

Small and Large Firms Linkages to Enhance Entrepreneurship and Innovation

Framework Paper

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Introduction

It is widely recognized throughout both policy and academic circles that one of the keys to growth in an economy's competitiveness and prosperity lies in the degree of innovation in an economy. Macro efforts to stimulate innovation outputs however have varied in their effectiveness: while higher expenditures on research and development generally result, these have not always been translated into a larger number of commercialized innovations within a specific economy. At a deeper level the micro aspects of business activity suggests that entrepreneurship is also an important element in creating high growth companies and prosperity. Much attention has been directed at small high growth companies, which contribute disproportionately to employment creation and which are consequently touted as engines of economic growth. However, the relationship between entrepreneurship and innovation at the level of the firm is not well understood. Moreover, small firms may be entrepreneurial and even R&D intensive, whereas large firms are big spenders on R&D but are not generally thought of as particularly entrepreneurial. Consequently examining the interplay between small and large firms and the strategies they adopt could increase our understanding of the entrepreneurship-innovation relationship and hence their ability to compete and prosper.

As a first step in this process this paper attempts to lay out a framework for examining the links between large firms and small firms with respect to entrepreneurial behaviour and innovation. This begins with the entrepreneurship definition adopted by ICE and the OECD which does consign entrepreneurial behaviour to only small firms, but allows its existence in large firms. Small firms are often sources of important new ideas but lack the ability to develop them commercially in the way large firms do. It is this potential for mutual benefit that is at the heart of this project: to understand how and why these linkages between small and large firms come about and also to assess whether there is a role for government in facilitating such strategic alliances.

The research questions that this paper seeks to answer include:

How are these mechanisms initiated?

What specific arrangements are most effective for successful strategic alliances?

What are the strategies for innovation that are pursued in small firms and large firms?

How do they differ?

How is entrepreneurship embedded in large firm strategies?

What are the challenges to the start-up and stability of these linkages? How is decision making undertaken in the alliance?

This paper is structured as follows. The initial section lays out the definition of entrepreneurship and strategic alliances and discusses the scope of these concepts. The literature is then used to discuss the theoretical underpinnings of corporate behaviour, the reasons for strategic alliances and the findings from studies on the effectiveness and durability of strategic alliances. Some of the material is confined to an appendix for brevity of presentation. The last part of the paper seeks to use this information to define the type of information sought and the considerations around the resources brought to an

alliance that will need to be borne in mind in undertaking the case studies to pursue. A case study approach is pursued given that information on business strategy is generally unavailable at the level of the firm.

II. Concepts and Scope

Entrepreneurship: There are many definitions of entrepreneurship but this paper follows Ahmed and Hoffman (2007) and defines entrepreneurship as actions by individuals and/or business owners who seek to generate value, through the creation or expansion of economic activity, identifying and exploiting new products, processes or markets.

The definition highlights the essential feature of entrepreneurial activity as creating something new (products, processes or markets) which is suggestive of the role of innovation in entrepreneurship. The focus is on the activity not the organization or the individual. Furthermore by using the word “seeking” both success and failure are included in the notion of entrepreneurial activity.

For the purpose of this project it is important to underline that no reference is made in the definition to business size. Entrepreneurial activity can occur within a firm by an individual who has no stake in the company. Entrepreneurship can potentially exist within all companies and is not the sole preserve of small businesses and the self-employed. The concept of corporate entrepreneurship has thus evolved to describe the ways in which established firms – generally large ones – can be entrepreneurial.

Corporate entrepreneurship (CE): Teng (2007) defines CE as “the process by which firms innovate, form new businesses and transform themselves by changing their business domain or processes”. The aim is to “leverage current competencies and evolve new ones through innovation for the purpose of growth and corporate renewal” O’Connor and Hyland (2008). There is a clear and specific link to innovation as an important component of entrepreneurship. Examples of corporate entrepreneurship include i) corporate venturing where established businesses create and advance new businesses within their firms in order to promote internal growth; ii) intrapreneurship – independent innovation by individuals within the established company – and the notions of championing an innovative idea and iii) fostering a management culture and attitudes that orients the company to being entrepreneurial. The distinct literature on corporate entrepreneurship is viewed through the lens of the large established firm which has resources to invest in different types of entrepreneurial activity (O’Connor and Hyland, 2008). The types of activity covered in this literature are outlined in Figure 1 and extend beyond alliances between small and large firms. In Figure 1 the different strategies are defined and divided according to whether there is direct ownership by the (large) established company and whether the focus of the strategy is internal to the company or external.

Strategic alliances: Linkages is a loose term that has been applied thus far – the subject of strategic alliances however is a recognizable strand in the CE literature. Strategic alliances are inter-firm cooperative arrangements that allow firms to temporarily seek resources from others for their own benefit. The partners' autonomy is preserved and consequently the original entities do not lose significantly their independence in the choice of their objectives and definition of their strategies (Dacin et al, 2007, BarNir and Smith, 2002). This is not the case with mergers and acquisitions, where a single chain of command is formed (e.g. Daimler Benz and Chrysler in 1998). Hence strategic alliances would include joint ventures - where two companies would establish a new company for the purpose of developing an innovation - but exclude mergers and acquisitions.

As can be seen from Figure 1 strategic alliances are a sub-component of CE. From the wide selection of strategies available under CE, those in the south-east quadrant and below the dotted line in the north-east quadrant (i.e. joint ventures) would be of interest for this project on strategic alliances.

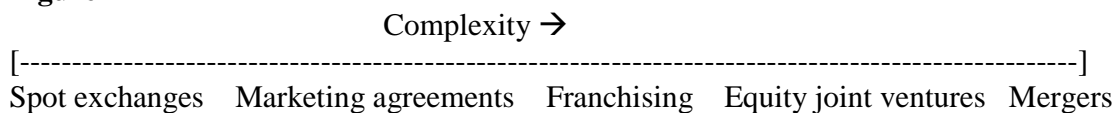
Strategic alliances are links formed between two or more independent companies which choose to carry out a project or specific activity jointly by coordinating the necessary skills and resources rather than: (1) pursuing the project or activity on their own, taking all the risks and confronting the competition alone, and (2) merging their operations or acquiring and divesting entire business units (Hagedoorn, 1993).

	Inside Company	External to company
Ownership Investment	<p>Internal venturing (Spin-in): new ventures formed to incubate inside the company, projects that do not fit current business models or structures of the firm. Spin-ins are such ventures that are moved to an existing company division after incubation</p> <p>New business creation: A group formed inside a corporate R&D function or a division. The investment could be spun-in; spun-out; a separate business unit or licensed technology</p>	<p>Corporate venture capital: investment of corporate funds directly in external start-up companies (direct equity or limited partnership)</p> <p>Internal venturing (Spin-out): new ventures formed to incubate inside the company, projects that do not fit current business models or structures of the firm. Spin-outs stand alone businesses that are set up after incubation</p> <p>-----</p> <p>Open innovation: Joint ventures to form a new legal entity</p>
Non-equity Investments	<p>Intrapreneurship: independent entrepreneurial behaviour by individuals within an established company</p> <p>Institutional CE: innovation viewed as a critical organizational competence</p>	<p>External corporate incubators: incubators set up outside company</p> <p>Open innovation: use and distribution of external and internal ideas as well as external and internal paths to market. Includes in-licensing; strategic partnerships; competency based acquisitions; new organizational intermediaries</p>

Specific cooperative agreements under a strategic alliance are bounded by two extremes: spot transactions undertaken by two firms, and their complete merger. In between lie a plethora of cooperative agreements that are characterized by a different degree of inter-organizational dependence. Examples include start-up assistance agreements, licensing agreements, franchising, know-how licensing, buyer-supplier relationships, outsourcing agreements, joint marketing agreements, non-equity cooperation in research, development or production equity joint ventures.

There is a vast richness of specific arrangements: both the legal form of the agreement and the strategic impact on the operations of each partner can vary and an infinite number of inter-organizational arrangements can be derived from the complex formal contracting and informal linkages (Figure 2). In general, as one moves to the right there is an associated increase in contractual requirements as firms become more and more integrated. However, this is a gross oversimplification that cannot do justice to the richness characterizing the reality of those inter-firm multi-dimensional arrangements.

Figure 2



Alliances can be between partners that competing firms or not. Alliances between competitors include shared-supply alliances, quasi-concentration alliances, and complementary alliances. Partnerships between non-competing firms can be categorized as international expansion JV, vertical partnerships, and cross-industry agreementsⁱ.

The wide spectrum of inter-firm collaboration can range from R&D collaboration to cooperation in the commercialization aspects of market activities. These efforts are coordinated via a large and varied set of agreements, both formal and informalⁱⁱ.

Large firms seem better placed to “go it alone” compared to small firms (Baum et al, 2000). They have more options at their disposal which in turn allows them to better compete in global markets. For example, large firms can choose to develop technology in-house, to acquire new technology across markets via licensing, or to collaborate in research ventures with universities, government research facilities, or with other firms. What they lack generally is flexibility in responding to market signals and the innovative intensity that characterize small firms. Hence, there is tremendous scope for collaboration between the large firms and small and medium-sized firms that will allow mutual help in surpassing internal and external constraints.

The essential point here is that despite the wide range of specific activities strategic alliances are one means for firms to address their gaps in resources as the pursue CE

goals. The next task is to examine the theoretical foundations of this and the results from the literature on strategic alliances.

III. Literature Review

The review of the literature will consider not just the theoretical models of firm behaviour and how they explain strategic alliances but also specific reasons to join such alliances. Much of these reasons relate to what assets small and large firms can bring to such a cooperative agreement and the differences between say a small high growth firm and a large established firm. Strategic alliances may therefore take advantage of synergies in the differences of the two types of organizations. However a further consideration is the degree to which strategic alliances are stable in the longer term and this is also addressed in the literature.

a) Theoretical Underpinnings of Corporate Behaviour

The number of theories of the firm is quite large and many are consistent with the establishment of strategic alliances. A broad selection of these theories is briefly outlined in Appendix A. Reuer (2004) and Faulkner and de Rond (2000) are good sources. From the literature however it is evident that the resource-based theory is the most prominent along with the theory of transactions costs (Das and Teng, 2000, Chen and Chen, 2003, Yasuda, 2005). Briefly, the resource-based theory allows for firms to maintain positive rents from its assets - unlike the theory perfect competition where competition always drive the rents to zero. A firm can sustain a competitive advantage by configuring its tangible and intangible assets in such a way that is difficult to imitate, or by acquiring resources, skills and capabilities that are durable yet not perfectly transferable or replicable. Where it cannot access all the resources it seeks, it can engage in a strategic alliance.

This theory can be couched in terms of transactions costs if the sustainable competitive advantage is thought of as a specific asset. Transactions costs are the costs of establishing and maintaining property rights over resources (e.g. monitoring transactions, negotiations, etc). Transactions cost theory looks at the choice between internalizing a certain economic activity and contracting for it over markets. Williamson, as one of the founders of this theory, emphasized asset specificity and the recurrent nature of transactions as key factors affecting the choices concerning governance. As a result, cooperative behaviour would result in cost reductions through the choice of appropriate organizational structures (Chen and Chen, 2003, Yasuda 2005).

In essence the strategic alliance can therefore be viewed as reflecting what the small firm brings to the agreement, what the large firms brings to the agreement along with the potential to reduce transactions costs. The types of assets can typically be financial, technological, human resources or managerial capacity. The nature of these resources

and their particular characteristics that make them able to command rents is explored further in the paper, but the development of strategic alliances can be viewed in reference to the resource based theory of the firm. Hence one needs to consider what the literature indicates on the general reasons for the existence of strategic alliances and then to discuss particular differences between a small firm interested in growing and a large firm interested in being more innovative and entrepreneurial. This will provide a picture of what each partner brings to the table. Results from the literature on the challenges and benefits from strategic alliances between small and large firms then complete this literature review.

b) The rationale for the existence of strategic alliances

The literature highlights a plethora of reasons as to why strategic alliances are attractive for firms generally. The following summary is, like any categorization, somewhat ad-hoc and does contain a certain overlap between categories. The following reasons are at various times found to be significant factors in the development of strategic alliances among firms of all sizes. Table 2 therefore offers a synthesis of the major reasons for alliances. Some of these reasons are more prominent given the discussion at hand.

Table 2: Broad reasons to join strategic alliances

1. Risk reduction	Lower asset exposure for SMEs
	Accelerate access to markets
	Lower total capital investment
	Reduce fixed cost
	Diversify portfolio
2. Economies of specialization, scale and scope	Reduce environment uncertainty
	Use complementary of competencies
	Reduce innovation costs
	Lower average cost via larger volume
	Facilitate product development
	Economize on transport costs
	Gain configuration flexibility
	Capitalize on location externalities
3. Complementary technologies	Capitalize on technological synergy
4. Co-opting or blocking competition	Block competition via a defensive SA
	Increase costs of rival via an offensive SA
	Improve strategic position
	Deter market entry or exit
5. Overcome a government-mandated barrier	Move competition at the alliance level
	Operate as a “local” entity because of local partner
	Satisfy local ownership requirement
6. Vertical quasi-integration	Conform to legal/regulatory requirements
	Gain access to materials, technology, labour, capital

	Gain access to distribution channels
	Gain access to information about markets
	Draw on existing marketing establishments
	Reduce TCs by using an appropriate governance mechanism
7. Learning	Learning via interaction

c) Different resources of small, growing firms versus larger, established corporations

Disruptive innovations increasingly originate in the private sector's emerging growth firmsⁱⁱⁱ (Das & Teng, 2000). In contrast, relatively large firms find it difficult to replicate the environment for spawning such rapid innovation. Both types of companies could therefore benefit from a strategic alliance while speeding the process of experimenting with the firm's own R&D ideas (Tatum 2007).

It is instructive to compare the environments in which small growing firms and large established firms operate. Areas of difference that are identified include 1) the nature of innovation; 2) the approach to the market, 3) the management culture, 4) the business model, and 5) capital deployment (Tatum 2007). These different dimensions suggest tremendous opportunities for synergy and what each partner can bring to the alliance, but they also highlight some sources of tension.¹

Small firms have been the primary source of innovation at the root of the industrial economies' tremendous growth (Baumol, 2002, Audretsch and Aldridge, 2008). This is not to say that large firms have little contribution to or undertake ineffective innovation activities. In fact the bulk of R&D expenditure originates with the large firms. The main contention is that the two types of firms take on different roles in the process, with the specialization yielding spectacular results. The small firms are usually more technologically inventive than the large firms. As a result they manage to attract the most competent scientists and engineers. On the other hand, large firms are associated more with incremental innovation (Baumol, 2006, Audretsch & Feldman, 2003, O'Connor & Hyland, 2008, p. 22).

While regular firms prepare carefully for a product launch, small growing firms necessarily improvise as they go, discovering the right product and the target customer on

¹ Growth firms are not new companies: roughly half of them are in business for more than a decade before suddenly experiencing rapid growth (Acs et al, 2008). A small share of growth firms accounts for the bulk of the net job growth in an economy (Halabisky et al, 2006). Equally important, growth firms offer a large contribution to the overall innovation in the economy. They shake up markets and exert pressure on larger firms to innovate. To this extent, growth firms are qualitatively different than regular small firms.

the fly. In the early stages of the innovation process smaller entrepreneurial firms necessarily have to stay close to the customer base, which precludes a distribution channel such as the large established firms would employ.

In terms of management culture, established firms reward managers according to revenue and earnings, while small entrepreneurial firms reward management on the basis of the potential impact of innovative products or processes. Since profitability in the latter case cannot yet be observed the appraisal is done by professional private equity investors and the focus is on the value added via innovation^{iv}. Consequently the management skills required are quite different in an environment of product development in an ever-changing, fast-growth environment compare to that of overseeing of scaling-up production at large established firms.

The business models of small entrepreneurial firms are different from the large established firms as well. Large firms invest in new knowledge with the goal of using it in the context of the current business model by taking advantage of the current operating scale and the associated efficiencies. The constraint represented by the existing business model rarely allows for a disruptive market effect of the new knowledge. Whereas small entrepreneurial firms are in the process of continually refining the business plan and this inherent flexibility is a key aspect of the innovative potential.²

Capital deployment also operates differently in the two cases. Established firms have pre-established deployment cycles of with semi-annual or annual frequency which entails elaborate planning. Small entrepreneurial firms, in turn, usually require a fast infusion of cash at the right moment, judged as appropriate by external private equity firms. Such flexibility is unlikely to be palatable to most established firms, and maybe the price paid is less radical innovation. Taking on high risk is not what large firms with a robust business model, established products and efficient distribution channels necessarily want to engage in.

Table 4 summarizes this discussion on the contributions small and large firms bring to the table as partners alliances. The resources put together by the two sides of an alliance are intended to be complementary, which is the source of the value creation of a partnership.

² At the same time, the more informal and flexible from an environment benefits innovation in small firms, allowing for better communication which in turn facilitates innovation. Large firms have become large by developing sales, manufacturing, and other organizational resources in a routinized fashion. All the highly efficient channels represent capabilities that make such firms highly sought after partners in an alliance with small firms.

d) The resources of each partner

Table 4: What each side brings to the table

Resource-based theory		
Small firm		Large firm
Technological inventiveness	Transaction costs theory	Large R&D budgets
Human Resources Specialized skills		Financial resources (non R&D)
Organizational Flexibility Closeness to client base Specialized knowledge of markets (niches)		Human resources Diversity of skills
Managerial culture focusing on the disruptive effect of knowledge		Organizational resources: marketing manufacturing distribution channels access to export markets intellectual property protection expertise
		Management capacity
		Managerial culture focusing on efficiency
Resource-based theory		

CE is about identifying new ways of doing business, developing new technologies, products, and processes, entering new markets, and, most importantly, devising new organizational forms. In today's competitive environment firms have to be able to innovate along all these dimensions using proactive strategies.

Strategic alliances can greatly enhance the outcomes of CE. Interfirm cooperative arrangements like joint R&D or marketing agreements, joint-ventures, or minority stake alliances, provide the vehicles needed to materialize and experiment with new combinations of resources required to bring to the market new products and processes.

The resource-based view of the firm emphasizes the presence of internal sources of perennial comparative advantage in firms. As such, this view clearly validates the use of strategic alliances in facilitating access to resources in the context offered by CE.

A key feature of entrepreneurship is the aggressive pursuit of growth opportunities. This effort attempts to overcome the inherent limitation represented by the current resources available to growth-oriented firms. The three major components of CE, innovation, strategic renewal, and corporate venturing, represent as many avenues to encounter new business opportunities while expanding. However, CE activities have significant resource implications, resulting almost always in the creation of resource gaps: the firm's resource base needs to be augmented in order to take full advantage of new opportunities.

A resource gap represents the type and quantity of needed resources and may refer to financial, technological, human, and organizational resources. In entrepreneurial firms this gap cannot usually be met by a simple reallocation of resources. Instead, filling resources gaps are tackled via market transactions, acquisitions, and strategic alliances. Tangible resources (e.g. physical, capital, financial) can be pursued via product, service, labour, and capital markets. Technological, knowledge, and organizational resources can be acquired via contract-based market transaction (e.g. licensing, consulting, etc.). Acquisition of another firm that has the needed resources is another way of bridging the resource gaps but the fact remains that most acquisitions fail to deliver the synergy sought through integration. Lastly, forging strategic alliances brings flexibility, cost and risk sharing among partners, and the much needed resources to meet resource gaps. Eisenhardt and Schoonhoven (1996) show empirically that more innovative firms tend to be associated to participation in alliances.

From the perspective of the resource-based theory, there are certain conditions or characteristics that resources need to have in order to enhance the firms' value-creation potential. The resources need to be valuable, rare, imperfectly imitable, and imperfectly substitutable. More generally, the resources need to be heterogeneous and imperfectly mobile, and be able to impose ex ante and ex post limits to competition.

Each firm is idiosyncratic in terms of its mix of resources accumulated over time. It is this resource heterogeneity that fuels the search for alliances. However, the firm has to carefully amass superior, scarce resources in order to fare well in the alliance process and to preserve its competitive advantage over time. The larger the resource heterogeneity of partners, the larger the gains flowing from an alliance. At the same time, firms fearing opportunistic behaviour from potential partners may choose partners with a similar resource makeup, in order to better protect its resources. In this case, the benefits of an alliance are drastically reduced. In contrast, firms that are aggressive and willing to take risk will prefer a high degree of complementarity in their partners' resources, reaping bigger rewards from alliances.

Imperfect mobility is a desirable feature of resources for firms entering strategic alliances because it insures that valuable resources cannot be easily bid away from the company. This leads to stabler alliances and sustainable comparative advantage for the firm.

Imperfect mobility is obtained by focusing on relation-specific assets (e.g. site specificity, physical specificity, human asset specificity). Specific assets lead to lower coordination costs, effective cooperation, and significant trust between partners. However, asset specificity presents a high potential risk of opportunism since specific resources cannot be easily traded without significant loss of value. Firms fearing such risks may choose not to enter alliances or to use less specific assets, foregoing substantial benefits coming out of alliances.

Ex post limits to competition refer to the use of resources that are imperfectly imitable and substitutable. These characteristics would reduce the competition for these resources and place the firms owning them in positions difficult (costly) to replicate. Acquiring such resources is usually done through a first-mover strategy. Examples of such strategy are developing new technologies or products/services, initiate price reduction, use patent protection, target niches with limited demand, or target strong reputational courses of action. These pioneering efforts will yield benefits by helping carrying out CE activities that are difficult to imitate and substitute.

Ex ante limits to competition insures that the costs of acquiring valuable resources is not too high so that they outweigh the future benefits. This feat is achieved via foresight and insight, with firms striving to acquire resources before their value become obvious to competitors. This insight comes from tacit knowledge which is able to cut through complexity and specificity to uncover valuable resources ahead of competition. Tacit knowledge is more relevant to knowledge-based resources (such as managerial, organizational, and certain technological), as opposed to property-based resources (physical, financial, patents). Strategic alliances may facilitate CE activities if they focus on obtaining tacit knowledge about certain resources. These alliances foster learning and are great vehicles for sharing and developing tacit knowledge. Certainly, the danger of a partner failing to be part of the learning process or even losing distinctive competence as a result of improper knowledge transfer is always present. A successful alliance will build mechanisms that insure smooth knowledge management.

e) The challenges faced by strategic alliances

Strategic alliances face significant management and operational challenges since they are based on top of a number of fault lines. These include: firm vs. group interest, short vs. long-term orientations, rigidity vs. flexibility in structure, differing firm goals and competitive environment, power differentials and asymmetric interdependence.

Alliances are seen as temporary commitments to be disposed of if the conditions that favour cooperation change. The calculus of cooperation vs. competition is different for each member of the alliance. The analysis is complex, with a multitude of factors playing a role, from factors internal to the firms, to intra-alliance factors, to those affecting inter-alliance competition, and finally to those factors present in the environment in which alliances compete. Non-cooperation has serious implications for SMEs since they are more likely to rely on outside resources to bring products and services to the market.

SMEs need alliances the most but are also the most vulnerable since they often lack other lines of business to fall back on if their alliances fail.

The existence of multiple decision centres will lead to constant bargaining and class of interests, which may lead to paralysis or dissolution of the alliance. In other word, the alliance mitigates some risks but creates a new set of risks. However, viable alliances have developed means to address challenges raised by incomplete contracts. While the firms remain independent, contributions are made continually by partners, which have limited control and share risks and benefits.

A particularly important challenge faced by firms contemplating setting up a strategic alliance is choosing a partner (Dacin et al, 1997, Das 2005, Das and Teng, 1998 and 2000, Miles et al, 1999). Since strategic alliances' performance depends crucially on how well the particular characteristics of the partner firms fit together, it is essential for firm pondering a potential the decision to enter an alliance to perform a thorough partner analysis. This requires a joint assessment comprising both the market and the resources offered by the potential partner. A thorough evaluation would reveal important dimension of the would-be alliance, such as collective strengths and interdependencies (i.e. resource alignment), and help identify a good overall match with a partner.

f) What small and large firms get out of a strategic alliance?

Finally, then what does the literature tell us about the positive aspects for small and large firms from a strategic alliance? A study of 128 alliances between large and entrepreneurial firms in three US industries by Alvarez and Barney (2001) reveals interesting albeit not totally surprising findings. The small (or entrepreneurial) firm is defined as a firm with fewer than 150 employees that had been in existence for less than 5 years. In this sample the entrepreneurial firms had sales averaging \$25 million while their large firm partners averaged \$1 billion in sales. Large firms that are part of alliances with small firms gain access to new technologies and to state of the art engineering talent, together with excellent innovative capacity. Strategic alliances can offer legitimacy to small firms, together with access to distributional, marketing, and manufacturing resources needed to commercialize its new technology. In addition, strategic alliances may constitute a vehicle to the financial capacity needed to bring a technology to market.

Alvarez and Barney's main finding refers to the extent to which the two sides of an alliance benefit from it. While the potential gains from alliance are mutual, in some instances the small firms can suffer from it, and even endanger the survival of the firm. The key aspect of the success of the alliance seems to be the speed at which the large firm has gained access to the new technology representing the main asset brought in by the small firm. When this technology is the only resources contributed to the alliance by the small firm, most of the value created by the alliance is appropriated by the large firm.

The large firm need to study the products and processes associated with the new technology proposed by the small firm in order to successfully commercialize it (e.g.

manufacture, market, and distribute it). This learning process is mostly one-sided, since it is difficult for the small firm to imitate the large firm's organizational capabilities. The associated routines were usually developed over long periods of time during the growth process of the large firm. It is this asymmetry that leads to the imbalance in the benefits drawn from the alliance by the two parties. This mechanism is consistent with the resource-based view of the firm.

Once the large firm learns about the partner's technology, it could elect to withdraw from, under-invest in, or shift resources away from the alliance, which would hurt the small firm. This danger constitutes the basis to the risks associated with joining an alliance by the small firm and may convince many a small firms to "go it alone", which would prevent the benefits flowing from alliances to materialize (market failure occurs).

One solution to this issue from the point of view of a small firm that joins an alliance is to control somehow the rate at which the large firm learns about the technology. While this comes at a cost, delaying commercialization and diminishing the small firm's cash flow early on, it significantly improves the chances of keeping the alliance afloat. To alleviate those delays, the small firm can use elaborate (yet costly) contracts to put milestones in place and define specific terms and goals. Building their relationship on trust throughout is essential for both parties. However, the ideal strategy by the small firm, if feasible, is to bring a diversified set of resources to the table, either in terms of several available technologies or strong ability to produce a stream of new technologies. This would put the small firms on a more equal footing with the large firm, yielding the right incentives for the latter to continue to contribute to the alliance. This strategy comes at a cost as well, since the small firm has to make large early investments in R&D capabilities. The strategy is also consistent with the resource-based view of the firm.

Large firms also need to understand the dangers flowing from building an alliance with an entrepreneurial firm relying on a sole new technology as its contribution. Unless it enters the alliance attempting to expropriate the small firm, the large firm has to insure that its partner has or at least is capable of generating several technologies. In addition, it is beneficial for the alliance if the small firm has adequate management skills to learn from the large firm how to emulate organizational capabilities, and more generally, the skills needed to make an alliance successful. Another aspect that needs to be clarified early on is the preference by the small form to remain independent or not, and whether it intends to grow rapidly or not.

Smith et al (1991) look at inter-firm collaborative networks between a large variety of firms, including small and large firms, using a case study approach. The focus is on the contribution of individuals that are part of small or large firms and the often informal networks they are part of. These individuals are the entrepreneurs in the small firms, and the "intrapreneurs" in the large ones. Superimposed on these networks are those of the decision makers at the top level of each firm. The complexity of these networks makes it hard both to predict as well as to materialize the gains from collaboration.

Smith et al investigated 27 cases of collaborative partnerships of firms in three sectors: biotechnology, electro-mechanical engineering, and electronics. The small firms in the sample employed less than 120 people. Almost all firms were operating within specialized niches in their sector. Findings include the apparent ability of small firms to effectively compete with large ones through their collaboration with larger partners. Their natural technological edge, coupled with access to resources offered through partnership, allows for a competition between networks of firms, rather than between firms.

Other findings include differences in the scope of collaboration across industries. For example, large firms in electronics emphasize the use of an alliance with a small firm in order to invest in a key technology, to use specific expertise helping an in-house project, and to facilitate access to new markets, large firms in biotechnology look for developing a major new product and to secure expertise that would help maintain market share. Small firms across industries try to develop new technology by augmenting access to resources, to increase their sales to partners and extend client base, to access outside expertise, and to develop new products via building prototypes.

Smith et al emphasize the fact that the transfer of technology between firms is a two-way process. Collaboration involves extending the firm's linkages into the partner's network, across individuals, firms, and sectors. Forging those alliances required in every case the discovery of new strategies needed to operate in the cooperative environment, accommodating organizational idiosyncrasies in order to take advantage of opportunities offered by collaboration. The newness of this sort of activity makes the ability to learn important for all actors involved. The study shows clearly the importance of informal networks among the scientific and engineering elite is a key factor in the establishment of collaborative links. The pre-existing networks were later formalized at the firm level, and personal contacts were used preponderantly to target potential partners.

IV. Framework for Analysis

Need for a case study approach given the aim is to seek out information on business strategies. Some information at a macro level is available in Innovation Surveys (see table at the end of Appendix A) but the project seeks to study firms' specific elements of strategic alliances. This kind of information is only really to be gleaned from a case study approach.

Case study approach

In the case study exercise we will discuss with the parent organizations. However, we need to think of the level of analysis we are most interested in: individual manager (of the JV or parent firms, parent firm level, dyadic relationship between them, JV embedded in industry structure, or multilevel).

1. Standard dimensions defining the nature of alliances

Characteristics of the company (industry, main products/services, sales, number of workers, export activity, perception of the market it operates in – competition level, etc.)

Participation in strategic alliances (last ten years, last five, exclusive with foreign/domestic companies, how many still active)

Objectives for participation in alliances: pick several reasons from a list, and rank their relative importance.

Types of strategic alliances the company has been involved with: pick from a list, allow for "other". (examples: JV, research consortia, production or marketing partnership, etc.)

Types of partners used: competitors, suppliers, clients, distributors, etc. Who are the most suitable partners? What are the criteria used to select partners?

Performance of alliance (process): life span, barriers to formation, risks, difficulties, stages, lessons learned, cooperation/competition balance, etc), decision making (has a formal assessment of the desirability of joining an alliance been done – e.g. cost-benefit analysis).

Impact of past and current alliances (including ranking): build firm's knowledge base, etc. It is OK to have some overlap with the question on objectives (benefits) above, because here we assess the perceived benefits already cashed in. Further analyzing impact: percentage of alliances that never materialized (why), percentage of alliances that were deemed successful (why), percentage of alliances that were deemed failure (why). Maybe offer a list of reasons/factors of success/failure and ask for ranking.

Looking forward: will the role of strategic alliances will increase/decrease/stay the same? Why?

Strategy of enhancing global capabilities: use or thinking of using: strategic alliances, acquisition/mergers, FDI, etc.

What is the current business environment?

Role of government (is there any need for policy in this area, what exactly, maybe offer a list of policy directions). I find the description of the policy areas in the determinants of entrepreneurship in the 207 OECD framework paper very useful here.

2. Specific questions targeting small-large relationships, as opposed to general alliances

Who initiates the talks on building a SA?

What defines a good match between a small and large firm?

Are small firm – large firm alliances inherently more unstable than large-large or small-small alliances? Why?

What kind of role do contracts play in supporting a SA? Are there significant problems with enforcing such contracts?

How important is the learning associated with being a member in a SA?

3. Characteristics of Resources

What are the strategic resources of the partners?

Why are these resources “strategic”? What are their characteristics?

Are these resources substitutable or imitable?

Are there resources tied to a physical location?

How are the knowledge assets dealt with? Is there a danger that knowledge in small firms will be expropriated by the large firm? What measures protect against this?

What factors influence the stability of the SA?

What are the levels of management experience in the partners?

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Appendix A

Theories framing cooperative behaviour can be divided in three broad areas: economic, organizational, and cooperative behaviour ones. A short description of each is offered below.

I. Economic theories

1. Strategic management theory (market power)
2. Transaction cost theory
3. Resource-based theory
4. Agency theory
5. Game theory
6. Real option theory

1. Strategic management theory (market power)

It originates with the publication of *Competitive Strategy* (1980) by Michael Porter. Paradoxically, competitive intensity is addressed with “positioning” and cooperative behaviour. The latter is a better instrument to achieve greater market power than, say mergers or acquisitions, and leads to better profitability. A host of other researchers then moved away from Porter’s atomistic view of the firm and toward the “keiretsu” approach to developing market power (“island of planned coordination in a sea of market relations”).

2. Transaction cost theory

The gist of TC theory: cooperative behaviour leads to cost reductions via different methods of organizing transactions. TCs are the costs of establishing and maintaining property rights over resources (e.g. monitoring transactions, negotiations, etc). TC theory looks at the choice between internalizing a certain economic activity and performing it over markets. Oliver Williamson advocated TC theory in the 1970s but the fundamental concepts were developed by Ronald Coase (1937, 1960). Williamson emphasized asset specificity and the recurrent nature of transactions as key factors affecting the choices concerning governance. The structures defining governance choices (e.g. joint ventures) are deemed as intermediaries between markets and hierarchies. While fundamentally sound and intellectually appealing, TC theory was criticized because it ignored factors important to the business decision maker, such as risk, synergy, and effectiveness, and because it adopts a static approach to cooperation.

3. Resource-based theory

Unlike the perfect competition story, this theory holds that competition cannot always drive the rents to zero. Instead, a firm can sustain a competitive advantage by configuring its tangible and intangible assets in a way that is difficult to imitate, or by acquiring resources, skills and capabilities durable yet not perfectly transferable or replicable. This

theory can be couched in TC terms, with the sustainable competitive advantage thought of as a specific asset.

4. Agency theory

This theory focuses on the ability of principals (shareholders) to ensure the agents (management) are fulfilling the objectives of the principals. Agency theory looks at mechanisms constraining the agents' self-serving behaviour, such as contracts and other incentives, with the goal of mitigating the asymmetry of information between principals and agents. Agency theory implies that both the principal and agent can be viewed as partners to a cooperating venture that need to clarify the split of returns from effective cooperation and need to put in place systems to share information and reduce opportunism.

5. Game theory

This theory looks at predictions of outcomes from games which involve several players whose interests are interconnected. It can be applied to a large variety of situations, such as sport, financial, and military affairs. It has started by focusing on non-cooperative games but quickly demonstrated that cooperation can emerge in a world of self interested players without a central authority, more likely in the case of repeated interaction. Short term non-cooperative dominant strategies yield to cooperative ones in repeated games with indeterminate end. Game theory makes valuable contributions to the analysis of cooperative strategies by revealing under what conditions cooperation is rewarding or undermined.

6. Real option theory

Standard finance theory states that no resource commitments should be made unless absolutely necessary, since the future will be different from that expected. Keeping one's option open seems like a sensible strategy. In addition, investment in a portfolio of options helps diversify risk. For example, "compound options" offer, if exercised, access to further options, which in turn render more options. "Learning options" are those where the holders makes small investments to learn about new opportunities (e.g. specific technologies). Cooperation then serves to generate a portfolio of low-risk options which in turn open up further options down the road.

II. Organization theory

1. Resource dependence theory
2. Organizational learning
3. Social network theory
4. Ecosystem view
5. Structurationist perspective

1. Resource dependence theory

Firms are not internally self-sufficient and therefore require resources from the environment. To this degree, they are dependent on the environment in which they transact. Consequently, cooperation may ensue in order to provide firms with access to financial resources, expertise, skills, processes, or markets. Further, firms try to reduce uncertainty in their environment by cooperating with prominent parts of it, yet this attempt in itself will represent a source of additional risk (e.g. the danger of opportunism from the partner). Resource dependence theory is consistent with the resource-based theory. The latter recognizes that firms' performance depends to some degree on unique capabilities (core competencies) and sustained competitive advantage, and these can be leveraged within a cooperative setting in which are traded for access to capabilities held by other firms (e.g. knowledge, technologies, etc.). It is useful to note that there is a trade-off at play here: the firm accepts some loss of autonomy while entering cooperative enterprises, but gains in terms of improving its competitive edge.

2. Organizational learning

This learning refers to the ability of firms/organizations to acquire and disseminate new knowledge that can enhance their future performance. Of course, there is always the danger that certain organizational structures, or cultures, or vested interest will pose barriers to learning. There are several types of learning: routine learning (incremental), reframing learning (more fundamental reassessment), and secondary learning (development of learning mindsets/habits). An alternative classification (more intuitive) is technical, systemic, and strategic. A different breakdown of learning can refer to the collaborative type (transfer of knowledge and skills from the partner firm), and learning about the complex management of cooperative ventures.

3. Social network theory

The definition of a network is somewhat ambiguous, pretty much as that of a supply chain. Networks are pictured as a hybrid form situated on the spectrum between markets and hierarchies. Social networks are defined as persistent and structured sets of autonomous players who operate on the basis of implicit and open-ended contracts. Such contracts are socially rather than legally binding. The actions of actors that are part of the network are explained in the context of their position in the network seen in dynamic terms. This theory emphasizes social links by examining their formation, evolution, performance, and performance consequences.

4. Ecosystem view

Related to social networks, the ecosystem perspective views organizations/firms as members of a community of suppliers, producers, competitors, and other stakeholders that seek mutual support and jointly progress toward a shared vision. The incentive to cooperate is embedded in the perceived value of generating economies of scale and

scope, and a reinvestment of return in this ecosystem to facilitate the arrival of future generations of products and services. The collapse of traditional industries gives rise to ecosystems with loosely defined boundaries. A firm's profitability, in turn, would depend on its ability to manage relationships in this ecosystem, to position itself inside it, and to contribute to the competition with similar constellations. Key idea here, somewhat similar to the keiretsu: competition takes place not among firms, but among constellations of organization. Within its own constellation, the firm is busy creating a reputation for creditworthiness, reliability, predictability, and designing know-how. In a nutshell, the constellation creates the setting for successful collective action, taking cooperation to a different level. Not unlike market power theory, the ecosystem view implies that competitive rivalry is enhanced, rather than being inhibited. Like-minded groups of firms have better chance at catching up to industry leaders, narrow competitive gaps, and bring about less differentiation among competing firms.

5. Structurationist perspective

A relative newcomer, this view originates in a sociological approach to the study of alliances and points to the impossibility of meaningfully describing structure in the absence of considering strategic choice. Action emerges out of social structure and at the same time reproduces or transforms these structures.

III. Cooperative behaviour

1. Culture
2. Trust
3. Commitment

1. Culture

Organization culture and leadership, together with the role of national culture in the workplace are the main topics here. Since international strategic cooperation is more and more prevalent nowadays, both aspects need to be taken into account in order to set realistic expectations and putting in place appropriate operating rules governing communication and performance measurement. National culture appears to reside mostly in values, while corporate culture is lodged primarily in practices. Homogeneity is a measure of strength, while heterogeneity is a potential source of weakness. However, companies originating in different cultures have a lot to gain by learning from each other, providing that they appreciate their differences and do not need to spend a lot of resources trying to understand each other.

2. Trust

Trust and goodwill have been found to be vital in alliances of all kind by enhancing communication, stabilizing the relationship, and help avoid conflict by increasing partners' tolerance for each other. While trust facilitates cooperation, it is not a necessary

condition. However, trust is a social norm that lessens the need to use hierarchy to attenuate opportunism. As such, trust lowers transaction costs and increases investment returns, while enhancing the innovation and learning.

3. Commitment

Commitment is different than trust: one can be committed to a partner it depends on, but not trusting him; one can trust completely a partner but at the same time be committed only to a limited degree, preserving viable alternative courses of action. Commitment can be signalled in several ways: making large capital investment, sticking with the deal even when the going gets tough, disclosing proprietary information, etc.

**Percentage of plants that co-operated on innovation activities with other firms or institutions and reasons important in determining involvement
Canada, innovative plants**

Plants in co-operative arrangements	of these, reasons for co-operation							
	Development of innovation					Commercialization of innovation		
	Sharing cost of developing innovations	Accessing research and development (R&D)	Accessing critical expertise	Prototype development	Scaling-up production process	Accessing new markets	Accessing new distribution channels	
	percent							
All manufacturing	22	50	58	75	70	42	42	29
Food manufacturing and beverage and tobacco products	22	50	49	79	58	44	53	42
Textile mills and textile product mills	24	41	68	58	78	48	57	41
Clothing manufacturing and leather and allied products	18	48	44	54	58	42	33	30
Wood product manufacturing	16	33	54	69	69	64	35	27
Paper manufacturing	27	50	71	74	71	42	30	17
Pulp, paper and paperboard mills	40	63	92	93	66	51	20	9
Printing and related support activities	18	58	51	75	58	44	71	40
Petroleum and coal products manufacturing	35	46	80	80	56	31	14	14
Chemical manufacturing	23	54	64	79	70	54	57	33
Plastics and rubber products manufacturing	24	37	62	66	78	54	41	27
Non-metallic mineral product manufacturing	23	49	69	87	67	42	43	38
Primary metal manufacturing	30	58	60	80	56	25	36	17
Fabricated metal manufacturing	18	43	42	69	76	27	26	13
Machinery manufacturing	18	53	60	88	76	52	45	29
Commercial and service industry machinery	33	81	60	80	77	30	42	9
Computer and electronic product manufacturing	33	68	67	78	67	18	53	28
Computer and peripheral equipment manufacturing	22	90	68	79	70	50	55	11
Navigational, measuring, medical and control instruments	44	67	70	72	66	6	56	28
Electrical equipment manufacturing	22	56	77	67	81	41	27	27
Transportation equipment manufacturing	31	58	60	81	64	49	23	12
Aerospace product and parts manufacturing	61	57	96	98	32	15	28	25
Furniture and related product manufacturing	16	45	55	63	83	38	41	50
Information and communication technology (ICT)	34	70	65	78	69	20	52	26

Source: Statistics Canada, Survey of Innovation, 2005.

Note: The figures in bold are above the average for all manufacturing in their category.

ⁱ International expansion, as the name suggests, is a strategic move whereby a company extends its activities into new geographic markets. Vertical integration corresponds to a strategy by which a company extends its activities upstream and downstream, in order to become its own supplier or customer (the make or buy decision). Cross-industry agreements achieve diversification by expanding a company beyond its industry of origin. The diversification can be either technology-related, market-related, or conglomerate in nature. (Hagedoorn, 2002).

ⁱⁱ Long-term strategic alliances are the main formal vehicle used to improve a firm's competitive position and involve a significant amount of planning from the participants. Cooperative ventures with short life span exist as well, revolving around a more specific project, but they still require a certain amount of planning. Both types of venture, either long- or short-termed, involve commitment and resources devoted to the discovery and enforcement of new rules of the game defining the cooperative behaviour. Less formal inter-firm collaboration exists too, used to take advantage of unforeseen opportunities, or to implement last resort solutions.

ⁱⁱⁱ Growth firms are not new companies: roughly half of them are in business for more than a decade before suddenly experiencing rapid growth (Acs et al, 2008). A small share of growth firms accounts for the bulk of the net job growth in an economy (Halabisky et al, 2006). Equally important, growth firms offer a large contribution to the overall innovation in the economy. They shake up markets and exert pressure on larger firms to innovate. To this extent, growth firms are qualitatively different than regular small firms.

^{iv} At the same time, the more informal and flexible from an environment benefits innovation in small firms, allowing for better communication which in turn facilitates innovation. Large firms have become large by developing sales, manufacturing, and other organizational resources in a routinized fashion. All the highly efficient channels represent capabilities that make such firms highly sought after partners in an alliance with small firms.