SPIN-OFFS AND THEIR PARENTAL INHERITANCE: TO WHAT EXTENT IS BUSINESS MODEL AFFECTED BY LEGACY?

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Abstract

Scholars in management sometimes use metaphors referred to biological theories in their studies and research works. Among those metaphors, the one about heredity is often used to investigate on organizational and business strategy issues. We aim at further investigating on the extent to which the characteristics of legacy helps in explaining subsequent development of spin-offs. 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 enduring effect on business model at birth 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 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, we thoroughly analyse business model construct; especially we focus on fundamental design elements and themes which scholars individuated to decompose business model construct. The purpose we have 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.

Keywords: Business model, spin-offs, heredity, business model innovation, organizational learning

Introduction

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

While there has been much concern about the effect of heredity at the moment of spin-offs' birth, further investigation is needed to understand if blueprints inherited from the parent organization, helps in explaining also "post start-up performance" (Phillips, 2002). 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. According to Stinchcombe (1965) prior history has an enduring impact on subsequent organizational outcomes, so the imprinting released by

parent organizations on spawned ventures is irreversible. However, some recent contributions are beginning to question about the validity of this tenet for the heredity metaphor.

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. Reimprinting is the concept they introduce to identify the process 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.

We propose to use the business model construct to observe the multiplicity of factors that may explain the roots of value creation by spin-offs. 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.

We contend that spin-offs inherit different blueprints, which are a function of the contexts were they have been generated. We aim at ascertaining if this difference in lineages is also reflected in the business models they adopt and affects (or not) business model innovation as well. For this purpose we have selected five case studies in the biotech industry, aiming at isolating 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 choosing to carry 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. Moreover, since universities and corporations have different research focus and a different orientation in performing marketing, production and distribution activities (Zahra *et al.*, 2007) and founders possess different human capital characteristics (e.g. Colombo and Piva, 2012), we might expect them to transfer different endowments to their spin-offs. Hence, we might expect also to have heterogeneity in elements that affect business model design choices and its subsequent evolution.

I.

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". This definition is crafted adopting a knowledge-based perspective, which assumes that knowledge is acquired largely through personal experience (Nonaka, 1994). In our opinion, this definition that 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. 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". This approach is clearly consistent with the view that considers entrepreneurs as organizational products, as suggested by Freeman (1986).

Heredity metaphor has already been used in management literature to explain entrepreneurial phenomena, especially the creation of new firms; its use builds the seminal and crucial argument of imprinting by Stinchcombe that dates back to 1965. According to Stinchcombe (1965), "groups, institutions, laws, population characteristics and sets of social relations that form the environment" are 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 organizations' subsequent evolution. Some scholars have focused their attention on the effect of genetic characteristics on firm survival (e.g. Carroll and Hannan, 1989; Bruderl et al., 1992; Shane and Stuart, 2002); others have been interested in firm growth (Bamford et al., 1999; Heirman and Clarysse, 2004) and some of them have investigated the effect on the choice of particular organizational strategies (e.g. Baron *et al*., 1996). The idea of an everlasting imprinting is also found in other studies: Bamford *et al*. (1999) demonstrated the lasting impact of initial financial capital and environmental munificence on profitability; more 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.

But, on the other side, e.g. Chatterji (2009) found that the extent of knowledge transfer and/or overlap between parent organization and spin-off does not influence the performance of the latter. Also 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. Moreover, on a highly speculative basis, they maintain that spin-offs have the necessity to deviate from their parents' trajectory to obtain success, establishing their sources of uniqueness and their competitive identity. Ferriani et al. (2012) tried to shed a light on the tension between imprinting irreversibility and the new trajectory that may characterize spawned ventures' development. This contribution is of particular relevance because authors who a light on the phases subsequent to the initial imprinting process and on events and conditions (deliberate or serendipitous) that have a role in deviation from parental pattern. Moreover, authors explicitly refer to a clear distinction between spin-off's business model and parent organization's one. However this conceptualization still lacks of a framework to acknowledge along which dimensions and across which stages, business model is shaped and changes.

Since we are addressing aspects 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 construct of business model. A relevant element of the business model construct 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). Furthermore, as stated by Chesbrough and Rosenbloom (2002), the business model construct assumes a legacy approach by itself. Indeed, according to those authors, knowledge held by the firm, its customers and third parties is cognitively limited and biased by the early steps of the firm.

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?

Among all the definitions proposed by scholars and practitioners (e.g. Afuah and Tucci, 2001; Amit and Zott, 2001; Osterwalder and Pigneur, 2010) we choose, in coherence with our framework, the definition proposed by Zott and Amit (2007 and 2010). Business model represents the construct that allows to depict the "content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities".

Content refers to the exchanged good or information and to the required resources and capabilities in order 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, 2010).

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 similar business models also in the case of firms having, institutionally, a different endowment. For this purpose we decided to carry on a twofold analysis, looking both at corporate and academic spin-offs.

Our analysis has been conducted only in one industrial sector: biotech industry. In this industry spin-offs are high in number and are a substantial fractions of entrants, and being both high tech and science-based, it is characterized by a significant evolution in company organization and management (Nosella *et al.*, 2005). Moreover, for science-based businesses, experimentation and innovation in business models, structures and arrangements, are as important to the health of these sectors, as the experimentation and innovation in science (Pisano, 2006).

Selected case studies have been chosen on a theoretical, and not on a sampling, basis. The criteria we adopted to select case studies were the following: spawned ventures orientation to economic profit; the age of spawned ventures; manifest change in business model since foundation; and, of course, heterogeneity in parent organizations' main characteristics, distinguishing between corporate and academic spin-offs.

In the remainder of this section we will provide short description of the organizational contexts we observed, together with some insights on the most relevant evidences we observed. All the information below were collected thorough public sources (companies websites, parent organizations' websites and press notices, specialized magazines, business and local press articles) and semi-structured interviews to members of funding teams and members of management and scientific board currently in charge. Data were then triangulated and some differences in spawned ventures endowment were observed, together with changes in business model design elements and themes.

The first involved corporate spin-off is 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 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. Activities performed by this spin-off 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 in selected therapeutic areas.

The other two selected case studies are spin-offs that, on the other side, have been developed in an academic context. The main traits which distinguish those ventures from the corporate spin-offs mentioned above are mostly represented by financing choices and the extent of licensing activities. The first academic spin-off we refer to is active in the discovery and development of fully proprietary therapeutics for well-defined therapeutic area with a 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, however it has been included in the analysis as 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-off and its business model have significantly evolved. The forth case we consider is an academic spin-off founded in 2003 within a Science Department at an Italian University, located in central Italy. This 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 and/or of its corporate partner in the imprinting process and how relevant it was.

Furthermore, a fifth case study was introduced in the analysis. Reasons why this choice has been made have to be found in the particular conditions that characterized the inception of this spin-off: a joint venture between a big pharmaceutical company and a research institution, located in an existing and well-known science park in northern Italy. In this case, localization seemed to have a central role in conditioning the founding and development of the company. Nowadays it 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 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 case studies we are dealing with are the two academic spin-offs: they needed an external force to fully understand why a change in the business model was to be made and along which dimensions this change ought to happen. In aforementioned case studies, significant change in one of the business model dimensions, especially along the content design element, was observed when an external force pressed to change the activities, inherited from the parent organization. Accordingly to insights coming from previous studies (particularly McGrath, 2010), we may conclude that the external force introduced into the company commitment to experimentation. This happened because its intervention allowed surmounting the cognitive bias on the characteristics that the model ought to possess. In our analysis we also found some insights on faster processes concerning the transformation of some dimensions of the business model construct. This happened because experimentation and learning processes encountered less internal resistances. In those cases, the reduced level of resistances is surely ascribable to the presence of an organizational leader who already benefits from high trustworthiness and legitimacy, since he was also the same who drove company foundation.

Conclusion

Our cases studies show that the biological metaphor of transferring genes from an organization to another has its relevance. In particular, in our case studies, some activities and the way they are performed do not change also when the parent organization do not directly

exert any influence on the progeny. However, this research, in line with recent findings by Garnsey et al. (2008), Chatterj (2009), Ferriani *et al.* (2012) provides additional evidence that imprinting is not irreversible, in contrast with the tenet of its highly enduring effect (e.g. Boeker, 1989; Marquis, 2003).

Other 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.

Another important aspect 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. In this perspective, 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, the pervasiveness of blueprints' influence is found to be diluted since no huge resistances to change seem to be in place at both academic and corporate spin-offs.

Finally, our study allows also 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.

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. 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. Governance and nature as design elements are more likely to change and there is no radical difference in the endowment of academic spin-offs when compared to corporate ones.

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. In this perspective, we also move a step forward on the comprehension of their role on spin-off performance, as solicited also by Ferriani *et al.* (2012). 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.

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.

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, especially when analysing their development trajectories.

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