

# The Growth Drivers of Start-up Firms and Business Modelling: A First Step toward a Desirable Convergence

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This paper represents the first step of a broader research project focusing on the growth performance of start-up firms in technological sectors. While our main assumption is that the growth of such firms can be mostly attributed to strategic factors, we aim at reviewing the available literature on the topic with a broader scope, with the purpose of identifying the different determinants of new firms' growth. After summarising the most relevant research perspectives on the theme, we introduce the perspective of the business model. In our view, this construct represents a significant conceptual improvement for the study and explanation of the developmental processes and performances of new ventures in high-tech and science-based fields. We first define what a business model is, according to the extant literature, and then discuss the implications of the adoption of such a concept for our research. We conclude the paper by describing the research path ahead.

*Key words:* new ventures, high-tech, science-based, growth, business model

## Introduction

Over the past few decades, new ventures in high-tech and science-based industries have been considered an important engine of economic development. They have received a lot of attention from

scholars from several scientific fields (e.g., economics of innovation, entrepreneurship, strategic management), and strong support for such entrepreneurial initiatives has been provided by policy makers from all over the world. This favouring of new high-tech ventures is based on the belief that certain types of firms – particularly those based on innovative products and new technologies – matter more than others when it comes to fostering countries' long-term economic growth. The level of interest in and support for such ventures has rapidly broadened in scope, to cover both the science-based and the high-tech, along with academic spin-offs, which are aimed specifically at exploiting public research (Chiesa and Piccaluga 2000).

However, given increasing evidence regarding the relatively poor performance of such new ventures, doubts have begun to be raised about their actual contribution to economic development (Lazzeri and Piccaluga 2011). Such doubts are based on the observation that while, on the one hand, there are a handful of new ventures that are indeed growing very quickly and for long periods of time (Morris 2011), on the other, the vast majority of high-tech and science-based new ventures still show very low rates of growth, if any at all. Consequently, a better understanding of the characteristics and attributes of such firms, their growth drivers and the possible obstacles to their development has become a primary goal for researchers, policy makers and the organisations whose mission is to promote and drive economic development.

This paper represents the first step in an ongoing research project involving several Italian Universities that is focused on start-up firms and their growth processes. The aim of the paper is to 'set' the grounds for an alternative view of the growth of high-tech and science-based new ventures. After summarising the most common research perspectives on the topic – entrepreneurial, contextual and strategic – we introduce the perspective of the business model. We first define what a business model is, according to the current literature, and then discuss the concept within the aims and scope of our research. At the end of the paper, we describe the path ahead for our research.

## Background

High-tech and science-based new ventures account for a disproportionate share of major, radical innovations. New ventures that have established their business around ideas and findings from both high-tech fields – such as nanotechnology, aerospace and robotics – and science fields – such as biology, biomedicine and nuclear physics

– are able to originate technological breakthroughs, rather than simply incremental product innovations. The available literature on the growth processes of new ventures operating in the high-tech and science-based sectors is still very limited. Thus, to provide the theoretical foundations for our research, we had to enlarge the scope of our review and examine the growth processes of small firms in general.

Indeed, Small and Medium Enterprises' (SMEs) growth drivers are among the most debated and controversial topics in the managerial literature (Churchill and Lewis 1983; Scott and Bruce 1987). In approaching this literature, we have mostly aimed to identify those drivers and variables that could have a significant role in high-tech settings. Although it is still questionable whether we can consider dimensional growth a firm's goal *per se*, we can definitely say that growth brings several benefits to a firm. Among these, many benefits are that it increases the firm's market power over customers and suppliers, it expands the investment capacity in new products and new technologies, and it improves the firm's reputation in the market. However, growth has also some negative effects, such as increased rigidity in the organisation and a slowing of the decision-making processes; nevertheless, generally, the benefits are thought to far outweigh the sacrifices.

Expectations for growth may vary substantially over a new firm's life cycle (Delmar and Wiklund 2008). However, growth is widely considered an impelling objective for new ventures, so much so that the topic has stimulated a considerable amount of empirical research (Delmar, Davidsson and Gartner 2003; Gilbert, McDougall and Audretsch 2006). Different explanations have been given for the differences between high- and low-growth new ventures. Emphasis has been placed on several determinants, such as the profile of the founding entrepreneur, the characteristics of the business environment, the different business strategies formulated and implemented, the different business models adopted and their adaptation over time (Song et al. 2008).

With no claim of being exhaustive, in the following pages, we identify and briefly introduce three of the main schools of thought that have contributed to the understanding of this topic. Different growth factors are emphasised by each approach. These are, namely:

- entrepreneurial factors;
- contextual factors; and
- strategic factors and access to resources and capabilities.

While such factors have general validity for any type of industry

and firm, we will derive from them specific implications regarding the growth processes of new ventures in high-tech sectors.

#### ENTREPRENEURIAL FACTORS

A number of academic contributions focus on the importance of the personal attributes and individual skills of the founding entrepreneur and identify a number of possible problems faced by new ventures when trying to grow, such as scarce market knowledge and sales capabilities, or poor timing for venture start-up (Carland, Hoy and Carland 1988; Terpstra and Olson 1993).

According to Bhidè (2000), transforming improvised start-ups into noteworthy enterprises requires a radical cultural shift, from 'opportunistic adaptation' in niche markets to the pursuit of more ambitious strategies, which, in turn, require specific personal traits in the founding entrepreneur and/or the management team that were less important initially, such as ambition and risk taking. Kelley, Bosma and Amorós (2011), in their broad study of entrepreneurship activities, also emphasise the 'personal' factors behind a new venture and focus on differences in entrepreneurial attitudes, experience and aspirations as a possible explanation for growth differentials between new ventures in different sectors and countries.

The founder's individual characteristics are assumed important for many reasons. First, it is believed that the individual traits of the founder can shape the culture and the behaviour of the firm he/she leads (Mullins 1996). It is understood that the consequences of this can be either positive or negative, but it is generally assumed that more innovation-oriented and risk-taking entrepreneurs generally represent an asset in new, proactive firms. Second, launching a new firm is a challenging process, and individual traits, such as education and prior industry experience, can be critical to providing the new venture with the appropriate strategies, the right combination of resources and the right time horizon (Birley 1985; Cooper, Woo and Dunkelberg 1988; Duchesneau and Gartner 1990; Hansen 1995; Sapienza and Grimm 1997; Stuart and Abetti 1986; Watson, Stewart and Barnir 2003). Third, external investors often assess the potential of a new venture by evaluating the individual attributes of its founder(s) (Colombo and Grilli 2005). In sum, individual traits, such as the founder's psychological attitudes and his/her experience and practical skills, can be expected to drive new ventures towards higher growth performance. Thus, Baum, Locke and Smith (2001) maintain that a motivated founder – with reference to his/her vision, goals and self-efficacy – is a key factor in the growth of a new firm.

Within this research vein, a widely used construct is the Entrepreneurial Orientation (EO). In its basic constituents, EO refers to the entrepreneur's attitudes towards risk taking, ability to capture emerging market opportunities and behaviour towards innovation (Covin and Slevin 1991). Many scholars have used EO in their attempts to explain growth differentials between new ventures. In general, such studies confirm that a high EO tends to be associated with superior growth performance (Wiklund 1999; Zahra and Covin 1993). However, some of the literature warns that a lot of fine-grained work remains to be done on the empirical side to fully prove this association (Hart 1992; Lumpkin and Dess 1996; Smart and Co-nant 1994).

Firms can also be led by entrepreneurial teams, not just by single individuals. Thus, we can understand why the quality of the founding team has become the unit of analysis for several scholars (Eisenhardt and Schoonhoven 1990; Feeser and Willard 1990). Here, the size and qualitative composition of the founding team are the factors that most support the growth of new firms (Zucker, Darby and Brewer 1998). Despite the commonalities at the conceptual level, the two approaches in the literature (solo entrepreneur vs. entrepreneurial teams) have developed in quite independent ways, with the latter taking a more organisational drift.

In sum, the literature described above supports a view of new ventures' development in which growth rates are affected by the profile of the founding entrepreneur and the management team. A number of studies, specific to the technological sector, share the same view. For example, a diversified management team in which technological and managerial expertise coexist is recognised as an important factor for the growth of new high-tech ventures (Colombo and Grilli 2005; Marino and De Noble 1997; McGee, Dowling and Megginson 1995).

#### CONTEXTUAL FACTORS

The relationship between the growth of the firm and contextual (environmental) factors has been observed from many different angles. Though the description that follows is not exhaustive, three perspectives have dominated the scene.

The *first* looks at the industry structure and the market dynamics. This perspective is largely dominant in strategic studies, where firms' moves are typically assumed to be driven by the opportunities (and threats) emerging from the market and to be favoured (or constrained) by the structural characteristics of the industry to which

a company belongs (Davidsson 1989a, 1989b; Stevenson and Jarillo-Mossi 1986; Stevenson and Jarillo 1990). The majority of these studies take the environment as a given. Hence, it is assumed that certain markets and industries offer more favourable conditions than others for both the establishment of new ventures and their growth (Audretsch 1995; Cooper, Gimeno-Gascon and Woo 1994; Vivarelli and Audretsch 1998). Other studies claim that industries, markets and niches do not exist *per se*, but are created by firms through their strategic decisions and moves (Deloitte and Touche Consulting Group (GB) 1997; Storey 1996).

A *second perspective* emphasises the role of institutional factors (regulations, culture, norms, infrastructures, etc.) in supporting or inhibiting growth. Among this group of studies, Fritsch (1997), Djankov, McLiesh and Ramalho (2006) and Ardagna and Lusardi (2010) observe that firms grow more and faster in countries (or regions) characterised by efficient markets and effective financial and labour regulations.

The work done by Hung and Chu (2006), Breznitz (2007) and Gilling, van Burg and Romme (2010) shows that it is possible to design effective public policies to foster the creation and growth of high-tech firms. The following mechanisms, in particular, have been shown to be more promising than others: encouraging partnerships, fostering entrepreneurship and venture initiatives in the innovation system and sustaining commercialisation activities. Finally yet importantly, differences in taxation systems contribute to differences in the firms' growth rates in different locations. In this regard, Fishman and Svensson (2007) find that both fiscal pressure and bribery practices reduce firms' growth capacity.

A *third perspective* on contextual factors looks at the location of the new firms and the characteristics of the local environment. This perspective has become widely popular among regional economists, geographers and industrial economists and has been brought into an impressive amount of studies on related concepts, such as industrial clusters (Porter 1998), industrial districts (Becattini 1990) and regional innovation systems (Doloreux 2003).

As local firms benefit from these contextual forces, the location itself becomes a key determinant of their performance, both in terms of profitability and growth. Under certain conditions, a 'magnet' effect is created (new suppliers, new clients, new firms and new talents are drawn to the area) that reinforces itself over time (Thakor and Lavack 2003). The case of the Silicon Valley in California is illustrative in this regard. In this vein, Glaeser et al. (1992) claim that

TABLE 1 Factors Affecting the Growth of New Ventures: Entrepreneur's Individual Traits

Factors	Definitions/measurements	References
Higher education	Important entrepreneurial skills are enhanced through higher education.	Sapienza and Grimm (1997); Watson, Stewart and Barnir (2003)
Entrepreneurial experience	Entrepreneurs with prior entrepreneurial experience are more accustomed to the entrepreneurial process and more likely to avoid costly mistakes than entrepreneurs with no prior entrepreneurial experience.	Cooper, Woo and Dunkelberg (1988); Duchesneau and Gartner (1990); Stuart and Abetti (1986)
Broad social and professional network	Founders with broad social and professional networks have potential access to additional knowhow, capital and customer referrals.	Birley (1985); Fu et al. (2006); Hansen (1995)
Entrepreneurial orientation	Willingness to innovate market offerings; propensity to take risks to try out new and uncertain solutions; proactive attitude toward new marketplace opportunities.	Wiklund (1999); Zahra (1991); Zahra and Covin (1993)
Motivation (vision, goals and self-efficacy)	Vision, challenging goals and self-efficacy represent mechanisms for actualising an entrepreneurial opportunity?	Baum, Locke and Smith (2001)

proximity and location play an important role in enabling the diffusion of knowledge – and especially of *tacit* knowledge – across firms in a spatially bounded region (Audretsch and Feldman 1996; Jaffe 1989; Jaffe, Trajtenberg and Henderson 1993). Strong inter-firm networks, enabling knowledge spillovers, offer high-tech firms a higher chance of survival and success (Raz and Gloor 2007), providing them with access to resources that would not otherwise be available (Witt 2004).

### STRATEGIC FACTORS

Several scholars emphasise the importance of market strategies in explaining growth differentials among new ventures (Almus and Nerlinger 1999; Bloodgood, Sapienza and Almeida 1996; Li 2001; Marino and De Noble 1997; Siegel, Siegel and Macmillan 1993; Smallbone, Leigh and North 1995; Zahra and Bogner 2000). For example, in an attempt to define the characteristics that distinguish high-growth from low-growth companies, Siegel, Siegel and MacMillan (1993) find that market strategies matter considerably, although this also depends on the size and the age of the firm. The

TABLE 2 Factors Affecting the Growth of New Ventures: Entrepreneurial Team

Factors	Definitions/measurements	References
Industry experience	Experience of the firm's management team in related industries and markets.	Colombo and Grilli (2005); Marino and de Noble (1997)
Marketing experience	Experience of the firm's management team in marketing.	Marino and de Noble (1997); McGee, Downing and Megginson (1995)
Managerial and start-up experience	Experience of the firm's management team in previous managerial positions and start-up situations.	Colombo and Grilli (2005); Marino and de Noble (1997)
R&D experience	Experience of the firm's management team in R&D.	Marino and de Noble (1997); McGee, Downing and Megginson (1995)
Size of founding team	Size of the firm's management team.	Chamanski and Waagø (2001)

TABLE 3 Factors Affecting the Growth of New Ventures: Market and Competitive Environment

Factors	Definitions/measurements	References
Competition intensity	Strength of inter-firm competition within the industry.	Chamanski and Waagø (2001)
Environmental dynamism	Pace of change in the firm's external environment.	Wiklund and Shepherd (2005); Zahra and Bogner (2000)
Environmental heterogeneity	Perceived diversity and complexity of the firm's external environment.	Zahra and Bogner (2000)
Product/market maturity	Stage of product life cycle.	Eisenhardt and Schoonhoven (1990); Park and Bae (2004); Sandberg and Hofer (1987)

results seem to suggest that since young and small companies have resources starvation, they will perform better by focusing all their efforts on reaching limited goals.

Kaplan, Sensoy and Stromberg (2009) analyse a sample of successful venture capital-financed companies and examine how firm characteristics evolve from the early business plan to initial public offering (IPO). What they conclude is that external investors should place more weight on the business strategy of start-ups ('the horse' in the authors' metaphor) than on the management team



TABLE 4 Factors Affecting the Growth of New Ventures: Strategy

Factors	Definitions/measurements	References
Internationalisation	Extent to which a firm is involved in cross-border activities.	Bloodgood, Sapienza and Almeida (1996); Li (2001); Marino and de Noble (1997)
Diversification	Extent to which a firm is involved into new product areas.	Li (2001); Marino and de Noble (1997)
Differentiation	Number of versions of products for each niche.	Baum, Locke and Smith (2001); Mangematin et al. (2003)
Low-cost strategy	Extent to which a firm uses cost advantages as a source of competitive advantage.	Baum, Locke and Smith (2001); Bloodgood, Sapienza and Almeida (1996)
Market growth rate	Extent to which average firm sales in the industry increase.	Bloodgood, Sapienza and Almeida (1996); Lee, Lee and Pennings (2001)
Marketing intensity	Extent to which a firm is pursuing a strategy based on unique marketing efforts.	Li (2001)
Product innovation	Degree to which new ventures are developed and new products or services introduced.	Li (2001); Park and Bae (2004)
Marketing planning	Formalisation of a synoptic model of strategic planning.	Gruber (2007)

(‘the jockey’), since having good strategies seems to be more important than having the best people to carry them out. In more general terms, the entire Stanford Project on Emerging Companies supports this view and suggests that a good business idea and non-human capital assets are relatively more important than the characteristics of the management team for the success of a start-up firm (Baron and Hannan 2002; Baron, Hannan and Burton 1999; Beckman and Burton 2008).

Furthermore, other studies try to combine the strategic view of the firm with other theoretical perspectives – such as the entrepreneurial theory and the organisational theory of the firm – in an attempt to come to a better, more comprehensive explanation of new ventures’ growth differentials (e.g., Baum, Locke and Smith 2001; Chrisman, Bauerschmidt and Hofer 1998; Sandberg and Hofer 1987). Much of this literature does not take a fully strategic perspective, but instead supports a contingency approach in which it is assumed that the

TABLE 5 Factors Affecting the Growth of New Ventures:  
Access to Resources and Capabilities

Factors	Definitions/measurements	References
Financial re-sources	Level of financial assets of the firm.	Robinson and Mc-Dougall (2001)
Firm age	Number of years a firm has been in existence.	Zahra, Matherne and Carleton (2003)
Firm size	Number of firm employees.	Zahra, Matherne and Carleton (2003)
Firm type	A firm's type of ownership (corporate ventures or independent ventures).	Zahra, Matherne and Carleton (2003)
Patent protection	Availability of firm's patents protecting product or process technology	Marino and de Noble (1997)
R&D alliances	The firm's use of R&D cooperative arrangements; for NTVs, these also correspond to horizontal alliances.	McGee, Dowling and Megginson (1995); Zahra and Bogner (2000)
R&D investment	Intensity of the firm's investment in internal R&D activities.	Zahra and Bogner (2000)
Supply chain integration	A firm's cooperation across different levels of the value-added chain (e.g., suppliers, distribution channel agents or customers).	George et al. (2001); George, Zahra and Wood (2002); Mc-Dougall et al. (1994)
Marketing capabilities	Nature of product/service offerings, marketing expertise and knowledge and product-promotion activities that new ventures have.	Zou, Chen and Ghauri (2010)
Technological capability	The use of advanced technology, valuable technology sources, patents and copyrights.	Lee, Lee and Pennings (2001)
Network capabilities	A firm's ability to develop and utilise inter-organisational relationships.	Heirman and Clarysse (2004)

growth of new ventures is mostly attributable to the fit between characteristics of the external environment and internal factors, such as the firm's organisational structure and strategies (Eisenhardt and Schoonhoven 1990; Feeser and Willard 1990). A complementary strategic view on the growth of new ventures is offered by the Resource-Based View of the Firm. According to this perspective, new ventures' growth is mostly due to their resources and capabilities base and their ability to access external resources through relations and networks with other firms (Lee, Lee and Pennings 2001; Heirman and Clarysse 2004; McDougall et al. 1994; Zahra and Bogner 2000; Zahra, Matherne and Carleton 2003).

TABLE 6 Factors Affecting the Growth of New Ventures: Contextual Factors

Factors	Definitions/measurements	References
University partnerships	A firm's use of cooperative arrangements with universities.	Chamanski and Waagø (2001); Zahra and Bogner (2000)
Nongovernmental financial support	Financial sponsorship from commercial institutes.	Lee, Lee and Pennings (2001)
Industry growth rate	Industry growth rate and the maturity of the market are recognised as directly correlated with small firms' growth.	Audretsch and Mahmood (1994); Baldwin and Gellatly (2003)
Economies of scale in the industry	Presence of economies of scale push firms to invest to grow quickly.	Audretsch (1995); Vivarelli and Audretsch (1998)
Fast-growing market niches	Profitable market niches tend to be created and populated by small firms that grow quickly.	Deloitte and Touche Consulting Group (GB) (1997); Storey (1996)
Environmental heterogeneity	When markets are complex and heterogeneous, companies can more easily identify and develop profitable niches to grow.	Covin and Covin (1990); Kolvereid (1992)
Industrial districts and clustering	Concentration within a geographic area results in higher firm efficiency, performance and growth due to three main location-related benefits: labour market specialisation and sharing; availability of specific intermediate goods and non-traded inputs; and knowledge externalities and knowledge spillovers.	Becattini (1990); Porter (1998)
Location brand advantage	When the location itself gets recognised by the market as superior in the production of specific outputs and under certain conditions can deliver a branding advantage to the firm.	Thakor and Lavack (2003)

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In particular, Lee, Lee and Pennings (2001) examine the influence of internal capabilities and external networks on firm performance (measured by sales growth) by using data from a sample of Korean technological start-up companies. The research results show that the indicators of internal capabilities are important predictors of a start-up's performance, while, among external networks, only linkages to venture capital companies predicted the start-ups' performance.

Tables 1–6 summarise, and partly expands upon, the results of the literature review.

TABLE 6 Continued from the previous page

Factors	Definitions/measurements	References
Knowledge spillover	Proximity and location play an important role in enabling the diffusion of knowledge across firms in a spatially bounded region.	Audretsch and Feldman (1996); Glaeser et al. (1992); Jaffe (1989); Jaffe, Trajtenberg and Henderson (1993)
Higher growth for knowledge-based firms in clusters	Firms based on knowledge inputs should manifest better performance if located in a firm cluster, since they will have superior access to both knowledge spillovers and knowledge resources.	Audretsch and Dohse (2007)
Level of regulation	Countries or regions with better regulations allow the economy – and the firms – to grow more quickly, and the quality of regulations plays a central role, particularly for new entrepreneurs, in the pursuit of a business opportunity.	Ardagna and Lusardi (2010); Djankov, McLiesh and Ramalho (2006)
Legal and financial systems development	Firms operating in industries that need more access to external finance grow much more quickly in regions with more advanced financial systems.	King and Levine (1993)
Local financial system sophistication	Stock market development and ease of access to private credit promote entry and growth of new companies.	Aghion, Fally and Scarpetta (2007)
Local taxation (and bribery) system	Local differences in the taxation system, both official and unofficial (in the form of bribery), are relevant to firm growth rate differences across locations.	Fisman and Svensson (2007)

## Business Modelling and the Growth of New Ventures: What We Already Know

### THE BUSINESS MODEL CONCEPT

The above review of what we know regarding the drivers of growth reveals how difficult is to integrate different explanations of new ventures' growth processes into a single perspective. In recent years, several scholars have moved their attention toward a new construct, i. e., the *business model*, which is able to provide a coherent framework for explaining how technical potential can be converted into economic value. In this vein, the business model can be considered a theoretical device that mediates between technological development and new ventures' growth (Chesbrough and Rosenbloom 2002).

The business model is a concept that, in recent years, has been

gaining ground in several managerial disciplines. Although we still lack an agreed-upon definition of what a business model is, we can objectively claim that the concept refers to a set of decisions that relate to a firm's market strategy and organisational structure, as well as to the activities it performs both inside and within the business environment, through a network of transactions. As such, the concept builds on the extant literature on business strategy, organisation design, transaction theory and business networks.

Zott, Amit and Massa (2011) provide a broad, multifaceted review of the literature on this topic, starting with the origins of the construct itself, and they discover that the literature on business models has been developing largely in separate silos. In particular, three non-converging research streams can be associated with the business model concept: the e-business literature, the strategic management field and the area of innovation and technology management.

The e-business literature stream has evolved in parallel with the rapid advent, since the late nineties, of the 'new economy.' Scholars' attention has been dedicated mainly to the different options available for creating and capturing economic value in this specific business environment, where products are typically intangible in nature and where proprietary rights are not always clearly attributable.

Second, the strategic literature has emphasised the importance – for both new and established firms – of combining several decisions that affect different management areas in a consistent way, from value chains to organisation design to market positioning. In this light, the business model corresponds to a framework that integrates such dimensions toward a common direction.

Third, the innovation and technology management literature uses the business model concept to enlarge the scope of the innovation activity carried out by firms. In this sense, business modelling is recognised as an additional dimension of the innovation capability of the firm. Special consideration has been dedicated to models that combine internal and external innovation activities within so-called 'open innovation systems.'

According to Amit and Zott (2001), the business model concept is very close to the strategy approach, but they do not coincide. Indeed, firms compete through their business models, but, while the strategy approach emphasises the competitive dimension (value capture), the business model places a lot of emphasis on cooperation, partnership, joint value creation and customer value proposition. For some authors, the business model definition precedes (or contains) strategy formulation (Zott and Amit 2007, 2008). For others, the business

model is the reflection of a realised strategy (Casadesus-Masanell and Ricart 2010).

Zott, Amit and Massa (2011) support a view of the business model as a construct that emphasises a system-level, holistic approach toward explaining how firms do business. This holistic view of the business model concept is shared by other authors (Onetti et al. 2012) who consider the business model a promising emerging unit of analysis in the management field, as it brings several advantages by combining organisational and strategic aspects and looking at how value is created and eventually captured.

In general, most of the literature tends to see the business model construct through static lenses and therefore look at it as a detailed description, at a specific moment in time, of how a company creates value for consumers and for itself (Osterwalder 2004). Another approach recognises that firms are continuously subject to external environmental pressures and need to adapt their business models to preserve their appropriateness (Cavalcante, Kesting and Ulhøi 2011; Wirtz, Schilke and Ullrich 2010).

Much of the literature on business models reflects the first (configurational) approach (Afuah and Tucci 2001; Teece 2010). For instance, Morris, Schindehutte and Allen (2005) define the business model as a structural template made up of six fundamental components: value proposition, customers, internal processes/competencies, external positioning, economic model and personal/investor factors. The focus is on the internal coherence of the six components. Johnson, Christensen and Kagermann (2008) break up the concept into the following four interwoven elements: customer value proposition, profit formula, key resources and key processes.

#### BUSINESS MODELLING IN HIGH-TECH AND SCIENCE-BASED CONTEXTS

Pisano (2006; 2010) and Braguinsky et al. (2010) have recently addressed the issue of designing viable business models for science- and/or research-based new ventures. Their main driving question is the following: can organisations, motivated by the need to make a profit and satisfy shareholders, successfully conduct basic scientific research as a core activity? According to Pisano (2010), science-based businesses confront three fundamental challenges: 1) the need to encourage and reward profound risk taking over long time horizons ('the risk management problem'); 2) the need to integrate knowledge across highly diverse disciplinary bodies ('the integration problem'); and 3) the need for cumulative learning ('the learn-

ing problem'). While each of these challenges – risk, integration, and learning – are present to varying degrees in most business settings, in science-based businesses, the three appear in far greater force and often simultaneously. In this respect, science appears to be a specific environment in which business organisations must develop different and specific models to run their activities in a profitable way. In other words, we can expect that viable science-based businesses will need to design and implement business models that are not just replications of those prevalent in traditional business settings.

Such new business models may also show radical differences at the entrepreneurial level. Indeed, Braguinsky et al. (2010) challenge the conventional view of science-based businesses, which is focused on the inseparability of the roles of the inventor and the Schumpeterian entrepreneur who implements the business in practice. Similar dynamics have been observed in the case of new high-tech ventures. Onetti et al. (2012) underline that nowadays, such firms are forced to develop a broad strategic vision and competitive strategies and capabilities that are necessarily global. What really matters to the growth of these firms is an 'effective business model design, where decisions about core activities and where to focus investments are interconnected to decisions about location of activities, and about inward and outward relationships with other players' (p. 363).

## Conclusions

Despite the limitations of and gaps in the literature on business models, we strongly believe that this construct can be potentially useful for our research on the growth processes of new ventures in high-tech and science-based sectors. Why do some new ventures grow more quickly (and for a longer time) than others? What explains the above-average performance of some new ventures, and which contingent factors may limit the growth of such firms? We believe that business models can represent a major driver of growth. Despite the scarce literature available in this area, we hold this claim to be true also for high-tech and science-based industries. Our key research question is the following: *Do certain business models appear to be more effective than others in supporting the growth of high-tech and science-based new ventures?*

To provide an answer, further steps are necessary. The first is defining the business model construct in a parsimonious way and operationalising it for empirical research. Most of the definitions we have found bring together many variables (e.g., value proposi-

tion, economic model, internal processes), and in practice, each one is declinable in multiple ways, producing a combination of possible models that would be impossible to manage empirically. Hence, our first challenge will be the selection of the most appropriate building blocks for the configuration of the business model.

Our second step will be to give this construct a dynamic nature and content. Indeed, it is the ability of the firm to adapt its business model to the changing environment that matters most in assuring good growth performance. Despite the dearth of literature on the topic, we believe it is possible to leverage and capitalise on some solid anchorages.

First, there is the work by Amit and Zott (2001), which identifies four different dimensions of the business model that can influence the value creation (and, thus, the growth performance) of a new venture. They include:

- the business model's novelty;
- the degree of customers' and partners' lock-in to a specific business model;
- the available complementarities (i. e., the possibility of offering a bundle of different products/services through the same business model); and
- the level of transactional efficiency.

Second, there is the work by Pisano (2010), which recognises the call for more risk-taking approaches, knowledge integration and cumulative learning practices in science-based and, in some measure, high-tech firms.

Relying upon such seminal works, while better clarifying the components and patterns of evolution of the business model, we aim to demonstrate that successful new ventures in high-tech and science-based sectors are those that can effectively adapt their business models over time. Such adaptation is facilitated by learning processes whereby the newly established firms experiment with new combinations of strategies, organisational designs and activity systems. New ventures must preserve their business model's fit with the environment while retaining the internal consistency of its components. Different stages of a new venture's development lead to business model changes. Such changes may support or impede growth. Further research in this area will need to identify effective patterns of business model changes in different industry settings for both high-tech and science-based new ventures.



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## References

- Afuah, A., and C. L. Tucci. 2001. *Internet Business Models*. New York: McGraw-Hill Irwin.
- Aghion, P., T. Fally, and S. Scarpetta. 2007. 'Credit Constraints as a Barrier to the Entry and Post-Entry Growth of Firms.' *Economic Policy* 22 (5): 731-79.
- Almus, M., and E. A. Nerlinger. 1999. 'Growth of New Technology-Based Firms: Which Factors Matter?' *Small Business Economics* 13 (2): 141-54.
- Amit, R., and C. Zott. 2001. 'Value Creation in E-Business.' *Strategic Management Journal* 22 (6-7): 493-520.
- Ardagna, S., and A. Lusardi. 2010. 'Explaining International Differences in Entrepreneurship: The Role of Individual Characteristics and Regulatory Constraints.' In *International Differences in Entrepreneurship*, edited by J. Lerner and A. Schoar, 17-62. Chicago: University of Chicago Press.
- Audretsch, D. B. 1995. *Innovation and Industry Evolution*. Cambridge, MA: MIT Press.
- Audretsch, D. B., and D. Dohse. 2007. 'Location: A Neglected Determinant of Firm Growth.' *Review of World Economics* 143 (1): 79-107.
- Audretsch, D. B., and M. P. Feldman. 1996. 'R&D Spillovers and the Geography of Innovation and Production.' *American Economic Review* 86 (3): 630-40.
- Audretsch, D. B., and T. Mahmood. 1994. 'The Rate of Hazard Confronting New Firms and Plants in US Manufacturing.' *Review of Industrial Organization* 9 (1): 41-56.
- Baldwin, J., and G. Gellatly. 2003. *Innovation Strategies and Performance in Small Firms*. Northampton: Cheltenham.
- Baron, J. N., and M. T. Hannan. 2002. 'Organizational Blueprints for Success in High-Tech Start-ups: Lessons from the Stanford Project on Emerging Companies.' *California Management Review* 44 (3): 8-36.
- Baron, J. N., M. T. Hannan, and M. D. Burton. 1999. 'Building the Iron Cage: Determinants of Managerial Intensity in the Early Years of Organizations.' *American Sociological Review* 64 (4): 527-47.
- Baum, J., E. Locke, and K. G. Smith. 2001. 'A Multidimensional Model of Venture Growth.' *Academy of Management Journal* 44 (2): 292-303.
- Becattini, G. 1990. 'The Marshallian Industrial District as a Socio-Economic Notion.' In *Industrial Districts and Inter-Firm Cooperation*

- in Italy*, edited by F. Pyke, 37–51. Geneva: International Institute for Labor Studies.
- Beckman, C. M., and M. D. Burton. 2008. 'Founding the Future: Path Dependence in the Evolution of top Management Teams from Founding to IPO.' *Organization Science* 19 (1): 3–24.
- Bhidè, A. 2000. *The Origin and Evolution of New Businesses*. Oxford: Oxford University Press.
- Birley, S. 1985. 'The Role of Networks in the Entrepreneurial Process.' *Journal Business Venturing* 1 (1): 107–17.
- Bloodgood, J. M., H. J. Sapienza, and J. G. Almeida. 1996. 'The Internationalization of New High-Potential us Ventures: Antecedents and Outcomes.' *Entrepreneurship: Theory and Practice* 20 (4): 61–76.
- Braguinsky, S., Y. Honjo, S. Nagaoka, and K. Nakamura. 2010. 'Science-Based Business: Knowledge Capital or Entrepreneurial Ability?' IIR Working Paper Series, WP#10-05, Institute of Innovation Research, Hitotsubashi University, Kunitachi.
- Breznitz, D. 2007. *Innovation and the State: Political Choice and Strategies for Growth in Israel, Taiwan, and Ireland*. New Haven, CT: Yale University Press.
- Carland, J. W., F. Hoy, and J. A. Carland. 1988. 'Who is an Entrepreneur? Is a Question Worth Asking.' *American Journal of Small Business* 124 (2): 33–9.
- Casadesus-Masanel, R., and J. E. Ricart. 2010. 'From Strategy to Business Model and onto Tactics.' *Long Range Planning* 43 (2–3): 172–94.
- Cavalcante, S., P. Kesting, and J. Ulhøi. 2011. 'Business Model Dynamics and Innovation: Reestablishing the Missing Linkages.' *Management Decision* 49 (8): 1327–42.
- Chamanski, A., and S. Waagø. 2001. 'The Organizational Success of New, Technology-Based Firms.' Working paper, Norwegian University of Science and Technology, Trondheim.
- Chesbrough, H., and R. S. Rosenbloom. 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): 529–55.
- Chiesa, V., and A. Piccaluga. 2000. 'Exploitation and Diffusion of Public Research: The Case of Academic Spin-off Companies in Italy.' *R&D Management* 30 (4): 329–39.
- Chrisman, J., A. Bauerschmidt, and C. W. Hofer. 1998. 'The Determinants of New Venture Performance: An Extended Model.' *Entrepreneurship: Theory and Practice* 23 (1): 5–30.
- Churchill, N. C., and V. L. Lewis. 1983. 'The Five Stages of Small Business Growth.' *Harvard Business Review* 61 (3): 30–50.
- Colombo, M. G., and L. Grilli. 2005. 'Founders' Human Capital and the Growth of New Technology-Based Firms: A Competence-Based View.' *Research Policy* 34 (6):795–816.

- Cooper, A. C., C. Y. Woo, and W. C. Dunkelberg. 1988. 'Entrepreneurs' Perceived Chances for Success.' *Journal Business Venturing* 3 (2): 97-109.
- Cooper, A. C., F. J. Gimeno-Gascon, and C. Y. Woo. 1994. 'Initial Human and Financial Capital as Predictors of New Venture Performance.' *Journal of Business Venturing* 9 (5): 371-95.
- Covin, J. G., and T. J. Covin. 1990. 'Competitive Aggressiveness, Environmental Context, and Small Firm Performance.' *Entrepreneurship: Theory and Practice* 14 (4): 35-50.
- Covin, J. G., and D. P. Slevin. 1991. 'A Conceptual Model of Entrepreneurship as Firm Behavior.' *Entrepreneurship: Theory and Practice* 16 (1): 7-25.
- Davidsson, P. 1989a. *Continued Entrepreneurship and Small Firm Growth*. Stockholm: Stockholm School of Economics.
- . 1989b. 'Entrepreneurship – and After? A Study of Growth Willingness in Small Firms.' *Journal of Business Venturing* 4 (3): 211-26.
- Delmar, F., P. Davidsson, and W. B. Gartner. 2003. 'Arriving at the High-Growth Firm.' *Journal of Business Venturing* 18 (2): 189-216.
- Delmar, F., and J. Wiklund. 2008. 'The Effect of Small Business Managers' Growth Motivation on Firm Growth: A Longitudinal Study.' *Entrepreneurship: Theory and Practice* 32 (3): 437-57.
- Deloitte and Touche Consulting Group (GB). 1997. *The Ten Percenters: Second Report; Fast Growing SMEs in Great Britain*. London: Deloitte and Touche.
- Djankov, S., C. McLiesh, and R. M. Ramalho. 2006. 'Regulation and Growth.' *Economic Letters* 92 (3): 395-401.
- Doloreux, D. 2003. 'Regional Innovation Systems in the Periphery: The case of the Beauce in Québec Canada.' *International Journal of Innovation Management* 7 (1): 67-94.
- Duchesneau, D., and W. Gartner. 1990. 'A Profile of New Venture Success and Failure in an Emerging Industry.' *Journal of Business Venturing* 5 (5): 297-312.
- Eisenhardt, K. M., and C. B. Schoonhoven. 1990. 'Organizational Growth: Linking Founding Team, Strategy, Environment, and Growth among us Semiconductor Ventures 1978-1988.' *Administrative Science Quarterly* 35 (3): 504-29.
- Feeser, H. R., and G. E. Willard. 1990. 'Founding Strategy and Performance: A Comparison of High and Low Growth High-Tech Firms.' *Strategic Management Journal* 11 (2): 87-98.
- Fisman, R., and J. Svensson. 2007. 'Are Corruption and Taxation Really Harmful to Growth? Firm Level Evidence.' *Journal of Development Economics* 83 (1): 63-75.
- Fritsch, M. 1997. 'New Firms and Regional Employment Change.' *Small Business Economics* 9 (5): 437-48.

- Fu, P. P., A. S. Tsui, and G. G. Dess. 2006. 'The Dynamics of Guanxi in Chinese Hightech Firms: Implications for Knowledge Management and Decision Making.' *Management International Review* 46 (3): 277–305.
- George, G., S. A. Zahra, K. K. Wheatley, and R. Khan. 2001. 'The Effects of Alliance Portfolio Characteristics and Absorptive Capacity on Performance: A Study of Biotechnology Firms.' *The Journal of High Technology Management* 12 (2): 205–26.
- George, G., S. A. Zahra, and D. R. Wood. 2002. 'The Effects of Business–University Alliances on innovative Output and Financial Performance: A Study of Publicly Traded Biotechnology Companies.' *Journal of Business Venturing* 17 (6): 577–609.
- Gilbert, B. A., P. P. McDougall, and D. B. Audretsch. 2006. 'New Venture Growth: A Review and Extension.' *Journal of Management* 32 (6): 926–950.
- Gilsing, V. A., E. van Burg, and A. G. L. Romme. 2010. 'Policy Principles for the Creation and Success of Corporate and Academic Spin-Offs.' *Technovation* 30 (1): 12–23.
- Glaeser, E., H. Kallal, J. Scheinkman, and A. Shleifer. 1992. 'Growth of Cities.' *Journal of Political Economy* 100 (6): 1126–52.
- Gruber, M. 2007. 'Uncovering the Value of Planning in New Venture Creation: A Process and Contingency Perspective.' *Journal of Business Venturing* 22 (6): 782–807.
- Hansen, E. L. 1995. 'Entrepreneurial Networks and new Organizational Growth.' *Entrepreneurship: Theory and Practice* 19 (4): 7–19.
- Hart, S. L. 1992. 'An Integrative Framework for Strategy-Making Processes.' *Academy of Management Review* 17 (2): 327–51.
- Heirman, A., and B. Clarysse. 2004. 'How and Why Do Research-Based Start-ups Differ at Founding? A Resource-Based Configurational Perspective.' *The Journal of Technology Transfer* 29 (3–4): 247–68.
- Hung, S. C., and Y. Y. Chu. 2006. 'Stimulating New Industries from Emerging Technologies: Challenges for the Public Sector.' *Technovation* 26 (1): 104–10.
- Jaffe, A. B. 1989. 'Real Effects of Academic Research.' *American Economic Review* 79 (5): 957–70.
- Jaffe, A. B., M. Trajtenberg, and R. Henderson. 1993. 'Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations.' *Quarterly Journal of Economics* 108 (3): 577–98.
- Johnson, M. W., C. M. Christensen, and H. Kagermann. 2008. 'Reinventing your Business Model.' *Harvard Business Review* 86 (12): 57–68.
- Kaplan, S. N., B. A. Sensoy, and P. Stromberg. 2009. 'Should Investors Bet on the Jockey or the Horse? Evidence from the Evolution of Firms from Early Business Plans to Public Companies.' *The Journal of Finance* 64 (1): 75–115.
- Kelley, D., N. Bosma, and J. E. Amorós. 2011. 'Global Entrepreneurship

- Monitor: 2010 Global Report.' <http://www.gemconsortium.org/docs/download/266>
- King, R., and R. Levine. 1993. 'Finance and Growth: Schumpeter Might Be Right.' *Quarterly Journal of Economics* 108 (3): 717-37.
- Kolvereid, L. 1992. 'Growth Aspirations among Norwegian Entrepreneurs.' *Journal of Business Venturing* 7 (3): 209-22.
- Lazzeri, F., and A. Piccaluga. 2011. 'Le Imprese Spin-off della Ricerca Pubblica: Convinzioni, Realtà e Prospettive Future.' Working Paper, Istituto di Management, Scuola Superiore Sant'Anna, Pisa.
- Lee, C., K. Lee, and J. M. Pennings. 2001. 'Internal Capabilities, External Networks, and Performance: A Study on Technology Based Ventures.' *Strategic Management Journal* 22 (6-7): 615-40.
- Li, H. 2001. 'How Does New Venture Strategy Matter in the Environment-Performance Relationship?' *Journal of High Technology Management Research* 12 (2): 183-204.
- Lumpkin, G. T., and G. G. Dess. 1996. 'Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance.' *Academy of Management Review* 21 (1): 135-72.
- Marino, K. E., and A. F. de Noble. 1997. 'Growth and Early Returns in Technology-Based Manufacturing Ventures.' *Journal of High Technology Management Research* 8 (2): 225-42.
- Mangematin, V., S. Lemarié, J. P. Boissin, D. Catherine, F. Corolleur, R. Coronini, and M. Trommetter. 2003. 'Development of SMEs and Heterogeneity of Trajectories: The Case of Biotechnology in France.' *Research Policy* 32 (4): 621-38.
- McDougall, P. P., J. G. Covin, R. B. Robinson, and L. Herron. 1994. 'The Effects of Industry Growth and Strategic Breadth on New Venture Performance and Strategy Content.' *Strategic Management Journal* 15 (7): 537-54.
- McGee, J. E., M. J. Dowling, and W. L. Megginson. 1995. 'Cooperative Strategy and New Venture Performance: The Role of Managerial Experience.' *Strategic Management Journal* 16 (7): 565-80.
- Morris, R. 2011. 'High-Impact Entrepreneurship Global Report.' Centre for High-Impact Entrepreneurship at Endeavor. <http://www.gemconsortium.org/docs/download/295>
- Morris, M., M. Schindehutte, and J. Allen. 2005. 'The Entrepreneur's Business Model: Toward a Unified Perspective.' *Journal of Business Research* 58 (6): 726-35.
- Mullins, J. W. 1996. 'Early Growth Decision of Entrepreneurs: The Influence of Competency and Prior Performance under Changing Market Conditions.' *Journal of Business Venturing* 11 (2): 89-105.
- Onetti, A., A. Zucchella, M. V. Jones, and P. P. McDougall-Covin. 2012. 'Internationalization, Innovation and Entrepreneurship: Business Models for New Technology-Based Firms.' *Journal of Management and Governance* 16 (3): 337-68.

- Osterwalder, A. 2004. 'The Business Model Ontology: A Proposition in a Design Science Approach.' PhD dissertation, University of Lausanne, Lausanne.
- Park, S., and Z. T. Bae. 2004. 'New Venture Strategies in a Developing Country: Identifying a Typology and Examining Growth Patterns through Case Studies.' *Journal of Business Venturing* 19 (1): 81–105.
- Pisano, G. P. 2006. 'Can Science Be a Business? Lessons from Biotech.' *Harvard Business Review* 84 (10): 114–24.
- . 2010. 'The Evolution of Science-Based Business: Innovating How We Innovate.' *Industrial and Corporate Change* 19 (2): 465–82.
- Porter, M. E. 1998. 'Clusters and the New Economics of Competition.' *Harvard Business Review* 76 (6): 77–90.
- Raz, O., and P. A. Gloor. 2007. 'Size Really Matters – New Insights for Start-ups' Survival.' *Management Science* 53 (2): 169–77.
- Robinson, K. C., and P. McDougall. 2001. 'Entry Barriers and New Venture Performance: A Comparison of Universal and Contingency Approaches.' *Strategic Management Journal* 22 (6–7): 659–85.
- Sandberg, W. R., and C. W. Hofer. 1987. 'Improving New Venture Performance: The Role of Strategy, Industry Structure, and the Entrepreneur.' *Journal of Business Venturing* 2 (1): 5–28.
- Sapienza, H. J., and C. M. Grimm. 1997. 'Founder Characteristics, Start-up Process, and Strategy/Structure Variables as Predictors of Short-line Railroad Performance.' *Entrepreneurship Theory and Practice* 23 (1): 5–24.
- Scott, M., and R. Bruce. 1987. 'Five Stages of Growth in Small Business.' *Long Range Planning* 20 (3): 45–52.
- Siegel, R., E. Siegel, and I. C. Macmillan. 1993. 'Characteristics Distinguishing High-Growth Ventures.' *Journal of Business Venturing* 8 (2): 169–80.
- Smallbone, D., R. Leigh, and D. North. 1995. 'The Characteristics and Strategies of High Growth Smes.' *International Journal of Entrepreneurial Behaviour and Research* 1 (3): 44–62.
- Smart, D. T., and J. S. Conant. 1994. 'Entrepreneurial Orientation, Distinctive Marketing Competencies and Organizational Performance.' *Journal of Applied Business Research* 10 (3): 28–38.
- Song, M., K. Podoyntsyna, H. van der Bij, and J. I. Halman. 2008. 'Success Factors in New Ventures: A Meta-analysis.' *Journal of Product Innovation Management* 25 (1): 7–27.
- Stevenson, H. H., and J. C. Jarillo. 1990. 'A Paradigm of Entrepreneurship: Entrepreneurial Management.' *Strategic Management Journal* 11 (special issue): 17–27.
- Stevenson, H. H., and J. C. Jarillo-Mossi. 1986. 'Preserving Entrepreneurship as Companies Grow.' *Journal of Business Strategy* 7 (1): 10–23.

- Storey, D. J. 1996. *The Ten Percenters: Fast Growing SMEs in Great Britain*. London: Deloitte and Touche.
- Stuart, R. W., and P. A. Abetti. 1986. 'Field Study of Start-up Ventures – Part II: Predicting Initial Success.' In *Frontiers of Entrepreneurship Research 1986: Proceedings of the Sixth Annual Babson College Entrepreneurship Research Conference*, edited by R. Ronstadt, J. A. Hornaday, R. Peterson, and K. H. Vesper, 21–39. Babson Park, MA: Babson College.
- Teece, D. J. 2010. 'Business Model, Business Strategy, and Innovation.' *Long Range Planning* 43 (2–3): 172–94.
- Terpstra, D. E., and P. D. Olson. 1993. 'Entrepreneurial Start-up and Growth: A Classification of Problems.' *Entrepreneurship: Theory and Practice* 17 (2): 5–20.
- Thakor, M. V., and A. M. Lavack. 2003. 'Effect of Perceived Brand Origin Associations on Consumer Perceptions of Quality.' *Journal of Product and Brand Management* 12 (6): 394–407.
- Vivarelli, M., and D. B. Audretsch. 1998. 'The Link between the Entry Decision and Post-Entry Performance: Evidence from Italy.' *Industrial and Corporate Change* 7 (3): 485–500.
- Watson, W., W. Steward, and A. Barnir. 2003. 'The Effects of Human Capital, Organizational Demography, and Inter-Personal Processes on Venture Partner Perceptions of Firm Profit and Growth.' *Journal of Business Venturing* 18 (2): 145–64.
- Wiklund, J. 1999. 'The Sustainability of the Entrepreneurial Orientation – Performance Relationship.' *Entrepreneurship: Theory and Practice* 24 (1): 37–48.
- Wiklund, J., and D. A. Shepherd. 2005. 'Entrepreneurial Orientation and Small Firm Performance: A Configurational Approach.' *Journal of Business Venturing* 20 (1): 71–79.
- Wirtz, B., O. Schilke, and S. Ullrich. 2010. 'Strategic Development of Business Models: Implications of the Web 2.0 for Creating Value on the Internet.' *Long Range Planning* 43 (2–3): 272–90.
- Witt, P. 2004. 'Entrepreneurs' Networks and the Success of Start-ups.' *Entrepreneurship and Regional Development* 16 (5): 391–412.
- Zahra, S. 1991. 'Predictors and Financial Outcomes of Corporate Entrepreneurship: An Explorative Study.' *Journal of Business Venturing* 6:259–285.
- Zahra, S. A., and W. C. Bogner. 2000. 'Technology Strategy and Software New Ventures' Performance: Exploring the Moderating Effect of the Competitive Environment.' *Journal of Business Venturing* 15 (2): 135–73.
- Zahra, S. A., and J. Covin. 1993. 'Business Strategy, Technology Policy and Company Performance.' *Strategic Management Journal* 14 (6): 451–78.
- Zahra, S. A., B. P. Matherne, and J. M. Carleton. 2003. 'Technological

- Resource Leveraging and the Internationalization of New Ventures.' *Journal of International Entrepreneurship* 1 (2): 163–86.
- Zott, C., and R. Amit 2007. 'Business Model Design and the Performance of Entrepreneurial Firms.' *Organization Science* 18 (2): 181–99.
- Zott, C., and R. Amit. 2008. 'The Fit between Product Market Strategy and Business Model: Implications for Firm Performance.' *Strategic Management Journal* 29 (1): 1–26.
- Zott, C., R. Amit, and L. Massa. 2011. 'The Business Model: Recent Developments and Future Research.' *Journal of Management* 37 (4): 1019–42.
- Zou, H., X. Chen, and P. Ghauri. 2010. 'Antecedents and Consequences of New Venture Growth Strategy: An Empirical Study in China.' *Asia Pacific Journal of Management* 27 (3): 393–421.
- Zucker, L., M. Darby, and M. Brewer. 1998. 'Intellectual Human Capital and the Birth of us Biotechnology Enterprises.' *American Economic Review* 88 (1): 290–305.



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