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**Building and Managing Strategic Alliances
in Technology-Driven Start-Ups:
A Critical Review of Literature**

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Abstract

In this article, we critically review the current literature on alliance formation and management with a particular emphasis on small businesses, and on managerial implications for start-up enterprises. In the beginning of the article, we discuss the advantages and the challenges of inter-organizational collaboration, by taking the perspective of technology-driven start-ups operating in highly competitive environments. We then review the managerial advice suggested by the current literature, in order to provide start-ups with the groundwork to address alliance challenges, and to enhance their alliance capability. Finally, we point out the literature limitations, and suggest directions for future research to improve the quality of academic recommendations to start-ups that wish to engage in strategic alliances.

Keywords: Strategic alliances, collaborative innovation, technology-driven start-ups, alliance strategy, alliance management, alliance capability building

1. Introduction

In Western economies, technology start-ups are receiving increasing attention by both policy makers and researchers, as they represent a major source of innovation and an engine of economic growth (Potočnik, 2008; Platts and Lim, 2008; Reding, 2008)¹. As traditional manufacturing is progressively outsourced to lower-cost countries, national governments encourage the development of high-tech ventures to stay abreast of global competition in a knowledge-based economy. However, technology start-ups have high failure rates, due to a ‘liability of newness’ involving scarcity of in-house resources, uncertainty about the quality of the organization’s products, and lack of reputation in the final market (Stinchcombe, 1965; Baum et al., 2000). In particular, European start-ups face an ‘innovation paradox’, as they have an innovation edge, but often fail to convert inventions into market value via new patents, products, and services (Figel’, 2006; Reding, 2008).

According to a promising literature stream, the constitution of strategic alliances² may enable start-ups to overcome the liability of newness, as well as to avoid the pitfalls associated with the earliest stages of venture development (Baum et al., 2000; Narula, 2004). As argued by Baum et al. (2000: 270), “By forming strategic alliances, start-ups can potentially access social, technical, and commercial

¹ In the remainder of the article, the generic term “start-up” will be used as a synonym for “technology-driven start-up”.

² For the purposes of this article, a strategic alliance is broadly defined as a collaborative agreement, whereby two or more companies team up in order to share reciprocal inputs, while maintaining their own corporate identities (De Man and Duysters, 2005).

resources that normally require years of operating experience to acquire”. Therefore, strategic alliances play a pivotal role for technology-driven start-ups, serving as a catalyst of organizational development, and a conduit of product innovation. However, strategic alliances are risky endeavours, and failure may be particularly consequential at the start-up stage, when in-house resources are stretched to the limit (Baum et al., 2000; Narula, 2004; Minshall et al., 2008). In order to reap the advantages associated with inter-organizational collaboration, start-ups need to develop alliance mastery, defined as the capability to establish, structure and manage strategic alliances (Draulans et al., 2003).

Our literature review thus explores the advantages and the challenges of inter-organizational collaboration, by taking the viewpoint of start-ups operating in knowledge-intensive, and high-technology sectors. We identify best practices in collaboration management with the purpose of providing a resource of intelligence for start-ups to address the challenges of alliance making, and to ultimately build up an alliance capability. In the final section, we point out the research and literature gaps and propose future research directions with the purpose of improving the quality of academic recommendations to start-ups.

As suggested by Ariño et al. (2008), “While there are strong connections between alliance research and strategic management ... research on alliances has often developed separately from the entrepreneurship literature” (p. 148). The few publications taking an integrative approach are scattered across different theoretical perspectives, thus leading to a rather disordered picture of alliance making in new ventures. As a research contribution, we make an attempt to bridge this gap, by providing an over-arching framework for integrating research on start-ups’ alliances, in connection with the broader literature on strategic alliances.

2. Methodology

Before getting to the core of our literature review, we will briefly outline the methodological approach adopted for gathering and analyzing the current literature on alliance making in new ventures. In order to screen pertinent articles, we have performed an extensive search of electronic databases – ABI Inform, JSTOR, Science Direct, and Springer Link – looking for the keywords “start-up” (or synonyms) and “strategic alliance” (or synonyms) in the title or abstract. As synonyms, we have selected the keywords “new venture” and “entrepreneurial firm” for “start-up”, followed by “partnership” and “inter-organizational collaboration” for “strategic alliance”. In particular, we have performed crossed searches of the above said keywords, and limited results to scholarly journals included in busi-

ness and management collections. Despite the extensive coverage of the electronic databases³, our search has led to a total of only 11 relevant articles, therefore confirming alliance making as a relatively unexplored phenomenon in the entrepreneurship literature. Nevertheless, we have made an attempt to broaden our article base, by gathering further articles from bibliographic references (10), and including contributions about small enterprises when appropriate (3). After a first screening of the gathered articles, we have realized that start-ups and small enterprises are often treated jointly in the entrepreneurship literature, with start-ups being portrayed as a subset of small enterprises. As a result, we have gathered a total of 24 peer-reviewed, scholarly articles on alliance making in the start-up phase of organizational development.

Given our intent to bridge the entrepreneurship and the alliance research (see introduction), we have further broadened our article search in order to include relevant publications from the general literature on strategic alliances. To this end, we have first gathered background articles quoted in the start-up focused alliance research, and screened the references of literature reviews on strategic alliances (Barringer and Harrison, 2000; Ireland et al., 2002). We have then followed an inductive process for identifying general themes in the alliance literature, and searched the electronic databases for relevant publications within each category. As the next section will make clear, the general themes we have culled out from the current literature reflect the lifecycle of alliance making and provide an overarching structure for comparing the start-up alliance research with the broader alliance literature.

3. Literature Overview

The following table (Tab. 1) provides a synoptic outlook of the articles under review, classified according to their primary relevance for the start-up alliance literature or the general alliance literature. As mentioned above, we identified general themes in the alliance literature which converge to describe the lifecycle of alliance making, from the constitution of a collaborative relationship, to the formulation of managerial lessons of future applicability:

Alliance formation. This literature stream is concerned primarily with understanding the antecedents of strategic alliances, while also outlining the relative consequences in terms of advantages and disadvantages. As suggested in Tab. 1, the general theme of alliance formation is covered extensively

³ Through the electronic databases we have accessed several journals in the field of business and management (141 with ABI Inform, 106 with JSTOR, 108 with Science Direct, and 133 with Springer Link). While the consultation of multiple databases has sometimes lead to overlapping results, this procedure has ensured maximization of the number of articles found.

by the broad literature on strategic alliances⁴, and receives considerable attention also within the narrower research on start-ups' alliance making. The current literature adopts different theories to explain the formation of strategic alliances, ranging from transaction cost theory, to the resource-based view, to a social network perspective. While these theoretical perspectives provide a general framework for understanding alliance formation, the entrepreneurship research reports distinctive motivations, advantages, and challenges for new ventures engaging in strategic alliances. As an example, start-ups are inclined to bring about alliances in order to compensate for resource limitations, but encounter considerable difficulties in attracting valuable partners.

Alliance strategy. This research tradition covers the structural features of strategic alliances, including the selection of suitable partners, the design of a governance structure, and the duration of the collaborative engagement. In general, alliance strategy deals with the foremost stages of alliance making, when a company sets out to define – in agreement with the corporate objectives – the overall structure of a strategic alliance. As visible in Tab. 1, the strategy theme has received considerable attention in both the literature streams, even though the focus on new ventures may need to be further developed in future research. As we will show in our literature review, strategy scholars have not fully explored the start-up perspective with respect to several relevant issues, such as the selection of governance modes, or the definition of the temporal duration of the collaborative engagement.

Alliance management. Taking a dynamic perspective on strategic alliances, this literature stream focuses on the on-going collaboration between alliance partners, and explores current practices for alliance making. While the dynamic perspective may be potentially extended to different aspects of a collaborative relationship (Ariño et al., 2008), the current literature comprises two stand-alone research streams in knowledge and risk management. This is the case since the monitoring of multiple risks, the integration of relevant knowledge, and the protection of proprietary knowledge represent primary requirements for the ultimate success of a strategic alliance. As suggested in Tab. 1, the management perspective is receiving increasing attention within the general alliance literature, but still needs to gain momentum within the start-up focused alliance literature.

Alliance capability. Building on theory about organizational capabilities (e.g. Teece et al., 1997), recent research proposes that companies need to build up an alliance capability in order to become successful with strategic alliances. As suggested by De Man (2005: 316) “learning-by-doing is the first step for building an alliance capability [but], it is not sufficient. Companies also need to focus on mechanisms that formalize lessons learned and transfer alliance best practices inside companies”. As

⁴ Given the large number of articles on alliance formation in the general literature, we cover the most relevant publications and refer to the reviews by Barringer and Harrison (2000) and Ireland et al. (2002) as pointers to prior studies.

visible in Tab. 1, alliance capability is a growing research stream, but has not yet received attention from alliance scholars focusing on start-ups. This literature gap is surprising, since companies with limited experience of strategic alliances – such as new ventures – tend to be less successful in alliance management (Anand and Khanna, 2000), and should therefore invest systematically in the build up of an alliance capability.

Life Cycle Phase	Start-up Alliance Literature	General Alliance Literature
Alliance formation	Baum et al. (2000) Baum and Silverman (2004) Calabrese et al. (2000) Chen and Li (1999) Colombo et al. (2006) Deeds and Hill 1996 Eisenhardt and Schonhooven (1996) Ho Park et al. (2002) Lee et al. (2001) Lee (2007) Leiblein and Reuer (2004) Mc Gee et al. (1995) Shan (1990) Shan et al. (1994) Silverman and Baum (2002) Stuart et al. (1999) Steensma et al. (2000) Van Gils and Zwart (2004)	Ahuja (2000) Barringer and Harrison (2000)* Das and Teng (2000b) De Man and Duysters (2005) Faems and Van Looy (2003) Freeman (1999) Lorange and Roos (1993) Powell et al. (1996) Gulati (1998) Ireland et al. (2002)* Stuart (2000) Willoughby and Galvin (1997) Zineldin and Dodourova (2005)
Alliance strategy	Ariño et al. (2008) Alvarez and Barney (2001) O'Dwyer and O'Flynn (2005) Narula (2004) Hoffmann and Schlosser (2001)	Bierly and Gallagher (2007) Brouthers et al. (1995) Das and Teng (1996) Das and Teng (2000a) Das and Teng (2000b) Hitt et al. (2000) Holmberg and Cummings (2009) Ireland et al. (2002) Joskow (1985) Lorange and Roos (1993) Mowery et al. (1996) Kogut (1998)
Alliance management	---	Anderson et al. (2006) Brachos et al. (1995) Nicholls Nixon (1993) Kumar and Andersen (2000) Lane and Lubatkin (1998) Simonin (1999) Tsai and Ghoshal (1998) Sammer (2004)

Alliance capability building	Minshall et al. 2008	Anand and Khanna (2000) Brockelman and Cucci (2000) De Man (2005) Draulans et al. (2003) Kale et al. (2002) Harbison and Pekar (1997) Heimeriks and Reuer (2006) Heimeriks et al. (2009)
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* Literature reviews

Table 1. Literature Overview

The above themes can be viewed in an integrative fashion as different stages of the alliance life-cycle. They can also be distinguished according to their research perspective: while alliance formation and strategy deal with the *content* of strategic alliances, alliance management and capability building focus on the *processes* involved in alliance making. In particular, alliance management research explores the collaborative processes between the alliance partners, whereas capability building studies shift attention towards the internal processes of alliance partners (De Man, 2005). As visible in Table 1, the content perspective has received greater attention in the current literature, while the process dimension needs to be further developed, especially with respect to new ventures.

In the next section we therefore proceed with the literature review, by taking the above themes as a general structure to organize the current research, while also trying to further advance the start-up perspective. In particular, we will first discuss the determinants of inter-organizational collaboration in the start-up phase, and outline the advantages and the challenges that strategic alliances pose to new ventures. Subsequently, we will review the current research on alliance strategy, management, and capability building in search for literature advice on how new ventures can overcome the challenges inherent to strategic alliances. In this regard, our literature review favours a pragmatic approach, and therefore makes an attempt to cull out managerial recommendation for new ventures, rather than to discuss different theoretical perspectives on strategic alliances per se. For excellent reviews of theoretical perspectives on alliance making see Barringer and Harrison (2000), Ireland et al. (2002), Das and Teng (2000b) covering – among others – the resource based view, transaction cost, and social network perspectives.

4. Alliance formation in the start-up phase: determinants, advantages and disadvantages

Over the last two decades, the global number of strategic alliances has risen by approximately 20 percent per year, and is currently estimated to account for as much as 25 percent of the total revenues

of participating companies (Anderson et al., 2006). The growing trend towards corporate partnering is largely driven by the knowledge-intensive nature of global competition, and by the cross-fertilization of technological domains (Narula, 2004; Powell et al., 1996). Particularly in high-tech sectors, the increasingly sophisticated and distributed nature of knowledge transcends corporate boundaries, making it harder to pursue innovation activities in isolation. Freeman (1991) identified a positive correlation between the technological sophistication of an industrial sector, and the number of collaborative partnerships undertaken by domain companies. In the words of Powell et al. (1996: 116), “when the sources of expertise are widely dispersed, the locus of innovation will be found in networks of learning, rather than in individual firms”. This is especially true for high-tech start-ups tending to concentrate research investment within a specific technological paradigm, and lacking the internal resources to develop a diversified bundle of technology-related products. In the next sections, we therefore review the motivations leading a start-up to engage in strategic alliances, and discuss the subsequent advantages and challenges.

4.1. The drivers of alliance formation

According to several scholars (Colombo et al., 2006; Eisenhardt and Schonhooven, 1996; Mc Gee et al., 1995; Shan, 1990), technology start-ups facing adverse conditions are more inclined than their larger counterparts to establish collaborative relations. In highly competitive and emergent industries, new ventures consider strategic alliances either to pioneer innovative technologies, or to move away from a vulnerable position (Shan, 1990). The intellectual capital of a new venture represents an important determinant of alliance formation, since the possession of valuable resources is a necessary condition for the attraction of suitable partners (Ho Park et al., 2002). Moreover, the social connections of the founding team, along with endorsement by reputable organizations – such as venture capitalists – facilitate start-ups’ involvement in strategic alliances (Eisenhardt and Schonhooven, 1996). While access to external resources represents the strategic rationale for alliance making, the possession of valuable resources – in terms of intellectual, social, and reputational capital – are the primary enablers of alliance implementation. In a way, alliance making presents an inherent paradox for new ventures, since strategic alliances are set up to access external resources, yet internal resources are needed to set up strategic alliances. In this regard, Ho Park et al. (2002) showed that technology start-ups endowed with valuable resources are better able to bring about strategic alliances, and to get access to external resources needed to cope with market uncertainties. Therefore, the foremost determinants of alliance

formation in new ventures are a combination of strategic necessities, internal resources, and social opportunities.

As suggested by diverse scholars (Colombo et al., 2006; Faems and Van Looy, 2003), the strategic alliances undertaken by new ventures can be classified in two broad categories based on the resources sought after in the collaborative engagement. On the one hand, start-ups may enter into *exploitative commercial alliances* with the purpose of accessing the resources necessary to introduce technological innovations to the final market. An exploitative propensity generally leads to the constitution of strategic alliances with *downstream partners*, such as large companies excelling at product commercialization. For example, several authors (Alvarez and Barney, 2001; Baum et al., 2000; Powell et al., 1996) report on biotech start-ups undertaking alliances with pharmaceutical corporations in order to leverage well-known brands, trained sales force, and specialized distribution channels. On the other hand, *explorative technological alliances* enable new ventures to advance innovation, either by pooling together complementary resources or internalizing the partner's knowledge. An explorative propensity usually leads to the formation of strategic alliances with *horizontal partners* in a similar positioning along the industry value-chain, or with *upstream partners* such as universities and government labs. In this regard, a research consortium where new ventures pool together resources in order to explore an untested field would clearly represent an example of explorative technological collaboration.

Although inclined to engage in collaborative relationships, new ventures encounter considerable difficulties in bringing about strategic alliances (Ahuja, 2000; Baum et al., 2000; Narula, 2004; Eisenhardt and Schoonhoven, 1996). In comparison to large companies, start-ups usually possess fewer technological resources to barter with potential partners, and cannot engage in collaborative agreements at multiple stages of the value chain (Narula, 2004). Besides, the limited social capital of new ventures is likely to restrain the attraction of valuable partners, and the lack of prior work-related ties may further limit the opportunities for collaborative engagement (Ahuja, 2000; Baum et al., 2000). The small size of management functions in new ventures also bears a negative influence on partnership formation, since small functions usually have less extensive connections with potential partner organizations. When the management function is small, top executives are also pressed with short-term operating matters, thus lacking the time to bring about collaborative relationships (Eisenhardt and Schoonhoven, 1996).

Besides reporting the challenges encountered by start-ups in alliance formation, the current literature portrays strategic alliances as a mixed blessing, with uncertain outcomes on venture development. On the one side, strategic alliances present the potential to enhance the competitive position of a new venture, by enabling access to critical resources. On the other side, strategic alliances may ultimately

undermine the survival of a new venture, because they pose numerous risks (such as knowledge loss or legal problems). In the next section we uncover these opposed forces at play in strategic alliances, while also taking into account the “liabilities of newness” of start-ups. As our analyses will make clear, the organizational characteristics of new ventures amplify potential advantages and disadvantages of strategic alliances.

4.2. Strategic alliances as the locus of innovation

The academic literature provides empirical evidence for the potential of strategic alliances to enhance the innovativeness - and in turn, the performance - of technology-driven start-ups (Baum et al., 2000; Lee, 2007; Shan et al., 1994; Stuart et al., 1999; Van Gils and Zwart, 2004; Willoughby and Galvin, 2005). Baum et al. (2000) showed that biotech start-ups excel at innovation when forming industry linkages with a vision to access complementary knowledge. In a study of start-ups in the United States semiconductor industry, Chen and Li (1999) found that strategic alliances have a positive impact on new product development. Stuart et al. (1999) showed that technology start-ups with prominent partners performed better than comparable ventures without endorsements – in terms of higher sales growth and faster initial public offerings. As reviewed below, the reasons why strategic alliances can contribute to start-up innovativeness are manifold, but ultimately result from the associated cost reductions, knowledge creation, reputation enhancement, and international expansion:

Cost advantages. The economic advantages provided by corporate partnering are likely to be particularly beneficial for technology start-ups confronted with resource constraints in hyper-competitive environments (Narula, 2004). Strategic alliances provide the security of a reversible investment, since limited damage is inflicted to the primary operations of a partner company, in case of project failure or alliance dissolution (ibid). At the same time, strategic alliances can lower the risks inherent to large projects, by spreading the costs across a number of partners, while also securing resources to bring forth the innovation process. Finally, teaming up with competent partners might result in a reduction in lead times, an aspect of particular relevance in high-tech sectors with a shortened product life-cycle (Faems and Van Looy, 2003; De Man and Duysters, 2005).

Knowledge detection, integration, and creation. Besides providing important advantages in terms of cost reductions, strategic alliances enable new ventures to enhance their innovation activities by accessing, absorbing, and creating new knowledge. According to De Man and Duysters (2005), a specific reason why alliance networking advances innovation consists in the provision of a ‘radar function’ for

detecting knowledge in the external environment. The ‘radar function’ is particularly germane to start-ups - permitting to scan the alliance network for relevant knowledge, although without incurring the costs to invest in a particular technology or infrastructure. By singling out external knowledge with target precision, start-ups can reduce the liability of newness. In addition to facilitating knowledge detection, strategic alliances also enable start-ups to absorb knowledge from the partner company, and therefore to further reduce the newcomers’ disadvantage. As argued by Simonin (1999: 595), “strategic alliances constitute perhaps the most adequate [...] vehicle to internalize the other’s competency”, among all the available approaches to imitate knowledge. Working together with a corporate partner brings along the acquisition of implicit knowledge, by means of a process of ‘absorptive learning’ (Faems and Van Looy, 2005; Lane and Lubatkin, 1998). In addition to internalizing existing knowledge, start-ups can further expand their competence portfolio by engaging in the creation of new knowledge within the scope of the collaborative venture. In this regard, extensive research underlines the relevance of collaborative relationships for fostering knowledge creation, an essential component of the innovation process (Baum et al., 2000; Faems and Van Looy, 2005). In the words of Muller and Välikangas (2002), strategic alliances permit “to extend the boundaries of corporate innovation”, through the *exploitative recombination* of the partners’ competences and the *explorative collaboration* of emergent opportunities.

Reputation enhancement. Besides representing a conduit of innovation development, strategic alliances are likely to enhance the public credibility of a start-up, by providing status transfer from prominent partners, along with a legitimate position in the competitive domain (Baum et al., 2000). Building on the reputation of corporate partners, a start-up might improve the perceived image among diverse stakeholders, and eventually attract capital for its investments (Stuart et al., 1999). Network endorsement is especially important in high-tech sectors, where scientific uncertainty about a product’s viability leads investors to assess a new venture by looking at its corporate relationships. In the case that precise evaluation measures are unavailable, business relationships - reflecting a start-up’s ability to connect with influential actors - are likely to shape the investors’ perceptions (Stuart et al., 1999; Baum et al., 2000).

In a study of the biotechnology sector, Baum and Silverman (2004) found that start-ups’ involvement in downstream – rather than upstream – alliances is positively correlated to the obtainment of financing from venture capitalists. As pointed out by the authors, this result may indicate that venture capitalists are particularly sensitive to the information about commercial viability signalled by downstream alliances. Downstream alliances are an indicator of a start-up’s access to commercial

channels, and signal the confidence of established firms in the technical soundness, and commercial viability of the start-up's products. Conversely, venture capitalists may interpret upstream alliances as an indication that the start-up lacks critical resources for innovation development, and remains in an exploratory phase far from product commercialization. In this regard, upstream alliances may be subject to ambiguous interpretation on the part of venture capitalists, despite providing access to cutting-edge knowledge essential for new product development.

International expansion. A further advantage of alliance engagement consists in the possibility of improving a company's position in the global market, by expanding corporate operations across geographically dispersed locations (Narula, 2004; Kuemmerle, 1999; Leiblein and Reuer, 2004). First, international alliances permit to overcome barriers to foreign market entry, and to leverage the market expertise of local partners for product adaptation and commercialization. Second, international alliances enable to access location-specific assets in foreign countries, and to tap into technological systems located in the most innovation-intensive regions of the global industry. These advantages are particularly relevant to new ventures which tend to concentrate their production and sales into their home country (Narula, 2004). As suggested by Leiblein and Reuer (2004: 285-6), "Because of heightened competitive pressures [...] and shrinking product life-cycles, an entrepreneurial firm's success in a high-tech environment can turn on its capacity to rapidly develop foreign sales". In a study of the semiconductor industry in North America, Leiblein and Reuer (2004) consistently found that international collaboration – combined with technological competency – sustains venture development.

However, international alliances involve complex coordination and demand substantial commitment in terms of financial, managerial, and administrative resources, therefore posing numerous challenges for start-ups. In this regard, Leiblein and Reuer (2004) found evidence for the argument that resource constraints make new ventures less capable than large companies to take advantage of international collaboration. Similarly, Narula (2004) showed that international collaboration in the information technology sector is primarily the domain of larger companies with greater resources and experience in transnational activities. Since the constitution of global networks is undoubtedly a demanding task, business incubators may provide assistance in the partnering process, by connecting start-ups spread over a wide territory. As regards the European case, incubators may connect start-ups across the economic community, in way of creating a pole of excellence with the potential to take lead of the global competition (Europe Innova, 2008).

4.3. *The failure risk of strategic alliances*

Although representing an important vector of innovation, corporate partnerships often result in failure, encountering premature disbandment or undergoing major revisions, for example via mergers and acquisitions (Das and Teng, 2000a; De Man and Duysters, 2005). According to current estimates, the failure rate is between 60-70 percent with collaborative agreements being dissolved without achieving the desired results in the innovatory activity (Draulans et al., 2003; Zineldin and Dodourova, 2005). In a study comparing small and large ventures in the electronic hardware sector, Narula (2004) reported that a 50 percent failure rate in alliance making was judged to be “very good indeed” by company representatives. However, an alliance failure brings heightened risks for small ventures, since they lack financial resources or reserves to recover from economic losses, and to find alternative partners for collaborative innovation. Overall, the literature indicates that the high instability of strategic alliances is due to the presence of internal competition among corporate partners, combined with the persistence of severe barriers to knowledge integration and communication. However, several insights into these over-arching problems have been discussed in the current literatures on strategic alliances and entrepreneurial ventures:

Internal rivalry. Strategic alliances are generally regarded as incomplete contracts, lacking a clear definition of responsibility allocation, and of the property rights associated with the collaborative outputs (Anand and Khanna, 2000). Due to the lack of binding mechanisms, corporate partners often lack trust, since an opportunistic behaviour may lead the counterpart to pursue self-interest, at the expense of the collaborative venture (Das and Teng, 2000a). For example, fear of helping a competitor in developing a novel technology may be an incentive to hold back in the alliance, by protecting research results, or hiding the best people (De Man and Duysters, 2005). Ultimately, intra-alliance rivalry may deteriorate into a ‘learning race’, where the partners attempt to absorb external knowledge as much as possible, while divulging internal knowledge as little as possible (Baum et al., 2000). Start-ups are particularly vulnerable to the risks of a learning race, possessing a limited technological portfolio, while also lacking the financial resources to enforce control mechanisms. As follows, start-up executives are often wary of alliances, and protect distinctive competences by making sure that none of the partners have access to enough know-how to become a potential competitor (Narula, 2004; Van Gils and Zwart, 2004). Since intellectual capital represents the foremost – if not the unique – asset of entrepreneurial ventures, appropriation hazards may be extremely detrimental, depriving the company of a vital source of competitive advantage (Colombo et al., 2006; Narula, 2004).

In particular, empirical evidence consistently indicates that the phenomenon of learning race is fiercest in horizontal collaboration where potential competition between alliance partners is likely to reduce knowledge transfer. As suggested by Baum et al. (2000), horizontal partners tend to derail the strategic alliance towards a zero-sum game, perceiving a high incentive to maximize individual advantage at the expense of the collaborative venture. In a study of the biotechnology industry in Canada, Silverman and Baum (2002) showed that horizontal alliances on average raised the likelihood of failure for biotechnology start-ups. Relatedly, Colombo et al. (2006) suggested that new ventures encounter greater difficulties in horizontal alliances, since the negotiation, contractual, and administrative costs incurred for dealing with appropriation concerns are overwhelming for most start-ups. Nevertheless, start-ups may be driven to forge such alliances, because they enable tapping knowledge relevant for innovation development (Calabrese et al., 2000).

Knowledge barriers. Even when alliance partners do not engage in learning races, their collaborative activity may face severe barriers, as the process of integrating knowledge across organizational boundaries is fraught with inherent complexity (Anand and Khanna, 2000; Lane and Lubatkin, 1998). On the one hand, *knowledge transfer* may be obstructed by substantial differences in terms of knowledge bases, corporate cultures, and organizational structures⁵. On the other hand, *knowledge recombination* may be prevented by the inability to successfully retain, and exploit the knowledge transferred by the partner company (Szulanski, 1996; Willoughby and Galvin, 2005; Baum et al., 2000). As reported by Szulanski (1996: 31), studies of innovation consistently indicate that knowledge retention in organizations cannot be taken for granted. The retention barrier may represent a major challenge for new ventures, which usually lack previous expertise in absorbing knowledge from partner companies. As pointed out by Anand and Khanna (2000) and Lane and Lubatkin (1998), absorptive capacity is enhanced by repeated involvement in collaborative relations, exposing the firm to a broad repertoire of experiences.

Communication challenges. In addition to the structural challenges described above, communication barriers in the context of team interactions may negatively affect knowledge integration, and in turn innovation development. In fact, the ultimate success of a collaborative activity relies heavily on the communication exchanges between individuals working in inter-organizational teams (Nonaka and Takeuchi, 1995; Szulanski, 1996; Brachos et al., 2007). Team members may encounter considerable difficulties in conveying complex insights to each other, especially when different cultures, expertises,

⁵ This is particularly relevant in international alliances, where cultural diversity may prevent reciprocal understanding, and eventually result in inter-partner conflict over values, beliefs, and norms (Kumar and Andersen, 2000; Flores, 2008).

and backgrounds are at play. When they lack motivation, trust, and learning orientation, team members may engage in defensive routines, therefore limiting their efforts in providing, or receiving knowledge (Eppler, 2007). In addition, teams might fall into the groupthink trap and take suboptimal decisions because of a tendency to sacrifice individual criticism in favour of group cohesiveness (Janis, 1982).

In spite of all these potential pitfalls and risks of strategic alliances for start-ups, there are also ways, documented in the relevant literature, how these challenges can be overcome. We summarize these recommendations in the next section.

5. Literature recommendations for alliance making in the start-up phase

Drawing on the collaboration challenges outlined above, this section reviews the academic literature in search for managerial advice on building successful alliances, with particular attention to the stage of venture development. While the current literature is not always focused on the specific case of technology start-ups, several recommendations are particularly important for new ventures approaching inter-organizational collaboration with stretched in-house resources. In particular, valuable insights can be found in three areas related to alliance making - namely alliance strategy, alliance management, and capability building for handling alliances. While the domain of alliance strategy is concerned with the structural design of strategic alliances (Das and Teng, 2000a), alliance management articles deal with the procedural techniques for governing ongoing alliance relationships (Ireland et al., 2002). Conversely, alliance capability aims at building up an organizational capability to manage alliances, by distilling lessons from previous experience, and absorbing knowledge from external sources (Draulans et al., 2003). Ideally, it is possible to envision a self-reinforcing cycle, whereby accurate strategizing lays the basis for a conscious management of an alliance, which in turn contributes to the development of an alliance capability.

5.1. Alliance strategy

The strategy literature has devoted considerable attention to the structural dimension of strategic alliances, with a focus on identifying the partner features, governance mechanisms, and time duration for successful inter-organizational collaboration. In this regard, the strategy literature provides relevant advice for the foremost stages of alliance making, specifically when a company decides to set up a collaborative venture.

Selecting partners. As pointed out by several scholars (Bierly and Gallagher, 2007; Hitt et al., 2000; Holmberg and Cummings, 2009), selecting an appropriate partner is a primary requirement for realizing the potential benefits of a strategic alliance. In general, the most suitable arrangement is between partners presenting *complementary competences*, *compatible objectives* and *cooperative attitudes* (Brouthers et al., 1995). By bringing together complementary competences, corporate partners can recombine knowledge for innovation purposes, and ultimately create value they could not achieve by working independently (Hitt et al., 2000). Besides, compatible objectives represent a necessary requirement to advance the corporate strategy of both the partners, and to prevent restriction of the alliance benefits to a single partner (Brouthers et al., 1995). In case the partners do not share a cooperative attitude, the alliance would result in an unbalanced relationship where one partner unwillingly contributes to strengthen a potential competitor (Baum et al., 2000). Taking a knowledge perspective, Lane and Lubatkin (1998) specify that alliance partners should present relatively similar knowledge bases in order to effectively integrate knowledge. In fact, sharing common ground fosters the alliance partners' capability to recognize, assimilate, and ultimately deploy the combined knowledge (ibid).

A variety of partnering protocols are available to provide alliance managers with a decision support throughout the identification, assessment, and selection of alliance candidates (Brockelman and Cucci, 2000; De Man, 2005; Holmberg and Cummings, 2009). A partnering protocol includes a *strategic fit* framework for evaluating the candidate's alignment with the company's strategy, and a *risk assessment* framework to select partners in conformity to the company's risk-tolerance threshold. As a result, alliance managers take a systematic stance in assessing the strategic value of the prospective alliance, and judging the likely impact of a partner's shortcomings on the alliance performance. While partnering protocols considerably improve the quality of decision making (Holmberg and Cummings, 2009), the literature does not provide indication of new ventures' adoption of such a support system. Unfortunately, the available frameworks are generally unsuitable for new ventures, being tailored to the specific requirements of large companies (see Brockelman and Cucci, 2000). However, start-ups should be even more careful than their larger counterparts in selecting partners, since they have fewer possibilities to eventually recover from alliance failure (Narula, 2004). In addition, start-up companies should avoid engaging in multilateral collaborations, given their limited resource endowment and expertise in alliance management (Hoffmann and Schlosser, 2001; Deeds and Hill, 1996). A study by Hoffman and Schlosser (2001) showed that the success rate of strategic alliances undertaken by small enterprises diminished by 23% when more than one partner was involved.

As confirmation of the relevance of partner selection for new ventures, it is worth noticing the development of a stand-alone research stream discussing the viability of 'asymmetric partnerships'

with larger companies. According to Brouthers et al. (1995), strategic alliances work better when the partners present a ‘symmetric configuration’ in terms of organizational dimensions, financial resources, and managerial style. By contrast, recent research has revealed that ‘asymmetric partnerships’ may deliver considerable advantages for start-ups, although bringing along additional challenges (Alvarez and Barney, 2001; O’Dwyer and O’Flynn, 2005; Minshall et al., 2008). A strategic alliance with a large company may provide a new venture with the resources necessary to bring its technology to the market, and may eventually increase its social reputation via status transfer. However, most of the economic value created by the strategic alliance is often appropriated by the large company, with severe threats for the survival of the new venture. To a large extent such a disparity in wealth appropriation is caused by a difference in the learning rate, with the large company being in a position to absorb knowledge at a faster pace. While the organizational competences of an established company are usually embedded within organizational routines, the technology developed by the start-up is embodied in discrete process, and is made accessible through the alliance itself. After learning about the start-up’s technology, the large company has an incentive to under-invest in the relationship, by shifting resources towards alternative activities. Hence, the current literature advises start-ups to put into place protective measures, by performing due diligence on the large firm under consideration, and by carefully crafting the alliance contract (Alvarez and Barney, 2001; Minshall et al., 2008). Above all, start-ups should pursue a diversified technology development strategy, and bring a bundle of potentially valuable technologies to the strategic alliance. As pointed out by Alvarez and Barney (2001: 147), “most technology can be imitated at a lower cost than the initial innovation, and thus is not a source of competitive advantage. Rather, the *inventive capability* – a capability that large firms usually value but cannot develop or imitate – makes it possible for entrepreneurial firms to create value and appropriate wealth through alliances with large firms”.

Defining the governance mechanisms. After conclusion of the partnering process, the first activity of alliance constituents consists in the joint development of a governance structure for regulating the collaborative relationship. The governance structure shapes the overall configuration of the strategic alliance, and is therefore among the foremost decisions of alliance partners (Barringer and Harrison, 2000; Das and Teng, 1996, 2000a; Gulati, 1998; Ireland et al., 2002). Inter-organizational collaboration can lead to a variety of governance structures, usually classified along a market-hierarchy continuum ranging from non-equity to equity arrangements (Lorange and Roos, 1993). On the one side, equity alliances formally lay out the relationships among partners, and provide the vertical integration necessary to enforce control, align incentives, and distribute residuals. On the other side, non-equity alliances en-

tail a loose interaction among partners and result in a flexible framework allowing to control risk, limit commitment, and exit easily (see fig. 1).

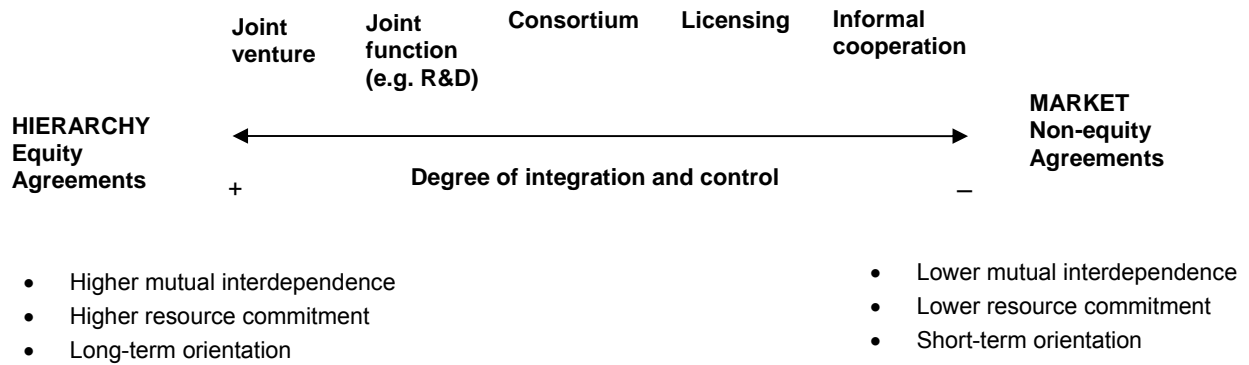


Figure 1. Governance Mechanisms in Strategic Alliances (Adapted from Lorange and Roos, 1992; Das and Teng, 2000a)

A non-equity arrangement is adequate when the alliance partners need to reduce the risk of performance failure, taken a cooperative attitude for granted. Conversely, an equity arrangement is most suitable when the hazard of opportunistic behaviour is particularly severe (Das and Teng, 1996). Besides, Mowery et al. (1996) showed that the tight interactions entailed by equity-based alliances provide more occasions for the transfer of tacit knowledge between partners. Similarly, Anand and Khanna (2000) found that equity alliances are more likely to be observed when partners face greater ambiguity in codifying knowledge, such as in the context of research intensive collaborations. On the contrary, non-equity alliances are likely to be the governance mode of choice when knowledge is easier to articulate.

In summary, the selection of governance mechanisms depends on the scope of the strategic alliance, the risks entailed by the collaborative relationship, and the complexity involved in knowledge transfer (Anand and Khanna, 2000). While these factors determine the initial design of governance structures, the dynamic nature of strategic alliances inevitably leads to adaptations of the governance mechanisms. The alliance partners should be able to flexibly adjust governance structures over time, in accordance with the changing characteristics of the collaborative relationship (Ariño et al., 2008; Ireland et al., 2002)⁶. Therefore, *ex-post* contractual renegotiations are necessary in order to accommodate for unexpected requirements of alliance partners, as well as to correct the inefficiencies generated by

⁶ The dynamic perspective on contractual negotiations represent an original contribution within the strategy literature, which usually favours a static perspective on alliance making.

governance misalignments. In particular, governance misalignments occur when excessive control is enforced for relatively undemanding collaborations, or scarce control is put in place for commitment-intensive alliances. In a recent study of alliance dynamics for new ventures, Ariño et al. (2008) found that start-ups are less likely than established companies to adapt alliances in the face of governance misalignments. According to the authors, the lack of collaboration expertise, financial resources, and administrative capabilities for contractual renegotiation explain start-ups' low responsiveness to governance misalignments. By extension, the above liabilities may result in a limited capability to carry out further changes related to contractual renegotiations, such as redefining the alliance scope, or adjusting the market strategy.

In addition, Ariño et al. (2008) showed that start-ups tend to make transaction-specific investments in strategic alliances, although without incorporating safeguard mechanisms in their contractual agreements. Doing so, the start-up is subject to the risk of alliance lock-in, since transaction-specific assets depend on the continued existence of the collaborative relationship, and cannot be easily put to other uses in case of alliance breakdown. At the same time, the start-up is exposed to the hazard of opportunistic behaviour, since the alliance counterpart may attempt to expropriate some of the investment value by threatening to walk away from the collaborative agreement. The above risks may be particularly heightened in asymmetric partnerships where the large company has an incentive to under-invest in the relationship after having absorbed the start-up's technological knowledge.

Setting the temporal horizon. While defining the governance structure, the alliance partners must concurrently align their perceptions and expectations regarding the time horizon of the strategic alliance (Das and Teng, 2000a). Since the time span of a strategic alliance is often ill-defined (Kogut, 1991), the partner organizations may hold diverse views as regards the duration of their collaborative engagement. In particular, defining the time span of the strategic alliance is of fundamental importance in order to avoid an inherent conflict between a short-term and a long-term orientation (Das and Teng, 1996, 2000a; Joskow, 1985). On the one hand, the short-term perspective represents an exploitation propensity, framing the strategic alliance as a transitional device directed at the attainment of timely results. On the other hand, the long-term perspective reflects an exploration propensity, whereby the strategic alliance is viewed as a semi-permanent entity requiring considerable commitment. Although the diverse perspectives both provide distinctive advantages, it is necessary for corporate partners to agree on a common time horizon, so to prevent alliance disbandment. The short-term orientation provides assurance against failure risk, enabling an incremental approach to collaborative engagement, and avoiding excessive burdens on corporate partners. Conversely, the long-term orientation contributes to align

the partners' incentives, by providing a base for a durable relationship, and discouraging opportunistic behaviour (Das and Teng, 2000a).

To the best of our knowledge, the temporal perspective – although particularly relevant for the ultimate success of a strategic alliance (Joskow, 1985; Das and Teng, 2000a) – has not been explored from the perspective of new ventures. Therefore, the current literature does not address the question of if new ventures approach strategic alliances with an adequate consideration of the temporal perspective. The “liability of newness” typical of new ventures may result in a limited capability to explicitly articulate the duration of the strategic alliance, and to detect possible misalignments with respect to the partner company. Divergent perceptions of the alliance time-span may be particularly severe in asymmetric partnerships, where the large company is often inclined to attach a short-term, exploitative perspective to the collaborative relationship.

5.2. Alliance management

According to a second literature stream, the ‘conscious management’ of ongoing relationships is of crucial relevance, as the appropriate structuring of a strategic alliance does not provide – by itself – a direct way to success (Nicholls-Nixon, 1993; Lane and Lubatkin, 1998; Ireland et al., 2002). In particular, alliance managers should undertake substantial actions with respect to knowledge and risk management.

Knowledge management. The management function is required to reconcile divergent objectives, namely to protect individual partners against unintended spillover of proprietary knowledge, while also ensuring the smooth integration of knowledge related to the strategic alliance. On the one side, alliance managers should devise means to defend non-related knowledge, and to avoid giving away distinctive competences. In this regard, Brouthers et al. (1995) suggest the adoption of an information gatekeeper in order to restrict access to proprietary knowledge, and to keep partners out of the rest of the company's activity. On the other side, the management function should facilitate the integration of relevant knowledge, by providing face-to-face interactions for the transfer of complex insights (Lane and Lubatkin, 1998; Szulanski, 1996). In this regard, Brachos et al. (2007) underscore the relevance of creating a ‘social space’ among inter-organizational actors in order to foster reciprocal trust, and in turn increase individual motivation to share knowledge. Similarly, Tsai and Ghoshal (1998) emphasize the important role of social ties as key enablers of knowledge sharing, which in turn gives way to innovation creation and diffusion. However, the literature recommendations for managing knowledge in the

alliance setting rest on the general level, and fail to take the specific characteristics of new ventures into consideration.

Risk management. As the reviewed literature suggests, the failure rate of strategic alliances – reportedly about 60-70 percent – is related to the inherent risks associated with inter-organizational collaboration. According to Das and Teng (1996), strategic alliances involve two sets of risks: *relational risks* relate to the opportunistic behaviour of corporate partners, while *performance risks* involve the hazard of not achieving the alliance objectives. Based on Anderson et al. (2006), Brothens et al. (1995), and Das and Teng (1996), the following table summarizes the most severe risks related to strategic alliances.

Risk	Risk Description	Risk Classification
<i>Intellectual property risk</i>	The counterpart may use proprietary information in an inappropriate manner, with negative consequences for the company	Relational risk
<i>Misalignment of incentives risk</i>	The counterpart may take actions that would negatively affect the company, such as forging relations with competitors	Relational risk
<i>Partnering lock-in risk</i>	The selection of a specific partner may lock the company into a relation with negative long-term consequences	Relational risk
<i>Coordination risk</i>	The partners may fundamentally misunderstand each other's needs due to complexity with the task or difficulty in coordinating actions	Relational/Performance risk
<i>Innovation risk</i>	The partners may be unable to maintain adequate levels of innovation to support the alliance needs	Performance risk
<i>Outside scope risk</i>	The alliance may result in the creation of products or services outside the scope of the original agreement	Performance risk
<i>Input supply risk</i>	The partner may be unable/unwilling to supply key inputs in a timely manner or in accordance with the quality standards required by the alliance	Performance/Relational risk

Table 2. Relational and Performance Risks in Strategic Alliances

As the above risks present the potential to derail an alliance, managers are advised to regularly perform a risk assessment – both before and after entering a collaborative agreement. An effective risk management can increase the likelihood of alliance success, by drawing managers' attention on mitigating the most critical threats. As a general rule, alliance risks are assessed by estimating the likeli-

hood of occurrence and potential impact, with the use of both qualitative and quantitative techniques. To this end, a variety of risk frameworks are currently available for assisting managers in screening, evaluating, and addressing the various threats related to strategic alliances⁷. Although presenting different outlooks, risk frameworks share the feature of providing a logical and visual representation of the threats faced by a company, in a format understandable to employees at all levels (Anderson et al., 2006). However, given the limited resource endowment of start-ups, start-up entrepreneurs should not overshoot with this respect and not develop a highly bureaucratic risk monitoring system, but rather keep a ‘big picture’ view regarding their main collaboration risk drivers.

5.3. Alliance capability

As companies intensify their alliance activities, executives must shift their attention from the management of individual collaborations to the development of organization-wide alliance capabilities (Harbison and Pekar, 1997; Heimeriks and Reuer, 2006). While recognizing the relevance of learning-by-doing in alliance management, recent research encourages the adoption of formal approaches to capability building (De Man, 2005; Draulans et al., 2003). A large-scale empirical research project by Draulans et al. (2003) showed the inherent limits to learning-by-doing by finding that the success rate of corporate partnering gradually decreases after engagement in about six alliances. A study by Deeds and Hill (1996) on biotech start-ups consistently showed that alliances have a positive impact on new product development, but the relationship exhibits diminishing returns as the number of alliances increases. Thus, taking a disciplined approach to capability building creates a platform for repeatable success, and in turn leads to superior growth via strategic alliances (Harbison and Pekar, 1997). While the contingencies of a strategic alliance cannot be specified in advance, a systematic approach to alliance management enables managers to proactively respond to unforeseen occurrences. Overall, the alliance capability literature indicates that the following techniques present the potential to increase alliance success, by providing the means to incorporate alliance-related knowledge within the organization.

Alliance training. Leading companies recognise strategic alliances as a distinct organizing mode, and accordingly acknowledge the need for specialized training in alliance management (Harbison and Pekar, 1997; Heimeriks and Reuer, 2006; Heimeriks et al., 2009). Draulans et al. (2003) showed that

⁷ Released in 2004 by the Committee of Sponsoring of the Treadway Commission, COSO ERM is currently one of the most used risk framework among MNCs based in the United States (Anderson et al., 2006). Quantitative data is not available as regards the actual adoption of risk frameworks among SMEs.

training courses do foster alliance performance, with companies adopting such a technique outperforming the non-adopters by 10% in their alliance success rate. Taught either by in-company specialists or external consultants, training courses turn out to be particularly useful for organizations lacking previous experience in alliance making. In a recent study, Minshall et al. (2008) found that high-tech start-ups feel able to learn from the others' experience through a combination of multi-company workshops, consultancy support, and web-based access to reading materials.

Alliance evaluation. In combination with alliance training, the evaluation of previous collaborations contributes to develop an alliance capability by providing an occasion to learn from experience, and to cull out lessons of wider applicability (Draulans et al., 2003; Harbison and Pekar, 1997). Draulans et al. (2003) draw a distinction between *individual*, and *crossed* evaluation – the latter requiring the comparison of multiple strategic alliances. Whereas the crossed evaluation is most valuable to experienced companies, inexperienced organizations take advantage of the individual evaluation, particularly if used in combination with alliance metrics. Developing metrics to assess the advantages brought by an alliance is a complex task, yet leading companies are meeting the challenge by turning to the Balanced Scorecard for measuring the strategic value, operational effectiveness, and financial performance of the relationship (Sammer, 2004). However, the extant literature does not provide evidence as regards the adoption of evaluation metrics on the part of high-tech start-ups involved in strategic alliances.

Alliance specialist. In addition to the management techniques mentioned above, the appointment of an alliance specialist significantly increases the success rate of corporate partnering (Draulans et al., 2003; De Man, 2005). Draulans et al. (2003) showed that a superior performance is achieved in case the alliance specialist is positioned within the middle management, since closeness to the practical field permits to exert an authentic impact over collaborative agreements. Besides appointing an alliance specialist, senior managers can mandate a dedicated department to carry responsibility and coordinating the company's alliances. The introduction of dedicated alliance functions contributes to institutionalizing the lessons learned in previous alliances, to standardizing the procedures for alliance making, and to diffusing alliance knowledge within the firm (Brockelman and Cucci, 2000; Heimeriks et al., 2009). Kale et al. (2002) showed that firms that create dedicated alliance functions obtain greater success, measured in terms of long-term alliance performance, and stock market gains following an alliance announcement. The designation of such an alliance specialist, however, is a difficult and risky task for start-ups, as resources (and know-how) are scarce and most efforts must go into product development

and customer relations. Other than using business angels or venture capitalists as part-time alliance specialists or alliance coaches, we have not found any indications in the literature how start-up companies could implement this important function.

Alliance tool set. Finally, many companies make use of alliance tools designed to provide managers with standard procedures, and practical guidelines for dealing with day-to-day alliance issues (De Man, 2005; Heimeriks et al., 2009). In general, alliance tools contain codified knowledge related to different stages of the alliance life-cycle, therefore supporting the alliance manager along with the evolution of the collaborative relationship (Heimeriks et al., 2009). The alliance toolset usually includes process-support guidelines, decision-support protocols, and performance evaluation frameworks (Brockelman and Cucci, 2000; De Man, 2005). Besides, alliance-savvy companies resort to a number of technological applications for disseminating best practices throughout the organization (Harbison and Pekar, 1997; Anand and Khanna, 2000). To date, the most popular channels comprise e-networks, alliance portals accessible through the corporate intranet, and central databases for the storage of codified know-how on alliance management (Brockelman and Cucci, 2000; De Man, 2005).

According to Draulans et al. (2003), it is possible to envision an ideal learning trajectory, whereby executives gather general information via alliance training, and subsequently enter a number of collaborative ventures. At the time when practical experience will have produced a basic alliance capability, the company could bring in an alliance specialist, and develop formal systems for knowledge dissemination, in order to scale up along the learning curve. In general, basic techniques are likely to deliver the greatest advantage to inexperienced companies, while advanced techniques are required for moving to the next stage of alliance capability. This implication is particularly relevant for start-ups, which generally lack prior experience in alliance management. Accordingly, any project designed to develop alliance capability in start-ups should begin with the adoption of basic techniques, while keeping scalability in mind to sustain progress along the learning curve.

6. Discussion and directions for future research

6.1. Critical success factors for start-ups' alliance making

In this section, we summarize the managerial recommendations provided by the current literature, and propose an integrative framework of the key success factors for alliance making in new ventures (Fig. 2). The conceptual framework in Fig. 2 is integrative in the sense that it provides a synoptic overview of the literature advice and concurrently makes an attempt to connect the research streams on en-

entrepreneurship and strategic alliances. The framework serves a twofold purpose: First, it provides start-up executives with reference guidelines for managing strategic alliances effectively. Second, it provides entrepreneurship scholars with a conceptual schema for structuring current – and prospective – research on alliance making.

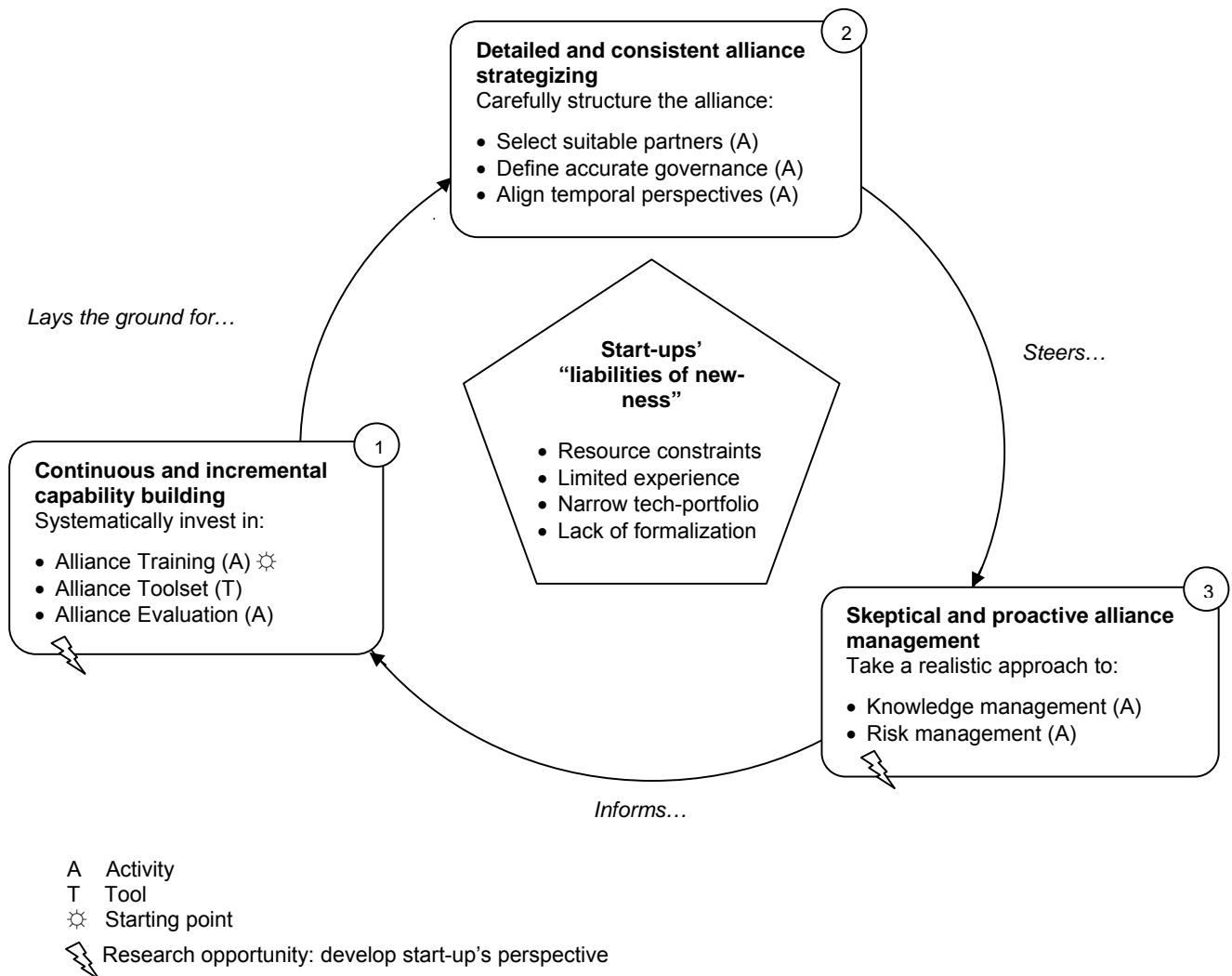


Figure 2. Critical Success Factors for Alliance Making in New Ventures

The cyclical pathway describes the course of action new ventures should follow to succeed in alliance making, while the edged shape represents the resource constraints which act against the realization of such a virtuous circle. As suggested by the starting point in Fig. 2, start-ups' managers should first acquire basic knowledge about strategic alliances, by engaging in a training programme on alliance making. The learning activity will *establish the ground for* the subsequent stage of alliance strat-

egy, by providing practical guidance on selecting partners, defining governance mechanisms, and aligning perspectives. In turn, the accurate structuring of the strategic alliance will *steer* alliance management, which requires to create the conditions for knowledge sharing, and to deal with multiple risks. Eventually, the new venture's managers should undertake an individual assessment of any concluded alliance and derive managerial lessons for the future. Before engaging in further alliances, the new venture should continue investing in capability building, for example by following an advanced training or acquiring a tailored toolset to support the diverse stages of strategic alliances. In this way, the new venture should be able to gradually scale up according to its learning curve, and to accommodate for other developmental necessities. As suggested in the literature review, a new venture should invest in internal capabilities, and expand its technological portfolio in order to profit the most from inter-organizational collaboration. In fact, technological competences interact with external linkages in determining the economic performance of a new venture (Lee et al., 2001), and are of essence to attract valuable partners (Eisenhardt and Schonhooven, 1996), as well as to mitigate risks in asymmetric alliances (Alvarez and Barney, 2001). In addition, technological competences – together with collaborative linkages – influence a new venture's ability to pursue expansion in highly competitive global industries (Leiblein and Reuer, 2006).

Besides investing in internal capabilities, new ventures may take advantage of the support of business incubators as a means to overcome impediments to successful alliance making. A prominent role is emerging for start-up incubators to train their companies in alliance making, and to facilitate the identification of suitable partners (Baum et al., 2000; Europe Innova, 2008). On the one hand, incubators may act as *sources of expertise*, by providing start-ups with the knowledge and resources necessary for building up an alliance capability. In this view, incubators are expected to disseminate knowledge, by providing alliance consultancy, training courses, and evaluation frameworks to large communities of start-ups. On the other hand, incubators may act as *linking devices*, and foster the constitution of successful alliances by means of connecting companies with complementary competences and resources. In the long run, incubators may build up an international forum whereby tenant companies get access to innovation systems located in other countries, thus meeting the challenges of economic globalization.

Nevertheless, the support activity of incubators encounters considerable barriers, since the available research is relatively under-organized, and ultimately fails to provide advice on building strategic alliances in the start-up phase. As recognised by the coordinator of a start-up incubator interviewed by us in the exploratory phase of the literature review, “strategic alliances represent a priority issue for start-ups, yet a practical methodology is lacking to guide tenants in the constitution, management, and evaluation of collaborative relationships” (November 2008). The following section thus highlights the

current gaps in the literature in order to provide a starting point for future research to be carried out in the domain of alliance making in new ventures. We structure the literature gaps into *analysis gaps*, regarding the different levels of theoretical reflection, and *recommendations gaps*, regarding the transformation of research findings into actionable guidelines for start-ups.

6.2. Analysis gaps

Start-up level of analysis. As suggested in the literature overview, the research stream on alliance making in new ventures is still underdeveloped, and lags behind the general literature on inter-organizational collaboration. While providing some insights into new ventures' alliance strategy, the reviewed literature fails to develop a focused outlook on the subsequent stages of alliance management and capability building. This gap in the literature is surprising, since start-ups need to develop expertise in alliance making, and would probably take advantage of such tailored advice. As our literature review made clear, the 'liability of newness' faced by start-ups leaves fewer possibilities for alliance failure, while also implying additional challenges in inter-organizational collaboration. In addition, the broader literature on strategic alliances – focusing primarily on large organizations – has not fully addressed the question of whether alliance making exhibits idiosyncratic patterns across the different stages of organizational development. Therefore, researchers should lay the foundations for systematic research on strategic alliances in the start-up phase, and eventually draw comparisons with the collaborative practices developed by established ventures. Subsequently, they should also begin investigating the *dynamic aspects* of new ventures' strategic alliances, and empirically explore the evolution of the collaborative processes over time.

Geographical level of analysis. The current research has taken a narrow perspective on alliance making in the sense that it focuses on collaborative relationships undertaken in the United States (but see De Man, 2005; Minshall et al., 2008; Lee et al., 2001; Steensma et al., 2000; Van Gils and Zwart, 2004). Consequently, research findings suffer an inherent limitation in external validity, since generalizability to a wider geographic context cannot be taken for granted, not even to the European Union. Altogether, the literature gaps reflect the need to document the specific demands of start-ups based in the European Union or in Asia, as a starting point to formulate tailored advice on alliance management.

Micro level of analysis. The current research on strategic alliances favours a macro perspective of analysis, thus neglecting the communication patterns whereby inter-organizational teams integrate knowledge for their collaborative innovations (Stock, 2006). As a result, corporate partners - particu-

larly start-ups lacking prior experience in inter-organizational collaboration – are left without pragmatic guidance on how to overcome barriers to knowledge transfer. Future research should thus adopt an interactionist or communicative perspective, in order to uncover the behavioural dynamics underlying innovation development in the social space between partner companies. In doing so, it should be possible to open up the black box of knowledge integration, and accordingly derive workable advice on creating a fertile context for innovation. In this regard, the emergent literature on knowledge communication may provide a promising perspective, focusing on improving communication dynamics for facilitating knowledge integration (Eppler, 2007).

6.3. Recommendation gaps

Lacking management recommendations. Although emphasizing the relevance of corporate partnering for enterprise development, the management literature thus far fails to deliver tailored recommendations for alliance making in the start-up phase. In this regard, future research should bridge the literature on enterprise development, strategic alliances and new ventures in order to derive practical advice for catching up the ‘liability of newness’ via strategic alliances. As an example, the current literature has neglected the challenge for start-ups to avoid growing pains by accessing resources in the collaborative network, while concurrently developing formal systems as control mechanisms.

Insufficient recommendations regarding learning and capabilities. A burgeoning literature points to the relevance of building an alliance capability in start-ups, but the recommended techniques fail to take into account the resource constraints, and the expertise liability faced by new ventures. For example, start-ups clearly lack the financial resources necessary to bring in an alliance specialist, and set up a dedicated alliance function. Although providing a source of alliance capability, incubators face considerable constraints due to the lack of a systematic approach for educating tenant companies in the development, management, and termination of strategic alliances. In order to unlock the training potential of incubators, future research should document the learning requirements of new ventures, and accordingly suggest techniques for capability building in large communities of high-tech start-ups. The study by Minshall et al. (2008) provides a valuable basis, focusing on the development of a practical methodology for divulging management lessons about ‘asymmetric partnerships’ between technology start-ups and large companies. In this regard, future research should further expand the work by Minshall et al. (2008), by focusing on the large-scale dissemination of research findings related to a broader range of collaborative relationships.

In synthesis, future research on start-up alliance making should follow three major lines of inquiry: first, to explore inter-organizational collaboration and associated communication patterns in the start-up phase; second, to translate the research findings into actionable guidelines for entrepreneurs and start-up managers; and, third, to uncover viable practices for building up an alliance capability in new ventures. Formulating evidence-based, and yet tailored and pragmatic advice is a key requirement to unlock the innovation potential of start-ups through strategic alliances.

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