incorporated.

ZAHRA SA (2005), Entrepreneurship and Disciplinary Scholarships: Return to the Fountainhead; in ALVAREZ SA, AGARWAL R and SORENSON O (Eds.), *Handbook of Entrepreneurship Research: Disciplinary Perspectives* (pp. 252–268). New York: Springer

ZECHENDORF B (2004) Biotechnology policy in European countries: An assessment, *Journal of Commercial Biotechnology*, 10 (4): 340-351

ZOTT C, AMIT R, DONLEVY J (2000) Strategies for value creation in e-commerce: best practice in Europe, *European Management Journal*, 18 (5): 463-475

ZOTT C, AMIT R, MASSA L (2011) The business model: Recent developments and future research, *Journal of management*, 37 (4): 1019-1042

ZOTT C, AMIT RH (2007) Business Model Design and the Performance of Entrepreneurial Firms, *Organization Science* 18: 181-199

ZOTT C, AMIT RH (2008) The Fit between Product Market Strategy and Business Model: Implications for Firm Performance, *Strategic Management Journal* 29 (1): 1-26

ZOTT C, AMIT RH (2010) Business Model Design: An Activity System Perspective, *Long Range Planning* doi:10.1016/j.lrp.2009.07.004

ZOTT C, AMIT RH, MASSA L (2010) The Business Model: Theoretical Roots, Recent Developments, and Future Research, IESE Business School Working Paper No. 862

ZUCKER L, DARBY M, BREWER M (1998) Intellectual Human Capital And The Birth Of U.S. Biotechnology Enterprises; *The American Economic Review*, 88(1): 290-306