

## Chapter 2

### **Theoretical framework and conceptual model**

As has been discussed in chapter 1, collaboration and networking are crucial for innovation and play a critical role in ensuring company survival and growth in a dynamic and changing environment. On the other hand, we have argued that partnerships can be problematic (especially for the SME partner) and that for a variety of reasons many partnerships fail. It is also evident from chapter 1 that innovation is important for company survival and growth.

Chapter 2 introduces the main theories that deal with partnerships between companies, and examines the complementary roles that SMEs and LCOs play in the cycle of technology innovation, including the opportunities that SMEs present to LCOs and the synergistic opportunities that LCOs present to counter the constraints faced by SMEs. The innovation environment of technology companies is discussed, including how to manage a disruptive innovation, and how to introduce a technology innovation to the market. This section concludes with a short discussion on innovation partnerships in South Africa.

Recognizing that competencies and capabilities are required for innovation, competencies and capabilities are defined for the purposes of this research, whereafter those competencies and capabilities that might attract an LCO are described. This section concludes with a description of a proposed relationship between competencies, capabilities and successful partnership.

Understanding that knowledge forms the basis of competencies and capabilities, the characteristics of knowledge in a company are discussed, as well as the associated problems of knowledge spillover and appropriation. Control systems as mechanisms to control appropriation and opportunism (including hierarchical systems as a formal control mechanism, and trust and social embeddedness as informal control mechanisms are discussed. Safeguards as a control mechanism moderating an LCO: SME partnership

are identified and described. Finally a conceptual model is proposed and the research hypotheses and subhypotheses are stated.

The chapter begins by introducing the theories that explain the reasons for partnerships. Practical motivations for partnerships, and specifically innovative partnerships and the complementary role that SMEs and LCOs play in the cycle of technological innovation are discussed. Examples are taken from the information and communications technology industry and the biotechnology industry to illustrate the respective roles.

## **2.1 Partnerships between SMEs and LCOs and their complementary roles in the cycle of technology innovation**

This section examines the three main theories that focus on inter-organizational partnerships. The discussion then centres around the motives for partnerships, and specifically why SME-LCO partnerships form, highlighting the synergistic opportunities that LCOs provide for SMEs.

### **2.1.1 Theoretical support for partnership formation**

Three theories that support the reason for partnerships are introduced. These are transactional cost economics, social exchange theory, and resource dependence theory or the resource based view. The next section will introduce each respective theory and link the theories to motivations for partnerships.

#### **2.1.1.1 Transaction Cost Economics Theory (TEC)**

Williamson (1985:3) comments that transaction cost economics (TCE) treats the transaction as the central unit of economic behaviour, and that in TCE, elements of conflict, order and dependence are contained in the transaction (Kemp, 2006:45). In TEC the focus is on transactions as efficient market-based exchanges by reducing transaction costs. Examples of transaction costs would include the screening of reliable business partners, the negotiation of deals, the drafting of contracts, and the monitoring of partner's activities. Transactions form the unit of analysis, and the objective of the company is to find the most efficient way of transacting (Rahman, 2006:305).

Williamson's TCE is largely focussed on economic organization and contract enforcement. "The conscious decision of firms to withdraw from the market and produce in house or to merge with other firms is often – but not always – associated with cost-minimizing principles rather than being motivated by attempts to maximize economic power" (Kemp, 2006:51). Gulati (1998:304) comments that alliances are about both cost minimization as well as joint value maximization.

Williamson (1975:8) comments that costs associated with transacting "vary with the characteristics of the human decision makers who are involved with the transaction on one hand, and the objective properties of the market on the other". Where bounded rationality and opportunism characterize human decision making, asset specificity (both tangible and intangible, and production-specific) is the objective property of the market. Where there is high asset specificity, limited frequency of interaction between the exchange agents, and process uncertainty about the transaction, the transaction costs would appear to be higher (Williamson, 1975, 1985). This is because the parties engaged in the transactions could behave opportunistically, and this opportunism may not be anticipated because of bounded rationality (Williamson 1985). In the face of uncertainty, firms are therefore likely to decrease costs by organizing production in hierarchies (i.e. in organizations), and the legal system should ensure that these hierarchies are used to minimize costs.

Williamson (1975) comments that whereas markets and hierarchies form opposing governance structure for companies, that there are also intermediate forms of economic organizations (1991) such as inter-organizational relationships and networks (often labelled as so-called hybrids or 'relational contracting'). Hierarchical governance would be preferred to market "governance" where market-based exchanges generate high costs (Rahman, 2006). Similarly, a strategic alliance would be preferred over hierarchies or markets if this were to be the least costly means of doing business (Chiles and McMackin, 1996:74).

Kemp (2006) discusses the view of Commons ([1934] 1990) on TCE. Commons ([1934] 1990:58) commented that transactions, although the basic unit of economic exchange, occurred within a relevant social framework, and the social framework and legal structures lent authorization to the said exchange. The social framework, to a large extent, determined the shape of the economic transacting (Kemp, 2006:47). Commons ([1934] 1990:64) refers to three types of transactions where each represents a different legal-economic relationship in the economy. These types are bargaining transactions,

managerial transactions and rationing transactions where managerial and rationing transactions are hierarchical in nature and power is built into the nature of the transaction. In the case of managerial and rationing transactions, the courts decide whether “the resulting contracts involve a reasonable restriction of individual liberty (Commons ([1934] 1990:66), whereas in a bargaining transaction power is equalized across transactors (Kemp 2006:47). Commons realized that transferring power to the state to find a solution did not solve the original problems associated with economic relationships and hence that economic action should be cooperative rather than punitive or coercive Commons ([1934] 1990:291).

Commons further comments that because transactions involve an element of uncertainty because current valuations are based on future performance, working rules stipulating likely outcomes mitigate some of this uncertainty. However, the boundaries of the working rules are not clearly defined as individual discretion plays an important role. Kemp, in summarizing Commons views comments that economies, for many reasons including uncertainty, require hierarchical forms of organization to introduce power into the transaction process, and that the law must often ensure that the outcomes of the transactions are not socially undesirable or unreasonable (Kemp, 2006:48). In comparing the differences between Williamson’s and Commons’s approach to TCE, Kemp (2006:54) comments that where Williamson promotes cost minimization as the best policy, Commons promotes the equalization of bargaining power.

Rahman (2006:307) comments that although the strength of TCE is its focus on transaction characteristics in that “transactions costs are indeed a major source of costs in strategic alliances”, it falls short of considering the value maximizing goals of a firm and limits the role of the firm in developing strategy and achieving better performance in alliances (Madhok and Tallman, 1998; and Zajac and Olsen, 1993). Pyka (2002:154) also highlights a weakness in the transactional costs approach where it focuses on the assumption of opportunistic behaviour which does not permit mutual trust in a cooperative relationship to develop.

The following are examples of reasons, based on TCE, for companies to partner: economies of scale (Porter, 1998:66; Kogut, 1988); to eliminate the cost of developing and manufacturing proprietary products when cheaper, mass-produced building blocks are available (Harris, 2005:62)

To conclude, transactions come at a cost, and it is in the interests of the partners to minimize these costs. Where there is asset specificity (as is common in many SME-LCO relationships) the transaction costs can be high if opportunism is not anticipated due to bounded rationality. Where LCOs act opportunistically and try to appropriate the SME's knowledge, expertise etc, and transaction costs will be incurred and formal safeguards are in place to discourage opportunistic behaviour.

#### **2.1.1.2 Social Exchange Theory**

There has been a shift “from hierarchical governance structures (based upon threat and coercion) to network governance structures (based upon reciprocity and trust) (Freel, 2003:752). Social capital was initially identified with “... features of social organisation, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions” (Putnam et al., 199:167). The inclusivity of social capital was further expanded by Bowles and Gintis, 2003:419) “social capital generally refers to trust, concern for one's associates, a willingness to live by the norms of one's community and to punish those who do not.” Nooteboom (1999) comments that firms must consider their reputation as a reliable partner in industry. Were they to act opportunistically, they would inherit a bad reputation and with time, become isolated. Harris (2005:62) comments that partnerships can enhance credibility through association with a powerful ally. Rahman (2006:308), citing Blau (1964:91) comments that social exchange theory is premised on trust and power, where social exchanges are voluntary actions of individuals, motivated by the expected returns they will bring to others. Furthermore, these exchanges are not necessarily economically motivated, nor are the resource swaps necessarily governed by explicit contractual provisions.

Arrow (1974:23) comments that trust is efficient in that by relying on another's word, this saves time and effort. Trust becomes deeper as the alliance matures (Johnson, Cullen and Sakano, 1996), or as a result of positive experiences in repeated alliances (Gulati, 1995). The role of trust as a control mechanism and the potential cost-savings because of inter-firm trust has been highlighted in the literature (Bradach and Eccles, 1989; Gulati, 1995; and Zaheer and Venkatraman, 1995). Power plays a role where the partner is in need of the resource of the partnering firm, and especially where this is a critical resource. (Rahman, 2006:308).

Although this theory assumes that the cost savings from relational contracting are directly linked to alliance performance, it does not explain how cost savings can yield high

performing alliances (Rahman, 2006:308). It is also difficult to measure as the components of social capital are many, varied, and often intangible (Dasgupta, 2005:S2). Furthermore, social exchange does not necessarily result in overall economic betterment in the long run e.g. street gangs (Gambetta, 1993.) However, it can serve as an informal control mechanism, encouraging participants to play by the rules or risk being evicted from the network.

Gulati (1998:297) refers to accumulated strategic alliances (so called “repeated ties”) that can become social networks with embedded ties. He argues that embedded ties promote frequency of information exchange between the partners, which positively affects the success of the partnership. Furthermore, strong embedded ties may pose a barrier to companies that initiate structural loosening events, which are typical in network structures, and hereby protect the interests of the alliance partners.

In conclusion, inter-organizational interaction, that includes knowledge transfer and economic transactions, is embedded in social relations and systems. The role of trust is important in safeguarding such interactions and although not contractual and formal, trust can be viewed as an informal safeguard.

### **2.1.1.3 Resource Based View (RBV)**

The resource-based view (RBV) stems largely from Edith Penrose’s seminal work “The Theory of the Growth of the Firm” (1959). Penrose refers to internal inducements to firm growth as well as external inducements (e.g. new inventions, changes in consumer’s tastes and growing demand for certain products). Internal inducements are cited for firm growth, and resource-based reasons are given for why firms expand through diversification and contract through refocusing. The RBV maintains that the resources and capabilities of a firm can form the basis for competitive advantage if they are characterized by heterogeneous distribution among industry participants, imperfect mobility, and protection from competition (Spanos and Prastacos, 2004; Barney, 1991; Dierickx and Cool, 1989; Lippman and Rumelt, 1982; Peteraf, 1993). Firms are heterogeneous regarding their resources and capabilities as they have different levels of ability to accumulate, develop and deploy those assets needed for value-creating strategies (Spanos and Prastacos, 2004:32). Of the four characteristics: valuable, rare, non-substitutable, and difficult to imitate, of a firm’s resources that will give it competitive advantage, inimitability is the most important (Hoopes et al, 2003:890; Barney, 2001:45).

The RBV is used to determine the conditions under which resources offer competitive advantage (Perry et al, 2005:304). Penrose qualifies resources as either “productive resources” or as “administrative resources” – those that govern the use of productive resources. The “subjective productive opportunity”, that is what a firm thinks it can accomplish with its resources (Penrose, 1959:41) and some firms are qualified to take advantage of opportunities where others are not. Perry et al (2005:305) comment that this view is consistent with those of Barney (1986) and Alchian and Demsetz (1972) and one can conclude that what a firm does with its resources is just as important as the resources it has. Perry et al (2005:305) comment that the obvious implication from the above is that “firms with homogeneously distributed resources can realize competitive advantage”.

A firm, through administrative decisions, can acquire and then re-bundle resources to gain tremendous leverage. Administrative decisions could include rebundling existing resources, adding new resources, discarding resources, redirecting resources, or some combination of these options. Barney (1991) proposed a model whereby if a resource is valuable, rare, costly to imitate, and non-substitutable, then it can be a source of competitive advantage. Hence resources, if they are appropriately used, can give a firm a competitive advantage.

Technological competencies can give a firm a competitive advantage when they are difficult for competitors to imitate (Gonzalez-Alvarez and Nieto-Antolin, 2005: 842). Furthermore, technological competencies can be protected by various mechanisms, including patents, secrecy, having a lead time, moving quickly down the learning curve, or controlling certain complementary resources (Cohen et al, 2000; Geroski, 1995; Teece, 1987), and causal ambiguity, referring to “a similar lack of understanding of the logical linkages between actions and outcomes, inputs and outputs, causes and effects that are related to technological or process know-how” (Simonin, 1999: 597.). If there is a low level of understanding between the firm’s technological competencies and its sustained competitive advantage, it is difficult for competitors to know which competencies to imitate (Gonzalez-Alvarez and Nieto-Antolin, 2005:851). However, causal ambiguity can also have an adverse effect on firm performance if it blocks the transfer of technological competencies inside the firm itself (Szulanski, 1996; McEvily et al, 2000; Lin 2003).

Where companies cannot achieve the desired outcomes through markets or hierarchies, or where they can create synergies by bundling their heterogenous resources together, they may enter into dependent relationships with other companies, e.g. a joint venture. Such dependence would motivate companies to act in a trustworthy manner and hence

favours alliance stability. Three generic types of interdependence are: pooled, sequential and reciprocal. Pooled interdependence is where the expectations of both parties is that there will be an output from the JV, but where there is no dependence on each other, e.g. one firm may be interested in the profits of the JV whilst the other sees it as a means to satisfy anti-monopolistic legislation. Sequential dependence is where the one firm relies on the other to achieve its objectives, e.g. where the one firm uses the JV to utilise spare capacity but is reliant on the other firm for market access. Reciprocal interdependence is where there are mutual dependencies, e.g. where both firms wish to develop a new product that requires different technological knowledge or expertise and the JV provides the learning for each firm. Each of these patterns may be subject to instability. In the case of pooled interdependence, if the aims of the parents are in conflict; in the case of sequential and reciprocal interdependence, suspicions concerning opportunistic behaviour can damage the trust between the firms. Particularly where the interdependence is sequential, the firm that is dependent on the other can be in a very weak bargaining position, and risk being exploited (Perry, 2005).

Spanos and Prastacos (2004:32) comment that the shift in emphasis towards RBV and the associated vast number of publications referring to resources and capabilities have caused terminological confusion. “Resources, (invisible) assets, skills, capabilities, intellectual capital, stocks, flows, competencies, are just some of the terms used to denote those internal firm qualities that are assumed to constitute the basis of competitive advantage” (Spanos and Prastacos, 2004:32). This theme of terminological confusion will be discussed in more detail in section 2.3.

Examples of reasons for partnerships, grounded on RBV, include:

- to gain access to new technologies through licensing agreements and/or joint R&D (Harris, 2005:62)
- to access new product lines that complement their own (Harris, 2005:62)
- to ensure interoperability of their own products with solutions from other key vendors (Harris, 2005:62)
- to build the critical mass needed to compete against a larger rival (Harris, 2005:62)
- learning and access to organizational knowledge (Siriram and Snaddon, 2004:786; Kogut 1988)
- monitoring the evolution of technologies and opportunities (Hagedoorn and Schakenraad, 1989)



- access to markets (Siriram and Snaddon, 2004:786; Kogut, 1988; Hagedoorn, 1993; Harris, 2005:62; Hagedoorn and Schakenraad, 1989)
- access to new sales and distribution channels at a low-cost (Harris, 2005:62)
- “the reduction, minimizing and sharing of the uncertainty which is inherent of performing R&D” (Hagedoorn, 1993:372).
- reducing the period from invention to market introduction (Hagedoorn, 1993:373; Hagedoorn and Schakenraad (1989))
- access to technologies (Siriram and Snaddon, 2004:786; Hagedoorn and Schakenraad, 1989)
- enhancing competitive position (Kogut, 1988)
- meeting local government requirements (Siriram and Snaddon, 2004:786)

Examples specific to SMEs partnering with large companies (according to Radtke (1997:99), and grounded on RBV, include:

- “the need for financing to stay ahead of the competition
- support in developing products with short life cycles
- getting products to market and the real problems of making the transition from a successful single product company to a really viable long term player in the industry”.

Radtke (1997:97) lists the resources offered by large companies to SMEs as

- market access (local and international),
- credibility with existing customers,
- a marketing infrastructure of an established distribution network and brand recognition with major corporations, and
- a strong technology base from a sustained R&D programme – unaffordable to most SMEs.

Furthermore, the infrastructure that an LCO brings to the partnership is attractive to an SME. “IBM’s great attraction to a hard-core entrepreneur is its mix of enormous technical horsepower, the ability to drive innovation into the broad marketplace, and its unrivalled depth and breadth of technical talent. Great things do not happen in a vacuum, they are enabled through this balance of physical and intellectual assets.” Leifer et al (2000:169).

To conclude, resources are the building blocks of capabilities and competences. As resources are heterogenous, not only does this permit companies to have a competitive advantage, but it is also a reason for companies to collaborate due to the scarcity of

resources and the need to share resources. Accessing the resources of an SME can be a strong incentive for LCOs to partner with SMEs.

Table 2 below summarizes some of the main motives for partnerships and the associated theories upon which they are based.

**Table 2: Summary of motives for inter-organizational relationships/strategic alliances**

<b>Motives</b>	<b>Supporting literature</b>	<b>Supporting theory</b>
Need for financing	Radtke, 1997	RBV
Make transition from a successful single product company to a viable player in the industry	Radtke, 1997	RBV
Improve product lines	Harris, 2005; Hagedoorn, 1993; Radtke, 1997	RBV; TEC
Access new technologies	Harris, 2005; Siriram and Snaddon, 2004; Pyka 2002; Laurie, 2001; Hagedoorn, 1993	RBV
Source manufacturing capacity	Harris, 2005	RBV
Expand the market	Harris, 2005; Laurie, 2001; Pyka, 2002; Hagedoorn, 1993; Radtke, 1997	RBV
Market leadership	Moore, 1995	RBV
To meet customer demand for one-stop shop	Siriram and Snaddon, 2004;	RBV
Improve knowledge management and organizational learning	Siriram and Snaddon, 2004; Kogut, 1988; Lane and Lubatkin, 1998; Laurie, 2001; Tracey and Clark, 2003; Gulati, 1998	RBV; Social Exchange Theory
Acquisition of a competence	Siriram and Snaddon, 2004; Hagedoorn, 1993	RBV
Economies of scale	Siriram and Snaddon, 2004; Pyka, 2002; Gulati, 1998; Radtke, 1997	TEC
Economies of scope	Hagedoorn, 1993	RBV
Reducing transaction costs caused by small numbers bargaining	Kogut, 1988; Williamson, 1985	TEC
Relationship building resulting in benefits e.g. leading to supplier closeness	Siriram and Snaddon, 2004; Tracey and Clark, 2003	Social Exchange Theory
Embedded ties protecting interests of partners	Tracey and Clark, 2003	Social Exchange Theory
Necessity, asymmetry, reciprocity, efficiency, stability, legitimacy	Oliver, 1990; Harris, 2005; Radtke, 1997	TEC; RBV; Social Exchange Theory
Monitoring evolution of technologies and trends	Pyka, 2002	RBV
Scanning environment for new opportunities	Hagedoorn and Sadowski, 1999	RBV
Agility	Tracey and Clark, 2003	RBV

From the literature cited above it is clear that of the three theories presented, RBV appears to be the most prevailing theory in support of partnership formation.

Having discussed the three theories, as well as the practical reasons for partnerships/alliances, the role of partnerships in innovation development and implementation, and specifically SME-LCO partnerships will be discussed.

### **2.1.2 The innovation opportunities SMEs present to LCOs**

As the research will be considering partnerships between technology *innovative* companies, *innovation* partnerships will be discussed next. An *innovation partnership* for the purposes of this research is defined as being where “both parties work actively together to develop technologically new or strongly improved products, services and processes” (Oerlemans et al, 2001:73). We shall begin by emphasizing the importance of innovation because of its role in strengthening and growing companies.

There is a connection between high levels of innovation and profit. Higgins refers to a study done in 1993 by J Mauzy on 150 major US firms. It was found that innovative companies experienced profit growth rates that were four times as high as those of the non-innovative ones (Higgins, 1996). “Innovation is all about finding new ways to do things and to obtain strategic advantage – so there will be room for new ways of gaining and retaining advantage (Tidd et al, 2001:7). The contribution of the entrepreneur is to link the product to the market. At the one extreme is an existing product for a new market and at the other extreme is a new scientific discovery that “automatically commands a market without any further adaptation or development”. However, scientist-inventors or engineers who fail to consider the market requirements or the costs of their products in relation to the market usually fail as innovators. Similarly will inventor-entrepreneurs, lacking the necessary scientific competence to develop a satisfactory product/process fail, regardless of how well their appreciation of the potential market (Freeman and Soete, 1997:201).

Schumpeter (1934) made the argument that innovation is the stronghold of large firms as only they have the necessary resources. However, research (Bound et al (1984), Acs and Audretsch (1989)) has found that small firms in fact hold a greater percentage of patents than their share of sales. This would indicate that large firms are less productive in R&D. However, another interpretation of this finding could be that “large firms support innovation in affiliated smaller firms. Especially in emerging industries, there may be many opportunities for cooperation between small startup and large established firms in order to exploit technological spillovers and transfer resources for product commercialization” (Shan et al, 1994:387). Over 2200 cooperative agreements were formed between

startups and established firms in the biotechnology industry (Barley et al, 1991), and of the 2300 relationships in semiconductors between 1970 and 1980, many of these were between startups (SMEs) and established firms (Kogut and Kim, 1991).

What role do SMEs play in the cycle of innovation? An understanding of their role would provide valuable insights in the opportunities they can provide for a partnership with an LCO in terms of producing the much needed innovation required by LCOs. Freeman and Soete (1997:236) report on a survey of the British industry over the period 1945 – 1983 where small firms were responsible for about 17 % of all industrial innovations. Those industries where small firms contributed very little were those industries of high capital intensity, or where development and innovation costs for new products were very heavy. Product and process innovations had largely been monopolized by large firms. Previously small firms have played an important part in the early stages of major new technologies, but their role changes as the technology matures and a process of concentration takes place, and dominant designs emerge with associated lock-in (Freeman and Soete 1997:239 citing Utterback, 1993).

Freeman and Soete (1997:235) discuss the advantages an SME has over an LCO in terms of flexibility, concentration of management effort and internal communications. The linking of marketing, production and R&D decision-making may be more easily achieved in a small company environment, making the process more efficient. They cite Shimshoni (1970:61) commenting from his findings that the main advantages for small firms lie in “motivation to innovate, low costs, lead time in development work (from speed in decision) and flexibility to adopt a new product or technology.” SMEs are often better at identifying opportunities in new markets; have an ability to apply technology to specific client needs and applications and are focused, agile and quick in terms of developing or adapting products (Radtke. 1987:97). Tidd et al (2001:82) comment that small innovating firms have the following characteristics: “similar objectives – to develop and combine technological and other competencies to provide goods and services that satisfy customers better than alternatives, and that are difficult to imitate; organizational strengths – ease of communication, speed of decision-making degree of employee commitment and receptiveness to novelty.” Akguen et al (2004:41) comments that “hi-tech SMEs make a major contribution to industrial innovation and technological change. Unlike less technologically-oriented SMEs, which occasionally introduce a fundamentally new product, high-tech SMEs, such as advanced electronics and biotechnology firms, act as industry change agents and play complementary roles to large firms.”

Schramm (2004:109) discusses the relationships between new and established firms in the US, mentioning that established firms often become the customers of new firms, and see them as reliable sources of innovation buying, for example, specialized products or services that can be embedded in their own products. This is important for small firms for whom one of their greatest challenges is access to markets. If LCOs become their customers, they hereby grant them the much-needed access to their market. Schramm (2004:109) explains that established firms often outsource much of their R&D to start-ups<sup>4</sup>. This limits their effort and risks by maintaining an arms length distance from the new development. Once a new product has been developed by the start-ups, the established company often simply buys the start-up, acquiring the complete package of proven technology and expertise. It may be cheaper for an LCO to form an alliance with, or buy an SME already producing a specific technology, rather than produce the technology itself (Ressler, 1996: 274 citing Milne.) Sometimes the motivation for partnering is to bring about an eventual acquisition. Laurie suggests large companies consider *acquiring and integrating the next great business* as an alternative strategy to investing in internal research and product development (Laurie. 2001:157). Cisco Systems Inc, has followed this strategy and more than 70 businesses were acquired by Cisco in this manner during the period 1993 – 2001 (Laurie, 2001:170).

The biotechnology industry lends itself to partnerships between SMEs and LCOs. Most of the biotechnology investment is in the pharmaceutical products market, “having large R&D expenditures, long commercialization cycles, and complicated and lengthy regulatory procedures. Whilst uncertainty in the pharmaceutical segment is high, particularly for therapeutic applications, the potential pay-off is substantial, leading to intense competition” (Shan et al, 1994:388). However, biotechnology innovations are uncommon to established firms because their technology is built on organic chemistry (Pisano, 1990). There is therefore an opportunity for large companies to partner with small companies to learn biotechnology techniques and reduce the threat that they may pose as a substitute for traditional product development (Shan et al, 1994:388).

Freeman and Soete (1997:239) refer to the ICT and biotechnology industries where during the 1990’s concentration was evident as the acquisition of new technology and biotech firms by large chemical and drug firms became noticeable. Riedle (1989) comments that because SMEs have a shorter development time and are closer to the market, the contribution by SMEs to research and innovation appears to be slightly higher than that of very large corporations. Whitley (2002:504) comments that “the role of new

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<sup>4</sup> “Start-up” here is defined as an SME that is just “starting”, i.e. in the early stages of company formation.

firms founded by highly trained and experienced engineers and scientists in the development of the US biotechnology and computer industries has shown how relatively small and quickly formed organizations of specialist researchers and designers can play a major role in developing significant innovations. Under particular conditions, that is, the ability to create firms that integrate high-level skills around specific goals can generate competitive advantages in industries undergoing high rates of technical change. Such firms depend greatly upon the skills and knowledge of project leaders and their teams of specialist staff to develop innovations, as distinct from developing distinctive collective competences that are more organizational and institutionalized into managerial routines”.

As is apparent from the preceding discussion, partnerships or alliances between LCOs and SMEs are an important mechanism to facilitate technological innovation. In considering how such alliances are formed, reference is made to Gulati (1998:294) who comments that the sequence of events in alliances includes the following: “the decision to enter an alliance, the choice of an appropriate partner, the choice of structure for the alliance, and the dynamic evolution of the alliance as the relationship develops over time”. The selection criteria LCOs use in choosing their partners would be an important consideration for SMEs intending to form a partnership with an LCO. Gulati (1998:300) commented that there was evidence to suggest that firms enter alliances not only because of their financial and technological attributes, but also depending on how they are embedded in social networks between firms. “Firms that had more prior alliances, were more centrally situated in the alliance network, or had more focused networks, were more likely to enter into new alliances and did so with greater frequency” (Kogut, Shan and Walker, 1992; Gulati, 1993, 1997). Gulati’ fieldwork (1998:294) suggested that the social networks of prior ties not only influenced the creation of new ties but also affected their design, their evolutionary path, and their ultimate success.

Citing Gulati and Gargiulo (1997), Gulati (1998:301) comments that although the desire to control a new technology may result in a high-status organization cooperating with a low-status player, the ‘homophily principle’ in terms of high status cooperating with high status, operating under conditions of uncertainty reduces the likelihood of this event. It therefore appears that high status players would prefer to cooperate with other high status players, even though they are operating under conditions of uncertainty. Hence it is not a given that LCOs will collaborate with SMEs in order to control a new technology as this is not their preferred modus operandi.

Large companies, investing in R&D, sometimes do this with small start-up companies. This is a particularly attractive option in the biotechnology arena, as well as the automotive arena. Most of these deals involve a minority equity investment where the LCO tries to preserve the entrepreneurial spirit of the SME and does not view this as the first step to an acquisition (Radtke, 1997). Strategic partnering, on the other hand, provides an alternative to the acquisition route, and more specifically when the large company is interested in a subset of the skills and resources of the small company. The small company retains its independence in a strategic alliance, working in their own culture and having their own incentive system, but now having access to capital and the organizational resources of the large company e.g. manufacturing and/or marketing organization, and distribution channels (Slowinski et al, 1996:43).

This section has clearly highlighted the importance of innovation partnerships, and specifically between LCOs and SMEs. The literature has stressed that where SMEs are flexible, can make decisions quickly (Shimsoni, 1970), and generally have more efficient processes in terms of linking marketing, production and R & D decision making (Freeman and Soete, 1997), LCOs provide access to markets (Schramm, 2004). SMEs often have specific competencies and capabilities required for innovation that are of interest to an LCO. These include possessing specialist skills and capabilities; serving as reliable sources of innovation; developers of new techniques in established industries (e.g. biotechnology in the chemical industry); having the motivation to innovate; having an ability to apply technology to specific client needs; developing applications that are focused, agile and quick in terms of developing or adapting products; and providing goods and services that are difficult to imitate. SMEs wishing to partner with an LCO would need to clarify their position in relation to the LCO such that the LCO views them as an opportunity rather than a threat. Rather than merely acquiring an SME possessing the competencies or capabilities of interest which could result in destroying the entrepreneurial spirit of the SME team, the LCO may prefer to enter into an alliance with the SME. Such an alliance may be an attractive option for an SME that faces constraints because of their size and influence in the marketplace. These constraints and how they may be overcome will be discussed next.

### **2.1.3 Constraints faced by SMEs when partnering, and synergistic opportunities offered by LCOs to SMEs in partnerships**

Having considered the importance of innovation partnerships and technology alliances in the previous section, the discussion will now focus on some of the constraints that SMEs

face and how LCOs can assist them in overcoming these. For a partnership to be successful, both parties must gain from the relationship. The opportunities that SMEs present to LCOs has already been discussed, and what follows are the opportunities that LCOs present to SMEs that would encourage partnership formation.

Freeman and Soete (1997:236) citing Rothwell and Zegveld (1982) comment that “access to finance, ability to cope with government regulations and lack of specialist management expertise” are some of the constraints faced by SMEs. Tidd et al (2001:82) add to this list of constraints by including “*technological weaknesses* – specialized range of technological competencies; inability to develop and manage complex systems; and inability to fund long-term and risky programmes”.

Furthermore, developing new products is particularly risky for SMEs as they:

- “face big up-front R&D costs before sales are made (large firms can more easily obtain financing for risky R&D projects);
- are unfamiliar with the challenges surrounding the new product, including a new set of vendors, increased competition, rapid diffusion of technology, the multi-disciplinary nature of new technology, rapid or sudden technological changes, and shortening of the product life cycle;
- involve people who have predominantly technical and manufacturing backgrounds rather than marketing;
- may not be familiar with the markets that are ready to use the product;
- face instability in the organization and the environment because of rapid product obsolescence and the vagaries of consumer demand; and
- have difficulty coping when venture capital is no longer available for high-risk product development” (Akguen et al, 2004:41).

Given these constraints, collaboration with other organizations, and LCOs specifically, may be a very attractive option for an SME. Klofsten and Schaerberg (2000:141) refer to the work of Porter and Fuller (1991), and Forrest (1990) in terms of participation in strategic alliances being an important strategic option for small technology-based companies. Shan et al (1994:388) found that a startup’s number of cooperative relationships had a positive effect on its innovative output (using the number of patents granted to determine innovative output). However, the alternative hypothesis “a startup’s amount of innovative output explains the number of its relationships” was found not to be true, i.e., established firms did not form



relationships with startups whose innovative capabilities had already been demonstrated. They concluded that startup innovation output, rather than attracting large firm relationships, depends on these relationships. They furthermore found that public funding had a statistically significant effect on the number of startup commercial ties, suggesting that established firms “look for confirmation of a startup’s potential in the capital market before entering into an agreement with it. Startup participation in equity markets does not substitute for cooperation but encourages it” (Shan et al, 1994:393). Shan et al concluded that in the biotechnology industry, innovation in small firms is explained by agreements, but not the reverse. Furthermore, “access to public equity markets and position in the network of agreements has important direct or ancillary effects on innovation” (Shan et al, 1994:393). Hence it appears that start-ups are dependent on relationships with large firms.

SMEs typically require financial and non-financial assistance, whilst maintaining their independence. Large companies, on the other hand, want to invest cautiously whilst monitoring and possibly controlling the effort they are supporting (Slowinski et al, 1996:43). Radtke (1997:98) mentions that large corporations prefer dealing with SMEs that have already been invested in by venture capitalists because “this means that the company is already soundly financed, has been pre-screened by the venture capitalists, and that the company is used to dealing with an outside management group and meeting certain externally imposed deadlines”. This view of venture capital investment bringing credibility to start-up companies is also shared by Niosi (2003:748), in his study of biotechnology firms.

Hence the symbiotic relationship that an SME can enjoy with an LCO includes the following: the LCO can offer financial and non-financial (managerial and technical expertise) assistance to the SME; and LCOs provide opportunities for cooperative agreements, which as we have seen from the literature (Shan et al, 1994) has an effect on the SME’s innovative output. Next will be considered the context for innovating companies, and more specifically, in which innovation “space” SMEs typically find themselves.

## **2.2 Types of innovation and the management thereof**

It is important to understand the types of innovation in order to understand the role that SMEs can play in developing the respective types, from their respective knowledge base. Innovation can be described in terms of radical or disruptive innovation, and incremental

innovation. How does radical innovation differ from incremental innovation, and what environment is conducive to these different types of innovation? Burgelman et al (1995:398) report from their findings from longitudinal data across three diverse industries that “technology evolves through relatively long periods of incremental change punctuated by relatively rare innovations that radically improve the state of the art.” Most innovations improve on current technology, modifying existing functions and practices, whereas some innovations change the entire order of things, making current ways obsolete (Detienne, 2001, citing Van de Ven et al, 1999:171). Innovation can be defined as either incremental in nature, or radical (disruptive). Burgelman et al (1996:2) define incremental innovation as involving “the adaptation, refinement and enhancement of existing products and services and/or production and delivery systems (e.g. the next generation of a microprocessor), and radical innovation as involving “entirely new product and service categories and/or production and delivery systems (e.g. wireless communications)”. Detienne et al (2001) define incremental innovation as “low in cost and breadth of impact [in terms of] the following broad categories of innovation: procedural (management-determined innovations in rules and procedures); personnel-related (innovations in selection and training policies, and in human resource management practices); process (new methods of production or manufacturing); and structural (innovative modifications to equipment and facilities and new ways in which work units are structured). [They] define radical innovation as major in scope, breadth, and cost that here refers to strategic innovations or the creation of new products or services offered or markets served”.

Burgelman et al (1996:190) refer to the four components of a technology cycle: technological discontinuities, eras of ferment, dominant designs, and eras of incremental change. Citing Anderson and Tushman (1990), Burgelman et al describe technological discontinuities as “those rare, unpredictable innovations which advance a relevant technological frontier by an order-of-magnitude and which involve fundamentally different product or process design”. Technological discontinuities can be defined as competence enhancing (building on existing know-how) or competence-destroying (fundamentally different technological knowledge or concepts) (Burgelman, 1995:190). “Competence-enhancing discontinuities are order-of-magnitude improvements in price/performance that build on existing know-how within a product class. Such innovations substitute for older technologies, yet do not render obsolete skills required to master the old technologies” (Burgelmann et al, 1995:385). “Competence-destroying discontinuities are so fundamentally different from previously dominant technologies that the skills and knowledge base required to operate the core technology shift. Such major changes in skills, distinctive competence, and production processes are

associated with major changes in the distribution of power and control within firms and industries (Burgelman et al, 1995:385, citing Chandler, 1977).

The next era is that of ferment, where organizations struggle to absorb, or destroy, the innovative technology. After much experimentation and both market and technical uncertainty, a dominant design eventually emerges. A dominant design is “a single architecture that establishes dominance in a product class (Abernathy, 1978). Future technological progress (until the next discontinuity) consist of incremental improvements on the standard (Burgelman et al, 1995:192) The emergence of a dominant design results in a decrease in technical uncertainty and the basis of competition shifts from product to process innovation (Abernathy, 1978). In summary, “incremental innovation introduces relatively minor changes to the existing product, exploits the potential of the established design, and often reinforces the dominance of established firms” (Henderson and Clark, in Burgelman et al, 1995:401, citing Nelson and Winter, 1982). “Although it draws from no dramatically new science, it often calls for considerable skill and ingenuity and, over time, has very significant economic consequences (Henderson and Clark in Burgelman et al, 1995:401 citing Hollander, 1965 ). “Companies must strive to “push the envelope” steadily and avoid reliance on great leaps” (Burgelman et al, 1996:874). “Radical innovation, in contrast, is based on a different set of engineering and scientific principles and often opens up whole new markets and potential applications (Henderson and Clark in Burgelman et al, 1995:410, citing Dess and Beard, 1984). Radical innovation often creates great difficulties for established firms and can be the basis for the successful entry of new firms or even the redefinition of an industry “(Henderson and Clark in Burgelman et al 1985: 401, citing Cooper and Schendel, 1976).

SMEs typically have a role to play in the first component of the technology cycle – technological discontinuity, and the last component - era of incremental change. Those SMEs that cause technological discontinuity are generally “superstars” and are the exception rather than the rule. However, many SMEs are very effective in bringing about incremental innovation – hence the last phase of the cycle. This is supported by research done on industrial innovation in South Africa where it was found that the vast majority of innovations by SMEs and LCOs were of an incremental nature (Oerlemans et al, 2003:42).

As SMEs can be involved in developing both incremental and radical innovations, a short discussion on differentiating between incremental and radical innovation follows.

Whereas radical innovation projects usually involve high levels of uncertainty; incremental innovation projects usually involve low levels of uncertainty (Leifer et al 2000:19-20). Christensen et al (2002:22) reflect that the most dramatic stories of growth and success of companies were launched from a platform of disruptive (radical) innovation. Whitley (2002), (citing Kenney (2000) and Lee et al (2000)) refers to the US where large integrated firms pursue largely self-sufficient innovation strategies where smaller specialist research-based firms develop radical innovations in close cooperation with the public science systems, e.g. in Silicon Valley. Managing radical innovation is very difficult, and at the same time, critical for success. Christensen et al (2002:22) believe that one way to achieve this is by launching new growth businesses whilst the core units are strong and that this is the only way a corporation can maintain its growth. Chasing a disruptive opportunity is a great opportunity for the creation of new growth businesses rather than merely pursuing small, poorly defined markets. Furthermore, capitalizing on a disruptive innovation may present an opportunity for setting a new industry trend, and the associated reward may be that the company gets elevated to the status of an industry leader.

Considering the importance of a disruptive opportunity, how does one recognize such an opportunity? Christensen et al (2002:24) list the following as being the litmus test for creating new disruptive growth businesses:

1. “Does the innovation target customers who in the past haven’t been able to “do it themselves” for lack of money or skills?”
2. Is the innovation aimed at customers who will welcome a simple product?
3. Will the innovation help customers do more easily and effectively what they are already trying to do?”

They maintain that “force-fitting” disruptive innovations into established markets is a sure way to kill the innovation. These technologies should not be seen as “sustaining” technologies that are already in use by entrenched competitors. They comment that “successful disruptive innovators always target customers who welcome simple products” (Christensen et al, 2002:25). “The older, larger, and more successful organizations become, the more likely they are to have a large repertoire of structures and systems which discourage innovation” (Van de Ven, 1986: 596). Having emphasized the importance of disruptive innovations, incremental innovation and its occurrence shall be briefly discussed.

Although specialist SMEs are sometimes responsible for radical innovations and the cause of dramatic success stories of company growth and success (Christensen et al, 2002), R & D in small firms, by and large, has a developmental rather than a fundamental focus (Freel, 2005:124; Santarelli and Sterlacchini, 1990). “A substantial part of the learning may not take the form of well-defined R&D programmes and other formalized “technological effort”. Informal and incremental problem solving and experimentation take place on the shop floor and are closely associated with production. This is a priori the case in small companies that do not have the resources and organization to mount large R&D and human resource development programmes (Albaladejo and Romijn, 2000:4-5). Furthermore Detienne et al (2001) found from their study of aerospace and electronic/telecommunication industries that incremental innovation increases as age and size of the firm increased. They comment that their findings reinforced those of Herbig (1994) that older and larger firms were more likely to produce incremental innovations. However, where Herbig had expected younger and smaller firms to produce more radical innovation, their results failed to support this. To conclude, therefore, although SMEs can be responsible for disruptive innovations, this is the exception rather than the rule. SMEs are accustomed to innovating incrementally and informally by experimentation on the shop floor. Incremental innovation is therefore the more common form of innovation for which SMEs are responsible.

As SMEs are perceived by LCOs to be a good source of innovation, and although, as we have seen above, disruptive innovation is not that common, when it occurs it does result in dramatic company growth and success. However, the management of disruptive innovation in particular presents many challenges. It is therefore worthwhile considering how to manage disruptive innovation and the view of Liefer et al (2000) on managing radical innovation are therefore discussed below.

### **2.2.1 Nurturing and managing disruptive innovation**

Leifer et al (2000:26) believe that the starting point in recognizing and managing radical innovation is to bridge the gap between technical knowledge and the formation of radical innovation projects. They propose that the following three activities are involved, namely: idea generation; opportunity recognition, and initial opportunity evaluation. These three characteristics characterize the “fuzzy end” of the radical innovation life cycle. First we shall examine idea generation.

Idea generation is the starting point for both incremental and radical innovation. Incremental innovation generally results from ongoing interaction between a company and

its customers. However, ideas leading to radical innovation are more likely to result from bits of disparate technical information. In some instances a technical idea may be born out of the natural curiosity of a scientist or engineer, or a challenging problem. It could “take the form of a discovery of a novel technology, a new insight into an old problem, or a new way of linking existing technologies. In other cases, radical innovation has its roots in a market need, or the strategic vision of the firm’s leadership” (Leifer. 2000:26). Ways to determine whether a radical innovation matches a market need will next be discussed.

To recognize an opportunity, both technical knowledge and business savvy including an understanding of the market to understand the business potential in a radical idea (Leifer. 2000:27).

Initial evaluation of an innovation makes explicit assumptions regarding how the technology will develop, how markets will develop, and how the organization will respond to the opportunity. The “initial evaluation (of a radical innovation) should answer a couple of questions: What is the technical “wow” associated with this innovation? and, “Is the market big enough?” Leifer et al (2000:45).

They also found that market learning was achieved via non-traditional approach that included the following:

- Attendance at trade shows
- Professional technical conferences/meetings
- Internal networks for peer feedback
- Past experience of team members
- Use of a prototype to demonstrate the technology
- Developing a partnership with a lead user
- Customers’ interactions with existing technologies were observed.

Having identified a market opportunity, Leifer et al (2000:100) indicate that the introduction of a radical technology that cannibalizes existing offerings will need to be managed. There could well be resistance to accepting the new technology, both by the sales force, and the customer. Revenue models, acceptable to the innovating firm, as well as to all the members of the value chain must be developed (Leifer et al. 2000:105). They further found that radical innovation did not follow a systematic, organization-driven process, but rather was driven primarily by individual initiative. Often the processes and systems of the

mainstream organization had to be overcome if radical innovation was to succeed (Leifer et al. 2000:157).

As SMEs that have developed a radical technology usually require the marketing infrastructure of an LCO to introduce the technology to the market, this discussion has highlighted the importance of understanding the process of introducing a radical technology to the market from the LCO's perspective. It is evident from this discussion that SMEs developing radical innovations must have an understanding and an awareness of the market, they must have an ability to generate the appropriate innovation to meet the market need, and they must be aware of how to market their radical technologies to LCOs, i.e. they must be aware of how LCOs source such technologies.

### **2.2.2 The innovation environment**

Not only do companies need to understand the importance of radical and incremental innovation for company survival and growth, and know how to manage it, but they also need to be able to understand the frequency with which innovation occurs. Peter Scott-Morgan et al (as cited in Arthur D Little, 2001:5) discuss how companies today compete on their ability to change faster and more effectively than their competitors. However, disruption from this change drains financial and human resources and the resulting change fatigue undermines the ability of a company to compete effectively. Understanding and being aware of the environment in which the company finds itself and the frequency of the innovation it needs will enable the leadership to better manage the respective innovation and hence stabilize the company. Scott-Morgan et al describe the various frequency types of innovation and their associated environments as follows:

- **“Incremental innovation** is appropriate for environments that are only occasionally disrupted and then only by factors that the organization knows how to manage
- **Spasmodic innovation** is needed when organizations only occasionally have to deal with one-time change; a big pulse goes through the organization as it shifts from one form to another
- **Repetitive innovation** is the best for organizations that face frequent change of a recurring nature one after another after another
- **Incessant innovation** is for organizations that face fast and furious changes they've never experienced before, with challenges coming from all directions” (Arthur D. Little, 2001:6).

SMEs who are aware of the environment in which they operate and understand the associated environmental dynamics, can better position themselves such that they are viewed favourably by an LCO. For example, if the environment is one of repetitive innovation there may be numerous opportunities for an SME to present innovations to an LCO and possibly even form a partnership with the LCO. In an environment of spasmodic innovation, on the other hand, this may not be the case and an SME may only have a relatively small window of opportunity during which to present an innovation to an LCO. Having considered the ability capability to be innovative, the types of innovation and the various innovation environments, the next section will focus on the capability an SME needs to have in terms of being able to identify and market to the appropriate market segment, for it to introduce successfully an innovative product or technology to the market.

### **2.2.3 Introducing a technology innovation to the market**

Having discussed the different types of innovation, next to be considered is how, having developed an innovative product, a company introduces this product to the market. Moore (1999:5) describes the difficulties encountered when trying to develop a market for a high-tech product. In his book “crossing the chasm” he highlights the dangerous transition from an early market that is dominated by a few visionary customers, to a mainstream market which is dominated by a large group of customers being mainly pragmatists. Moore describes the technology adoption life cycle as a bell curve. The premise used is that “technology is absorbed into any given community in stages corresponding to the psychological and social profiles of various segments within that community” (Moore, 1999:13).

At the start of the curve is a very small group of *early innovators*. Their interest lies in the technology and any fundamental advance intrigues them. Their interest in purchase is essentially for the pleasure of exploring the properties of the new device. The next group along the bell curve are the *early adopters*. Unlike innovators, these are not technologists, but are people who appreciate and understand the potential benefits of the new technology. The next group (comprising 1 standard deviation from the mean) are the *early majority*. This group is driven by a strong sense of practicality, and they depend on references that the new technology does indeed work. This group represents roughly one-third of the whole adoption life cycle and they are therefore key to developing the market. The *late majority* (also roughly one third of the adoption life cycle), but unlike the early majority, they are not able to handle a technology product. They wait until the



technology has become an established standard with much support. They tend, therefore, to buy from large, well-established companies. The last group, the *laggards*, will only buy a new technology when it is embedded in another product such that they don't know it is there.

Moore (1999:17) describes the first crack (problem area) as existing between the early innovators and the early adopters. It arises when a technology product cannot be translated into a major new benefit. The way to cross this crack is to demonstrate some strategic leap forward and which has an appeal to the non-technologist. The most effective way to do business with visionaries is using a small, top-level sales force who can sell to the dream of the visionary. Visionaries need answers to the questions “who for and what for” (Moore, 1999:151). Finding the visionaries is usually via the technologists. The next crack is between the early majority and the late majority. To cross this crack, the product must be made increasingly easier to adopt, and must not require a level of technological competence. However, between the early adopters and the early majority, there exists a chasm – which must be crossed to ensure successful market development. Moore elaborates on the differences between these two groups, and how the chasm can be crossed.

“By being the first to implement this change in their industry, the early adopters expect to get a jump on the competition, whether from lower product costs, faster time to market, more complete customer service, or some other comparable business advantage. They expect a radical discontinuity between the old ways and the new, and they are prepared to champion this cause against entrenched resistance. Being the first, they also are prepared to bear with the inevitable bugs and glitches that accompany any innovation just coming to market. By contrast, the early majority want to buy a productivity improvement for existing operations. They are looking to minimize the discontinuity with the old ways. They want evolution, not revolution. They want technology to enhance, not overthrow, the established ways of doing business. And above all, they do not want to debug somebody else's product. By the time they adopt it, they want it to work properly and to integrate appropriately with their existing technology base. (Moore, 1999:20).

Moore (1999:29) presents the argument that creating the ability for the early majority to cross reference each other when making buying decisions is critical to the successful marketing of high-tech products. The early majority tend to network vertically, within their segment, and it is from here where they will seek their references. These pragmatists

need to understand both the competition, and the differentiation (Moore, 1999:151). They are, furthermore, reasonably price sensitive.

The late majority are conservatives who are against discontinuous innovation. They tend to invest in mature technologies, which offer lower prices and where the products can be treated as commodities. They want pre-assembled packages at heavily discounted prices. Conservatives need to know that the product comes from a vendor with staying power and who will continue to invest in this product category (Moore, 1999:151). They extend the market for products which are no longer state of the art. Typically they would buy from a VAR, although VARs typically do not focus on the high volume marketplace.

Moore (1995:44) stressed the importance of dominating the market segment targeted. He therefore recommends that a market share of 40% should be targeted and that this should ensure early market domination. He also recommends that the market development efforts should be focussed on the end-user community and not the technical community. The “economic buyer” of the organization, i.e. the person responsible for the profit and loss function served by the new product, should be targeted.

What is important is recognising the need for transition from product-based to market-based values (Moore, 1999:135). “Crossing the chasm requires moving from an environment of support among the visionaries back into one of scepticism among the pragmatists. It means moving from the familiar ground of product-oriented issues to the unfamiliar ground of market-oriented ones, and from the familiar audience of like-minded specialists to the unfamiliar audience of essentially uninterested generalists” (Moore, 1999:137)

Having crossed the chasm, Moore (1999:187) refers to the 4 key guiding principles for pricing a product and putting it into a sales channel. The first is to secure access to a customer-oriented distribution channel (i.e. that which the pragmatists would want and from which they would expect to buy the product). The second is that the type of channel selected should represent the price point of the product. (It may be necessary to select a channel that would create demand – to stimulate early acceptance in the mainstream.) The third is to price the product such that it carries the message of market leadership (making it a function of the pricing of competitive comparable products). The fourth is to pay a premium margin to the channel used for crossing the chasm.

Moore (1995:66) further elaborates that once the chasm has been crossed, the challenge is to manage the market where demand now exceeds supply. He comments that part of the process lies in managing the pragmatists. He mentions that pragmatists, in trying to minimize risks, react as a herd, viz. they all move together, they try all to pick the same vendor which will lead them to the new paradigm, and once the move starts, the sooner it is over, the better. This situation of all moving together, and all vying for their share of vendor attention whilst feeding off each other’s behaviour, whips the market into a frenzy, and this Moore describes as “the tornado”. Moore further elaborates that the strategy when immersed in a tornado is to ship the product, and not focus on customer needs. The focus should turn from the economic buyer and end user to the infrastructure buyer. It is a seller’s market and the opportunity should be exploited to the fullest.

Moore (1995:99) summarizes the differences in strategy between early market entry – the bowling alley (prior to crossing the chasm), and later market entry (having crossed the chasm and entering the tornado) as follows:

<b>Bowling Alley</b>	<b>Tornado</b>
Focus on the economic buyer and the end user; approach the infrastructure buyer late in the sales cycle. Emphasize return on investment as the compelling reason to buy. Differentiate your whole product for a single application. Partner with a value-added distribution channel to ensure customized solution delivery. Use value-based pricing to maximize profit margins Avoid competition to gain niche market share. Position your products within vertical market segments.	Ignore the economic buyer and the end user; focus exclusively on the infrastructure buyer. Ignore return on investment. Focus on timely deployment of reliable infrastructure. Commoditize your whole product for general-purpose use. Distribute through low-cost, high-volume channels to ensure maximum market exposure. Use competition-based pricing to maximize market share. Attack competition to gain mass market share. Position your products horizontally as global infrastructure.

Moore highlights that companies controlling the customer relationship are those with the greatest leverage (Moore, 1995:163).

Having an ability to understand the market dynamics (including the paradigms of the players) in order to introduce a technology innovation to the market, is very important for an SME wishing to commercialize an innovation. Such an in-house ability would enable an SME to position its product correctly such that it is attractive to the respective target market. For SMEs wishing to get onto a high growth trajectory, they would need to be able to address the paradigms of the “early majority”.

Having an ability to understand the type of technology an LCO is after (radical or incremental), as well as an ability to understand the innovation environment (incremental, spasmodic, repetitive, incessant), as well as the market dynamics and paradigms of the players, should give an SME an advantage when positioning itself for a partnership with an LCO. This is because it can then align its offering to meet the needs and expectations of the LCO.

Having considered the innovation environment in general, as the research will be conducted on South African companies; it is useful to contextualize innovation partnerships in South Africa. A brief discussion on innovation partnerships in South Africa therefore follows.

#### **2.2.4 Innovation partnerships in South Africa**

Recent research by Oerlemans et al (2001:74) on innovation in South African companies has revealed that the larger the company, the higher the percentage of companies having innovative partners in South Africa (36% of large firms versus 15% of SMEs collaborate with domestic partners). Furthermore, approximately 18% of all innovating companies are actively collaborated with South African partners on innovation (this figure being considerably lower than that for European firms). However, approximately 26% of South African innovation companies have partnered with companies located outside South Africa. The same research revealed that innovating companies partnered most frequently with the following categories of companies, in the following order of priority: suppliers (66%), consultants (55%), buyers (53%) and competitors (52%). To conclude, therefore, it is apparent that for South African companies: collaboration with innovative partners is common for large companies; collaboration with foreign rather than local companies appears to be preferable; and the selection of a partner often includes competitors. As the research did not specifically address the number of partnerships between SMEs and LCOs, no comment can be made in this regard. This is, therefore, the environment and context in which the current research was conducted.

Having examined the context for innovation and innovation partnerships, the next section will focus on how innovation is presented by a company. The discussion will focus on how is innovation potential “packaged” by an SME such that this will attract the interest of an LCO?

## **2.3 Definition of capabilities and competencies**

From the previous discussions it can be concluded that innovation is dependent on ideas, technical information, expertise, business savvy, or in summary, a specific knowledge base. As has been described in section 2.1.1.3, in RBV resource-based reasons are used to determine the conditions under which resources offer competitive advantage (Perry et al, 2005). For a firm to sustain a competitive advantage it should have technological competencies that are difficult to imitate (Gonzalez-Alvarez and Nieto-Antolin, 2005:842). Stalk et al (1992:62) comment that “competition is now a “war of movement” in which success depends on anticipation of market trends and quick response to changing customer needs. Successful competitors move quickly in and out of products, markets, and sometimes even entire businesses. In such an environment, the essence of strategy is not the structure of a company’s products and markets but the dynamics of its behaviour. And the goal is to identify and develop the hard-to-imitate organizational capabilities that distinguish a company from its competitors in the eyes of customers”. However, as firms do not necessarily have all the required resources in house they often enter into partnerships/alliances to gain access to such resources. In order to understand the dynamics at the interface between technology innovative SMEs and LCOs it is necessary to arrive at a common understanding of the nature of the desirable resources that are encouraging partnership formation.

Because of the emerging interest in RBV, as has already been mentioned, the vast number of publications referring to resources and capabilities has caused terminological confusion. Some of the terms that have been used to describe the internal firm qualities that are assumed to form the basis of competitive advantage are resources, (invisible) assets, skills, capabilities, intellectual capital, stocks, flows, and competencies (Spanos and Prastacos, 2004:32). The next section will further highlight the confusion in the literature regarding the definition of specifically capabilities and competencies and will motivate for an acceptable definition for these terms to be used for the purposes of this research. Thereafter, specific capabilities and competencies are identified, defined and where relevant support is provided from the literature.

### **2.3.1 Capabilities**

Hafeez et al (2002a:40), citing Wernerfelt (1984) comment that resources can be defined as “anything which could be thought of as a strength or weakness of a firm”. This could

include physical resources (raw materials, equipment, financial endowment, etc), human resources (training, experience, skills, etc), and organisational resources (firm image, process, routines) (Barney, 1991; and Marino, 1996). Hafeez et al (2002a:40) point out that this definition describes capabilities as part of resources. They then explain that other authors argue that “capabilities are not part of resource because of their dynamic “doing” nature, rather they are the result of resource deployment and organizational processes. Capabilities use resources, and therefore, are more dynamic and complex entity and should be treated independent to resources” (Hafeez et al, 2002a:40, citing Amit and Schoemaker, 1993). Hafeez et al (2002a:40) conclude that capabilities are “the ability to make use of resources to perform some task or activity”. Citing Nanda, 1996, Hafeez et al (2002a:41) comment that where resources can exist on their own, “capabilities are deeply embedded in the organizational routines, practices and business activities”. (Routines are as a result from history, experience and collective learning of the firm.)

Amit and Schoemaker (1993) define resources as assets that are either owned or controlled by a firm; and capabilities as the firm’s ability to exploit and combine resources, by means of organizational routines, to achieve its targets. This is supported by Grant (1991) who defines capabilities as the capacity of a firm to deploy existing resources to accomplish a task or activity. Javidan (1998:62) refers to capabilities as being how the company leverages its resources. Capabilities comprise “business process and routines that manage the interaction among (the firm’s) resources”. Javidan describes a process as being “a set of activities that transform an input into an output”. What defines a capability is that it is functionally based e.g. marketing, production, distribution and logistics, and human resource management capabilities. This is supported by Collis (1994) who defines capabilities as socially complex processes that determine how efficient and effective a firm is in transforming inputs to outputs.

Spanos and Prastacos (2004) comment that whereas resources are what the firm has or owns (tangible assets), capabilities are what the firm can do (intangible assets). Capabilities are invisible, knowledge-based phenomena (Stalk et al, 1992). They are nurtured through complex interactions between organizational members and develop over time (Amit and Schoemaker, 1993).

Stalk et al (1992:62) define a capability as a set of business processes that have been strategically understood by the company. “Capabilities-based competitors identify their key business processes, manage them centrally, and invest in them heavily, looking for a long-term payback”. Stalk et al (1992:63) comment that the overriding test of a CEO’s

management skill in the 1990s would have been determined by whether s/he could build capabilities. More specifically, winning companies would be those that can outperform competitors by behaving dynamically, namely those that can outperform competitors on the following five dimensions:

- **“Speed.** The ability to respond quickly to customer or market demands and to incorporate new ideas and technologies quickly into products
- **Consistency.** The ability to produce a product that unfailingly satisfies customers’ expectations.
- **Acuity.** The ability to see the competitive environment clearly and thus to anticipate and respond to customers’ evolving needs and wants.
- **Agility.** The ability to adapt simultaneously to many different business environments.
- **Innovativeness.** The ability to generate new ideas and to combine existing elements to create new sources of value.”

They conclude by commenting that “capabilities are often mutually exclusive. Choosing the right ones is the essence of strategy” (Stalk et al, 1992:69).

Coates (1996:442) describes capabilities as the building blocks of core competencies. The primary capabilities of an organization, he explains, are made up of discrete activities, skills and disciplines within the organisation, the major categories being market interface, infrastructure and technological capabilities. The critical capabilities are those having the most direct and significant impact on competitiveness.

Not all capabilities lead to competitive advantage. Some may be supplemental or enabling and establish a foundation for competition, rather than a competitive advantage (Leonard-Barton, 1995). Hamel and Prahalad (1992) comment that evidence of the *relative contribution* of the capability to the entire value bundle that enticed a customer to buy, was what differentiated “core” from “non-core”. Furthermore, “core” and “non-core” changed with time and needed to be assessed by management continually.

Capabilities therefore comprise resources and effect their deployment. Capabilities are built over time and are business processes and routines that manage the interaction between the company’s resources to deliver an output.

### 2.3.2 Competencies

Javidan (1998:62) explains the composition of core competencies as follows. The building blocks of competencies are resources. Citing Barney (1991) he categorizes resources into three groups: “physical resources such as plant, equipment, location and assets; human resources such as manpower, management team, training and experience; and organizational resources such as culture and reputation. Some resources are tangible and physical such as plant and equipment and others are intangible like a brand name”. Although every company has resources, not all leverage these resources effectively. A competency is a “cross-functional integration and co-ordination of capabilities. In a multi-business corporation, competencies are a set of skills and know-hows housed in an SBU [strategic business unit]. They result from interfaces and integration among the SBU’s functional capabilities.” Core competencies cross SBU boundaries and result from the interaction between different SBU’s. They are “the skills and areas of knowledge that are shared across business units and result from the integration and harmonization of SBU competencies” (Javidan, 1998:62).

Spanos and Prastacos (2004:33) comment that a competence denotes a firm’s ability to act. They argue that “resources become competencies only when their loose coupling becomes structural coupling, that is when they are consciously brought together to form socially complex processes to accomplish certain tasks” (Spanos and Prastacos, 2004:36).

Hafeez et al (2002b:29) comment that “core competencies are usually the result of ‘collective learning’ processes and are manifested in business activities and processes”. Coates (1996:441) defines core competencies as being “specialized areas of expertise that exist within some organisations. Valid core competencies have special qualities – namely, they provide competitive advantage, are translated into customer-perceived value, are difficult to imitate, and are extendible to new markets”. Coates comments that core competencies result from complementary critical capabilities – core competencies are aggregates of capabilities.

With time, organizations develop competencies closely associated with their ability to cope with environmental demands (Burgelman et al, 1996:34, citing Selznick, 1957.) McKelvey and Aldrich, (1983:112) in Burgelman et al, (1996:34) view distinctive competence as “the combined workplace (technological) and organizational knowledge and skills ... that together are most salient in determining the ability of an organization to



survive”. “In general a firm’s distinctive competence involves the differential skills, complementary assets, and routines used to create sustainable competitive advantage” (Burgelman et al (1996:34) citing Selznick (1957), and Teece et al (1990)).

Malmberg and Maskell (1997) comment that “a firm’s competitiveness is based on a set of product- and process-related competencies, which are unique to the market, as well as the ability of the firm to strengthen these competencies through learning and subsequent adjustments.

Hafeez et al (2002a:41), citing Klein et al, (1998), refer to competencies as a network of capabilities rather than a single activity-based process. As an example they refer to 3M’s competence in R&D, commenting that this is as a result of the coordination of several capabilities, for example research, product development, and experimentation. Competencies are as a result of cross-functional business process and usually form the platform for multiple lines of businesses and/or products within a firm (Hafeez et al, 2002a; Hamel, 1994; Doz; 1997).

Hamel and Prahalad (1990:81) believe that competitiveness results from an ability to build at a lower cost and more rapidly than competitors, the core competencies that are responsible for unanticipated products. “The critical task of management is to create an organization capable of infusing products with irresistible functionality or, better yet, creating products that customers need but have not yet even imagined” (Hamel and Prahalad, 1990:81.) Competencies are valuable capabilities in that they enable a firm to deliver a valuable customer benefit (Hamel, 1994).

Prahalad and Hamel (1990:82) define core competencies as “the collective learning in the organisation, especially how to co-ordinate diverse production skills and integrate multiple streams of technologies”. They believe that a core competence should:

- “provide potential access to a wide variety of markets
- make a significant contribution to the perceived customer benefits of the end product
- be difficult for competitors to imitate.” (Prahalad and Hamel, 1990:83)

Prahalad and Hamel (1990:85) comment that unlike physical assets that deteriorate with time, core competencies do not diminish with use, but rather the competencies are enhanced as they are applied and shared. But, the competencies need to be nurtured and protected as the knowledge will fade if not used. Furthermore, core competencies

take time to build as this happens through a process of continuous improvement and enhancement that may span a decade or longer. “A company that has failed to invest in core competence building will find it very difficult to enter an emerging market, unless, of course, it will be content simply to serve as a distribution channel” (Prahalad and Hamel, 1990:85). “Core competencies are the wellspring of new business development” (Prahalad and Hamel, 1990:91). “Core competences are the connective tissue that hold together a portfolio of seemingly diverse businesses. Core competences are the *lingua franca* that allows managers to translate insights and experience from one business setting into another” (Hamel and Prahalad, 1995:35).

A competency is therefore a cross-functional integration and co-ordination of capabilities resulting in an ability to act. Competencies are aggregates or networks of critical capabilities and are manifested in business processes and activities. They are improved with time as learning occurs, are difficult to imitate, add value to the client, and provide a firm with a competitive advantage.

### **2.3.3 Relationship between capabilities and competencies**

Bakker et al (1994:14), citing Stalk (1992:66) explain that where core competencies emphasize “technological and production expertise at specific points along the value chain, capabilities are more broadly based, encompassing the entire value chain”. For example a company may have specific technological competencies, but not possess the equally important capabilities in distribution, sales, and customer support. Hence where a competence is equated with knowledge, a capability is equated with process.

Marino (1996:41) discusses competencies and organisational capabilities as follows. He views competencies as having a technology or knowledge-based component, often from a blending of technology and production skills. Capabilities, however, he defined in terms of processes and business routines. Marino believed that the managerial challenge is for the management team both to define the core competencies and capabilities, and also agree on the definitions.

Spanos and Prastacos (2004:36) refer to a hierarchy that exists when “some capabilities are formed from the integration of more specialized ones and still more specialized individual skills ...”. Citing Hamel (1994:12). “this hierarchy ... runs from competencies to skills and technologies down to individuals – ‘competence holders’...”. Similarly, Grant (1996b) comments that at the base of the hierarchy are individuals’ specialized

knowledge. The first level of integration is capabilities for specialized tasks – single-task capabilities. Moving up the hierarchy are specialized, activity related, broad functional and finally cross-functional capabilities that closely resemble Prahalad and Hamel's (1990) core competencies. Spanos and Prastacos (2004:37) comment that “the creation of capabilities critically depends on the firm's ability to integrate, combine, and reconfigure existing knowledge, skills, and assets in order to arrive at higher-order competencies that will address rapidly changing environments. Grant (1996a) has suggested four mechanisms for integrating specialized knowledge: rules and directives; sequencing; routines; and group problem solving, of which problem solving is the most effective mechanism for developing higher order organizational capabilities.

Hamel (1991:83) believes that a firm can be viewed as a portfolio of core competencies encompassing disciplines. Core competencies, comprising technology bundles, “make a critical contribution to the unique functionality of a range of end-products (Hamel, 1991:83). As an example he discusses Honda, whose expertise in power trains which is applied to automobiles, motorcycles, generators and lawn mowers, and encompasses disciplines such as total quality control, just-in-time manufacturing systems, value engineering, flexible manufacturing systems, accelerated product development and total customer services. “These disciplines allow a product to be delivered to customers at the best possible price/performance trade-off” (Hamel, 1991:83). Hamel expands this argument by suggesting that inter-firm competition (as opposed to inter-product competition) is essentially concerned with the acquisition of skills. Furthermore, core competencies require focus: “few companies are likely to build world leadership in more than five or six fundamental competencies. A company that compiles a list of 20 to 30 capabilities has probably not produced a list of core competencies (Prahalad and Hamel, 1990:84).

The link between competencies and *innovation* is explained by Bakker et al (1994:14) who believe that to successfully foster new business development, a corporation needs to identify, develop and deploy its core competencies. They comment that “core competence provides a guiding vision of the strategy – identifying those key resources which need to be regenerated, expanded, and built on in the firm's future activities” (Bakker 1986:65). They found that the company's efforts were directed by its core competencies, capabilities and strategic intent (Bakker et al, 1994:17). They stress the importance of viewing new business development as a core competency that organizations need to develop. “Rather than state that innovation programmes are the key to developing core competencies, or core competencies are the well spring to new

business development, we conclude that enhancing new business development competencies ... will enable companies to pair accelerated growth with building sustainable, yet flexible barriers against competitors". Hamel (2004:4) believes that employees should be trained to deconstruct orthodoxies and leverage deep competencies - this he believes, is the foundation for innovation.

The table below captures some of the differing definitions in the literature on capabilities and competencies.

**Table 3: Examples of definitions of capabilities and competencies according to various authors**

Capabilities	Competencies
socially complex processes that determine how efficient and effective a firm is in transforming inputs to outputs (Collis, 1994).	firm's ability to act (Spanos and Prastacos, 2004)
strength or weakness of a firm (Hafeez, 2002a; Wernerfelt, 1984)	network of capabilities (Hafeez et al, 2002a)
physical resources, human resources, organizational resources (Barney, 1991; Marino, 1996)	result from cross-functional business processes; manifested in business activities and processes (Hafeez et al, 2002a and 2002b)
Embedded in organizational routines, practices and business activities (Hafeeza, 2002a)	valuable capabilities that deliver a valuable customer benefit (Hamel 1994)
Intangible assets enabling a firm to "do" (Spanos and Prastacos, 2004; Stalk et al, 1992)	resources, namely: physical resources such as plant, equipment, location and assets; human resources such as manpower, management team, training and experience; and organizational resources such as culture and reputation (Barney, 1991)
a set of business processes that have been strategically understood by the company (Stalk et al, 1992)	responsible for unanticipated products (Hamel and Prahalad, 1990).
broadly based, encompassing the entire value chain e.g. sales, distribution, customer support (Stalk, 1992)	technological and production expertise at specific points along the value chain (Stalk, 1992)
	knowledge (Stalk, 1992)
processes and business routines (Marino, 1996; Javidan, 1998; Stalk, 1992)	blending of technology and production skills (Marino, 1996)
business process and routines that manage the interaction among (the firm's) resources (Javidan, 1998; Amit and Schoemaker, 1993; Hafeez, 2002a)	cross-functional integration and co-ordination of capabilities (Javidan, 1998)
discrete activities, skills and disciplines within the organisation, the major categories being market interface, infrastructure and technological capabilities (Coates, 1996)	specialized areas of expertise – aggregates of capabilities (Coates, 1996)
	differential skills, complementary assets, and routines used to create sustainable competitive advantage (Burgelman, 1996)

As can be seen from the table above, there is much confusion in the literature regarding definitions of capabilities and competencies. This view is also expressed by Hafeez et al

(2002a:40): “a literature review suggest that concepts such as resources, capabilities, competencies and core competencies are not clearly defined”. Sanchez (2004) talks about the confusion in the literature in conceptualizing competencies and refers to Chiesa and Manzini (1997) who suggest that the three reasons for this confusion are because: different terminology is often used for similar concepts; competence appears to refer to different levels of activities within organizations; the view on competencies is usually static and does not consider how they are built, or can be changed within an organization.

In arriving at a framework for defining competences and capabilities for the purposes of this research, an unambiguous definition of competencies and capabilities is sought. Considering the literature above, commonalities are sought to arrive at unambiguous definitions. What follows is therefore a logical “reconstruction” of the literature above to arrive at an unambiguous definition of capabilities and competencies that will be used as the basis for this research.

In determining the relationship between knowledge and capabilities and competencies, it appears that knowledge is the common resource to both capabilities and competencies (Stalk et al, 1992; Javidan, 1998; Spanos and Prastacos, 2004).

Capabilities comprise skills (Barney, 1991; Marino, 1996; Coates, 1996) discrete activities, disciplines, and the major categories include infrastructure and technological capabilities (Coates, 1996). Capabilities are a result of resource deployment and organizational processes (Hafeez et al, 2002a, Amit and Schoemaker, 1993).

Malmberg and Maskell (1997) describe a firm’s competitiveness as being based on a set of product- and process-related competencies ...”. Coates (1996:441) defines core competencies as aggregates of capabilities. Competencies are defined by Javidan (1998) as a “cross-functional integration and co-ordination of capabilities”. Spanos and Prastacos (2004:36) argue that “resources become competencies ... when they are consciously brought together to form socially complex processes to accomplish certain tasks”. Hafeez et al (2002a) comment that competencies result from cross-functional business process and usually form the platform for multiple lines of businesses and/or products. They also comment (2002:29) that “core competencies are the result of ‘collective learning’ processes and are manifested in business activities and processes. Prahalad and Hamel (1990:82) define core competencies as “... how to co-ordinate diverse production skills and integrate multiple streams of technologies”. Hamel (1994:12) comments that there is a form of hierarchy and “this hierarchy ... runs from competencies

to skills and technologies down to individuals – ‘competence holders’ ...”. Similarly, Grant (1996b) comments that at the base of the hierarchy are individuals’ specialized knowledge. The first level of integration is capabilities for specialized tasks. Moving up the hierarchy are specialized, activity related, broad functional and finally cross-functional capabilities that closely resemble Prahalad and Hamel’s (1990) core competencies. Spanos and Prastacos (2004:37) comment that “the creation of capabilities critically depends on the firm’s ability to integrate, combine, and reconfigure existing knowledge, skills, and assets in order to arrive at higher-order competencies that will address rapidly changing environments.

From the above it is possible to construct a hierarchy with knowledge as the basis, whereupon skills, organization and technologies are based. Combinations of skills, technologies, infrastructure and organization result in capabilities, and competencies are cross-functional capabilities, comprising complex processes to achieve certain tasks.

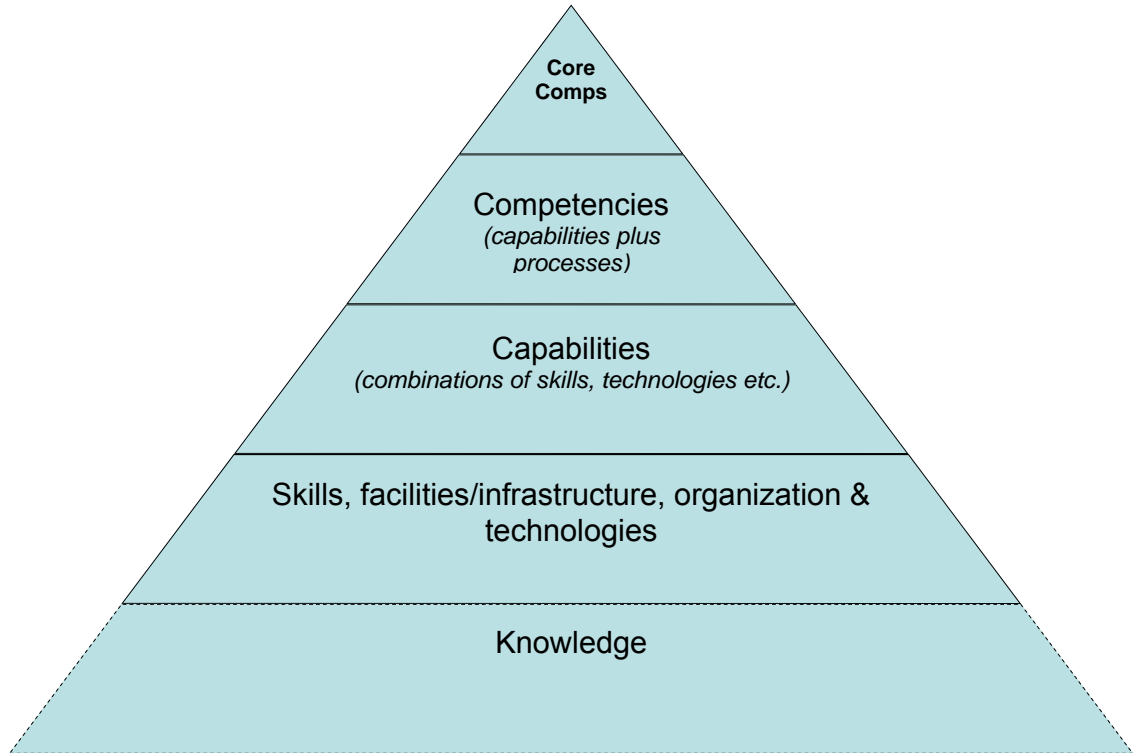
In line with the hierarchical description of capabilities and competencies is a definition paper (unpublished) by Ela Romanowska (2001). Romanowska refers to *skills* as being the basic building blocks of the ability of individuals. She cites the Generics Group who defines *capabilities* as “the combination of organization, skills and facilities needed to enable an individual or organization to achieve certain objectives ... *Capabilities* relate more to how the organization can harness skills in the context of available facilities, and are created through combining skills with facilities, or infrastructure, through appropriate organization. *Competences*, in turn, draw on capabilities by linking these through appropriate processes.” (Romanowska. 2001:1). In citing the work of Hamel and Prahalad (1990), Romanowska defines a *core competence* as “the bundle of skills and technologies that enables a company to provide a particular perceived benefit to customers, and cannot easily be imitated.”

The following pyramid (Figure 3) explains the relationship between core competences (CC) and capabilities. The basis or original foundation of core competencies is knowledge. Knowledge when it is applied translates into skills, organization and technologies. Capabilities have been defined as an organization’s discrete activities, skills and disciplines (Gallon et al, 1995:235).

Hence, in arriving at an unambiguous definition for capabilities and competencies for the purposes of this research, capabilities are defined as skills, facilities/infrastructure, organization and technologies. Competencies are defined as a combination of skills,

facilities/infrastructure, organization and technologies, and processes or business routines. Bundles of capabilities result in competencies, whereas critical capabilities form core competencies.

**Figure 3: Hierarchy from knowledge to core competencies (adapted framework of Romanowska, 2001:2)**



As has been discussed above, one of the major reasons for companies to form partnerships is to access technologies, skills and resources that have developed from a knowledge base. SMEs offering complementary competencies and capabilities can be very attractive to LCOs that have recognized their deficiency in certain areas. Although competencies comprise capabilities, capabilities can operate independently of competencies. As has been stated previously, competencies should give a company a competitive edge. However, competencies evolve with time. An SME may only have capabilities when still in start-up mode, and as it grows these capabilities may evolve into competencies. An LCO may be motivated to partner with an SME to access either capabilities or competencies. If the LCO has its own processes it may merely wish to access a capability. However, where an SME is offering a competitive advantage based on a certain competence, the LCO may wish to acquire the entire competence.

Having defined competencies and capabilities and how they relate to each other, as well as their role in innovation and competitiveness, the question that arises is whether the more resources an SME has, the higher the probability of a successful inter-organizational relationship with an LCO. More specifically, would an SME having many competencies and capabilities be associated with a higher level of partnership success with an LCO?

To answer the abovementioned question, competencies and capabilities of an SME that can be tested for a relationship with perceived successful partnership with an LCO, had first to be identified. These would be competencies and capabilities that it was felt SMEs should possess in order to influence the balance of power in their favour. Hence next to be discussed are capabilities.

#### **2.3.4 SME capabilities that may attract an LCO**

Capabilities have been described in the literature (see Figure 3 above) as combining skills with facilities or infrastructure, through appropriate organization. Capabilities, for the purpose of this research, have been classified as either *ability* capabilities, or *awareness* capabilities. *Ability* capabilities are those skills, technologies and facilities/infrastructure that enable a company to achieve its targets and transform inputs to outputs. Where a capability is defined by Hafeez et al (2002b:29) as “the capacity for a team of resources to perform some task or activity” ability capabilities for the purposes of this research include intellectual property; expertise; technology; understanding of the types of technology LCOs source (incremental or radical); and understanding of the market segmentation and related strategies for introducing a technological innovation.

In addition to ability capabilities, ***awareness*** capabilities are important. An important part of the pre-negotiation process for a partnership, Gadiesh et al (2001:28) believes is to court the prospective company for months, or years before the transaction takes place. This assists in gaining access to inside information e.g. performance histories, likely strategies and employee morale. Hayhow and Ressler (1996:278) reporting on an interview held with Robert J. Calcaterra, CEO and President of the Arizona Technology Incubator in Scottsdale, Arizona, record him as saying “... doing an extensive amount of research to understand the nature of the large company’s business, what their problems are, how they sell to their customers, and what they consider important in terms of the characteristics of their products or services. In short, the small company needs to learn just about everything possible – it’s the only way to gain a true understanding of how the



small business can fit in and give the large company an advantage.” Hence, “awareness” is an important capability that an SME needs to develop if it intends partnering with an LCO.

*Awareness* capabilities are those skills, technologies and facilities/infrastructure that enable a company to have knowledge about (have an awareness of) the attributes of companies with which it interacts. These could include an awareness of: the SMEs complementarity with the LCO’s core business; the main reasons for the LCO to partner with the SME; the innovative technology sourcing behaviour of the LCO (from LCO’s, SMEs or research institutions); the internal politics of the LCO; the LCOs strengths, weaknesses, opportunities and threats (SWOT), and an alignment of the SME’s offerings with the LCOs SWOT; and the technology sourcing strategy behaviour of the LCO (acquire or partner).

Having identified certain capabilities that are thought to influence the balance of power between an SME and an LCO, what follows is a discussion on the reason for classifying these items as either ability capabilities or awareness capabilities. The hierarchy from skills to core competencies (Figure 3) is used to qualify the capabilities and competencies.

#### **2.3.4.1 Ability capability: Developing and patenting intellectual property**

The need for innovation and new products has been discussed at length above. Linked to innovation is the development of *intellectual property* that should be recognized as a valuable, intangible asset. Anecdotal and empirical research indicates that patents have increased in importance since the early 1980’s (Arundel, 2001:611). One of the possible explanations for this is the increasing economic importance of proprietary knowledge as a result of a shift in competition based on price towards that based on technical innovation. A second explanation is because of the rise of new technologies such as biotechnology and information technology, areas in which many small firms have been active (Arundel, 2001:611).

Oerlemans et al (2000:61) believes that for companies to innovate and to profit from innovation, they need to acquire and protect information. Kwak (2002:10) comments that start-ups that possessed at least one patent increase their probability for collaboration. Niosi (2003:748) states that patents are used by biotechnology firms to send a signal to the financial community about the novelty of their future products (and the related high profits often associated with a unique technology). However, quantifying the value of

intellectual property can be challenging. The increasing disparity between the book values of publicly traded companies and their share market valuations can be attributed, inter alia, to the substantial value of their intangible assets (patents, trademarks, brand recognition, goodwill) which are generally not accounted for in their balance sheets. Such a patent analysis can be used, for example, to value potential merger and acquisition candidates, provided that they are in a technology-based industry. Breitzman et al (2002:29) cautions, however, against assuming the value of a company is linked to its number of patents, as much of the value normally resides in a small number of breakthrough inventions. It is therefore necessary to examine both the quantity and quality of the patents. Measuring the quality of the patents can be estimated by looking at the patent citation index. However, as highly-cited patents do not necessarily represent cutting edge technology as the older patents tend to get cited more often, citations of recent patents should be counted.

Patents do not necessarily, however, exclude other firms from using the technology they have developed. Even though direct mimicking is prevented, by disclosing the innovation, a similar but sufficiently different innovation can readily be developed, hence compromising the original innovation (Teece, 1990:4).

A serious negative affect of patenting is therefore the requirement to fully disclose the invention. Such disclosure can make available valuable information to competitors on potentially profitable areas, as well as on how to invent around the patent. Rather than patenting, therefore, firms may choose rather to use secrecy to protect their invention (Arundel, 2001:612).

SMEs may elect to patent to give them time to build up their manufacturing or marketing capabilities. However, they may choose NOT to patent because of the difficulties they face in protecting their patents from infringement (Arundel, 2001: 613). From their analyses, Arundel found that a higher percentage of firms, regardless of size, found secrecy to be a more effective means of appropriation than patents. Small firms were “less likely than large firms to find patents to be of greater value than secrecy for product innovations, although there is little difference by firm size for process innovations” (Arundel, 1999:622). However, firms that engaged in cooperative R & D were more likely to find patents of greater value than secrecy.

Intellectual property (IP) is a direct output of certain expertise and capability that resides in a company demonstrating an ability to innovate. Such expertise would result from certain

disciplinary knowledge. In further support of this, knowledge is defined in the concise Oxford dictionary as: “theoretical or practical understanding of subject ...; person’s range of information”. Knowledge is a prerequisite to ability as ability is founded on a knowledge base (understanding and experience). A patent is a formal capturing and documentation of specific knowledge and can therefore be viewed as a measure of ability. Hence, because IP can be viewed as direct output of certain applied knowledge and expertise, and because patents are a formal process for capturing and reflecting certain knowledge that would have resulted from certain expertise, IP has been categorized as an *ability* capability.

#### **2.3.4.2 Ability capabilities: Expertise and technology**

Freeman and Soete (1997) in discussing inventive activity over the centuries, describe how this activity has shifted during the twentieth century, away from the individual inventor to the professional research and development (R&D) laboratories (industrial, government and academic). They describe Thomas Edison, who took out more than 1 093 patents, as embodying the transition from “great individualists” to large-scale R&D laboratories – which he helped establish. Most of the more recent innovations (PVC, nylon, polyethylene, hydrogenation, catalytic cracking nuclear power, computers, television, radar, semi-conductors) were the result of professional R&D activity and usually over long periods of time. Where entrepreneurs or inventors played a key role, they were usually scientists or engineers having access to large laboratories to conduct sustained R&D work. The body of knowledge required for these inventions (macromolecular chemistry, physical chemistry, nuclear physics and electronics) was based on theoretical principles and “could never have emerged from casual observation, from craft skills or from trial and error in existing production systems, as was the case with many earlier technologies. The same is true of recent biotechnology” (Freeman and Soete, 1997:199).

Tidd et al (2001:130), citing Hoffman et al (1998) comment that most of the research to date concentrates on the small group of spectacular high-tech successes (or failures) rather than the much more numerous run-of-the-mill small firms coping with the introduction of IT into their distribution systems”. Tidd et al refer to *superstars* being those high growth firms that on the back of a major invention (e.g. instant photography) or a rich technological trajectory, have managed to exploit first-mover advantages like patent protection and learning curves. They define *new technology-based firms* (NTBFs) as small firms that have recently spun out from large firms and large laboratories in fields like electronics, software and biotechnology. “They are usually specialized in the supply of a key component, subsystem, service or

technique to larger firms, who may often be their former employers” (Tidd et al, 2001:130). “*Specialized supplier firms* design, develop and build specialized inputs into production, in the form of machinery, instruments and software, and interact closely with their (often large) technically progressive customers” (Tidd et al, 2001:132). Tidd et al (2001:130) conclude their discussion by commenting that “most small firms fall into the *supplier-dominated* category, with their suppliers of production inputs as their main sources of new technology ... These firms depend heavily on their suppliers for their innovations, and therefore are often unable to appropriate firm-specific technology as a source of competitive advantage”.

From the discussion above it is clear that SMEs having specialist knowledge, possess the expertise and technology often sought after by LCOs. They therefore have the ability capabilities of expertise and technology.

Capabilities have been defined by Romanowska (2001) as the combination of skills, facilities, organization and technologies. Developing a technology would not only demand certain skills plus an associated process, but it would also require a certain level of expertise. Expertise required for developing a technology would imply experience and a skill set grounded in a scientific discipline (e.g. engineering). The Concise Oxford Dictionary defines expertise as “expert opinion or skill or knowledge”. Hence it appears that skills and expertise are closely related. Expertise and technology are considered as building blocks for capabilities (Romanowska, 2001), and their presence indicates a certain level of ability of a company. Expertise and technology would therefore qualify as *ability* capabilities.

#### **2.3.4.3 Ability capability: Establishing a new trend**

Freeman and Soete (1997:202) comment that “since the advance of scientific research is constantly throwing up new discoveries and opening up the technical possibilities, a firm which is able to monitor this advancing frontier by one means or another may be one of the first to realize a new possibility. ... a firm which is closely in touch with the requirements of its customers may recognize potential markets for such novel ideas or identify sources of consumer dissatisfaction, which lead to the design of new or improved products or processes ... the test of successful entrepreneurship and good management is the capacity to link together these technical and market possibilities, by combining the two flows of information and new ideas”.

Hamel (2004:4) stresses the importance of keeping pace with new trends. Keeping abreast with the dynamic environment is pivotal to company survival.

As the SME innovates and develops new products, it could be that one of these is a technology that establishes a new trend. The partnering LCO, being aware that the SME might afford it the opportunity to be at the forefront of a new trend, might partner with the SME for this reason. For the SME to establish a new trend, it would need to have certain expertise and technological capability to develop a very innovative product that could establish a new trend. As we have seen above, having expertise and/or a technology would imply an ability capability. Hence, establishing a new trend would indicate an *ability* capability.

#### **2.3.4.4 Ability capability: To understand the LCO's innovation need (radical or incremental), and the associated innovative environment**

As has been explained in chapter 1, corporate growth requires a steady stream of innovation. This innovation is typically incremental, whereas leaps in growth are usually associated with the adoption of radical or disruptive innovation. "While resources are necessary to innovate on a consistent basis, there do not appear to be substantial economies to scale in the discovery of new ideas. Thus small firms may well innovate where larger firms often fail" (Oster, 1992:302). The sources of both types of innovation can be SMEs as not only are they agile, risk takers looking for niche areas, but in addition, new company formation is often built around a new technology - "small firms that depend on the specialist skills of their employees can develop either incremental or radical innovations in different situations" (Whitley, 2002:597).

An understanding of the type of technology the LCO is looking for (incremental or radical), and the innovative patterns prevalent in the current environment (incremental, spasmodic, repetitive and incessant) would demonstrate a certain learning ability by the SME to understand the innovative environment in which it operates. An SME would need to learn about the innovation environment in which it operates, as well as the LCO's need for innovation. Inkpen and Beamish (1997) comment that unequal learning will lead to a change in bargaining power. An SME therefore needs to learn and understand as much as possible, not only to improve its bargaining position, but also to demonstrate a learning ability. Hence understanding the LCO's innovation need and the associated innovation environment would qualify as an ability capability.

#### **2.3.4.5 Ability capability: Market segmentation strategy for innovative technologies**

An understanding of how to introduce new innovations to the market by segmenting and targeting, in a focussed way, potential buyers, will help SMEs identify and manage their innovation environment such that they can compete effectively with their competitors.

Understanding the paradigms of potential buyers for technology innovative products would require the pre-existence of certain skills, functional discipline knowledge (i.e marketing, and more specifically how to introduce a technological product to the market), discrete activities and organizational processes. These translate into an ability to understand the market which the SME is targeting such that it can package its offering appropriately, whether this be, for example, to early adopters or the early majority (as per Moore's chasm theory). Hence an understanding of an effective market segmentation strategy for innovative technologies should lead to effective implementation and can hence be categorized as an *ability* capability.

Having defined and discussed *ability* capabilities, the next discussion will focus on *awareness* capabilities.

#### **2.3.4.6 Awareness capability: Awareness of complementarity with LCO's core business and SWOT**

Klein Woolthuis and Groen (2000:161) found that the strongest motives for partner choice included not only pleasant personal relationships but also technological complementarity between partners. They referred to Hitt et al (1998) who stressed the importance of experience in implementing change, as well as of "strategic fit" in a successful partnership. Klofsten and Schaerberg (2000:140) believe that a major driver of collaboration between firms is the benefit of shared resources. These complementary resources can be in R&D, production, marketing and distribution, namely: in areas required for developing a new product. They refer to the work of Slowinski et al. (1996) who found that in their study of 50 alliances between small and large technology-based firms, that having identified a market opportunity, and because of their lack of technology, large companies join up with world-class small companies. They cite Rothwell (1991) who confirms that by joining forces, the issue of innovation too, can be addressed. Access to complementary assets is also stressed by (Teece, 1990:8, citing Teece, 1986): "The

profitable commercialization of technology requires timely access to complementary assets on competitive terms”. An innovating firm must not only develop the core technology required for a new product or process with good commercialization prospects, but must also “secure access to complementary technologies and complementary assets on favourable terms in order to successfully commercialize the product or process” These assets include marketing, competitive manufacture, reputation, and after-sales support, and are often specialized in nature e.g. the commercialization of a new drug may require a specialized information channel for disseminating the information.

Hence, ensuring that the SME’s technological offering is complementary to the large company’s core business in terms of strategic fit and alignment of the transactions process with strategic goals can play a role in partnership success. Awareness by the SME of its technological offering, as well as an awareness of the core business of the LCO will enable the SME to align itself in a complementary fashion with the LCO. This awareness of complementarity with the LCO therefore qualifies as an *awareness* capability.

Bakker et al (1994:14) believe that the first steps in strategically cultivating successful new business options is to be aware of the corporation’s core competencies, and understand its strengths and weaknesses. An understanding of the strengths and weaknesses of the large company and how the SME can complement these, should enable the SME to position itself favourably for collaboration with the LCO. “Recognition of shared purposes contributes to building continuity in a relationship, which, in turn, mitigates the prospect of opportunism” (Hart and Saunders, 1997:35). Klofsten and Schaerberg (2000:142) in discussing some of the ways of overcoming barriers to collaboration, mention that attention should be given to balancing the needs of the two partners – these needs should be similar in strength, but different in nature.

Klofsten and Schaerberg (2000:142) refer to the work of Hlavacek et al (1977) where the 3 criteria which can be used to identify an appropriate collaborator include:

- identifying a company with strengths where you have weaknesses
- identifying a company with an extensive and entrenched marketing position and a very favourable image to the end-user market you wish to serve
- be of an appropriate size, but still have the aggressive nature of a small company.

Hence, not only should the SME be aware of how the LCO's assets can complement its own (the SME's) business, but it should also be aware of the weaknesses and threats that the LCO faces and how its own competencies and capabilities can strengthen the LCO's position.

SMEs that understand the LCO's core business, the LCO's SWOT, and how their own (SME's) offering can complement an LCO can also package it such that it is attractive for the LCO. A capability to be aware of the SWOT of the LCO would enable the SME to align its offering appropriately and ensure complementarity. Understanding the opportunities for complementarity with the LCO's core business and its SWOT therefore qualifies as an *awareness* capability.

#### **2.3.4.7 Awareness capability: Understanding of the internal politics of the LCO**

Decisions taken in companies are not always rational, but can be influenced by, inter alia, the internal politics of the company. Political considerations often overrule economic considerations.

Lei and Slocum (1992:92) comment that firms that organize themselves along strategic business unit (SBU) lines may actually miss opportunities in converging and related technologies. Furthermore, the corporate organization may encourage its SBUs to develop joint technology alliances with external partners to secure financing for future product development. In this way each SBU becomes vulnerable to "predatory alliance partners willing to provide financing and markets in exchange for learning and technology transfer".

In order to position oneself strategically, it is important to have insight into the internal dynamics and politics of a company. For an SME wishing to partner with an LCO, it is therefore important to understand the "inner workings" of the LCO – who are the influencers, who are the decision makers, what is the relationship between the SBUs and the corporate organization, what will be affecting the decision-making process etc. An awareness of the "internal" issues of the LCO would therefore demonstrate an *awareness* capability and hence can be categorized as such.

#### **2.3.4.8 Awareness capability: Being aware of the opportunities that the SME presents to the LCO**



Opportunities that an SME may present to an LCO include benefiting from financial synergies, and satisfying managerial motives. Each of these will briefly be discussed below. Accessing funds is particularly difficult for an SME for the following reasons: little or no track record; unknown entity with little or no established reputation; limited assets against which loans can be secured.

The cause for failure of SMEs is very often related to cash flow. SMEs are therefore particularly vulnerable in this area, and this, in turn, presents an opportunity for a large company to gain a shareholding in an SME in exchange for the necessary finance. Fluck and Lynch (1999) quoting Fluck's earlier work (Fluck 1997, 1998) in stating that projects that cannot obtain equity financing cannot raise debt financing. "A conglomerate merger [or partnership] can then be viewed as a technology that allows a marginally profitable project, which could not obtain financing as a stand-alone, to obtain financing and survive a period of distress" (Fluck and Lynch, 1999:321).

Barber et al (1995:290) comment that the opportunity for financial synergies: for example, a target firm that has a high-growth potential, but is cash-poor, could benefit from an acquisition by [or partnership with] a cash-rich suitor. Therefore SMEs (that are usually cash strapped but may have high growth potential) can provide LCOs with an opportunity to improve their (LCO's) earnings per share. LCOs, in turn, can ensure the survival of the SME. Hence the SME presents an opportunity financial synergy with the LCO. Therefore, one of the motivations for an LCO to partner with an SME may be to benefit from financial synergies. If the SME is aware of this motivation, it can position itself appropriately for the partnership. *To benefit from financial synergies* therefore qualifies as an awareness capability.

In considering the management team, the development of a strong management team is usually essential to growing a company successfully (Candalino and Knowlton, 1994:25). A good management team recognized opportunities for company growth. Hence, satisfying managerial motives such as increasing profitability; improving the technical economies of scale; and recognition of management expertise for proposing the collaboration in the first place, can be reasons or motivations for the LCO to partner with the SME. An awareness of the LCO's management motives for the partnership would therefore demonstrate an *awareness* capability by the SME as it would be aware of the opportunities it presents to the LCO.

#### **2.3.4.9 Awareness capability: Understanding the organizational type from which LCOs source technologies**

As we have seen above, companies do not have all the resources to innovate in order to survive in today's dynamic environment and hence partnering in order to secure access to resources and innovative technologies becomes important. Beneito (2003:694) refers to technology-related decisions faced by firms, which include the following:

- Should the firm invest in some formal source of innovation?
- Should the firm generate innovation through R&D, as opposed to acquiring it through licensing?
- Should the firm locate the R&D internally, or contract them from outside?

Innovative technologies can be sourced from SMEs, LCOs and/or research institutions and each of these “innovation generators” presents their own set of benefits and challenges for the partner.

In the last decades of the 20<sup>th</sup> century, the gap between theory-driven public science and commercially driven private research has closed somewhat. Companies in emerging industries (e.g. biotechnology) have become more closely involved with theoretical [fundamental] research in academic laboratories as this interaction has been facilitated by changes in patent law, state funding policies and university structures. In addition to hiring trained researchers from the universities, these firms are reliant on the latest generic knowledge produced by academics in developing new products and services (Whitley, 2002:502). “The more firms rely on new generic knowledge – i.e. unpublished and in process – the more they will either conduct such research themselves, or develop close alliances with research teams in the public science system. As innovations become more closely dependent on generic knowledge firms can no longer rely on remote and formal access to the scientific and technological literature, but have to become more involved in acquiring and managing the relevant skills themselves” (Whitley, 2002:510).

LCOs have the option of sourcing new technologies not only from research institutions, but also from other LCOs or from SMEs. Partnering with LCOs and SMEs, with the end objective being to acquire new technologies, presents its own set of challenges. Klein Woolthuis and Groen (2000) claimed that there was an assumption that because of the differences in size between an LCO and an SME, a difference of dependence and power

was expected. It was assumed that the SME would suffer from a lack of power and influence on the relationship and the behaviour of its partner. Their research confirmed that, because of the size differences, LCOs preferably collaborated with other LCOs, as did SMEs with other SMEs (Klein Woolthuis and Groen, 2000:162).

An awareness of from where the LCO sources innovative technologies (i.e. from other LCOs; from SMEs; from research institutions; or from a combination of these) would inform the SME when targeting LCO partners in terms of whether the SME may be seen as a possible source by the LCO or not. Understanding the technology sourcing behaviour of the LCO therefore qualifies as an *awareness* capability.

#### **2.3.4.10 Awareness capability: Preferred technology partnership form of LCO**

An awareness of the preferred partnership form that the LCO uses in acquiring new technologies is important. Strategies to acquire new technologies range from wholly acquiring the technology; to entering into a partnership arrangement via a JV, a licence agreement, or becoming a reseller of the technology with either an SME or an LCO.

Hagedoorn and Sadowski (1999:93) refer to the work of Hagedoorn and Narula (1996) which concluded that contractual agreements prevailed in technology-intensive sectors, whereas joint ventures predominated in medium and low-tech industries. They also cited Oster (1992) who suggests that strategic alliances [or partnerships] are preferred to mergers and acquisitions (M&As) by new high-tech industries, characterised by risk, whereas M&As are expected to be more popular in the more mature sectors. Hagedoorn and Sadowski (1999:94) comment that contractual technology alliances are fairly limited in scope, are aimed at short-term technological achievement and have a fairly simple organizational nature. They cited the findings of Bert et al (1983) that joint ventures, however, are complex and are prone to failure. Narula and Sadowski (2002) refer to work done by Osborn and Baughn (1990) and Hagedoorn and Narula (1996), finding that non-equity forms of agreements were more efficient for research intensive activities. Equity agreements, however, were preferred where the aim was to learn and transfer tacit knowledge.

Subcontracting/licensing appears to be a relatively safe arrangement for an SME doing business with a large company. Lang (1996:798) comments that licensing is a way of exploiting a technological advantage; it is also a means of maintaining arm's length contracts (although Intellectual Property rights are often lost to the buyer). Lang

(1996:798) further expands that a small firm can reduce the risk of acquisition/appropriation of itself or its technology by having a protective set of relationships with partners.

An awareness of how the LCO acquires or accesses technologies would enable the SME to align its offering appropriately. This therefore qualifies as an *awareness* capability.

Having considered capabilities of an SME that may be attractive to an LCO in terms both of ability and awareness capabilities, next to be considered are competencies of an SME that may be attractive to an LCO.

### **2.3.5 SME competencies that may attract an LCO**

In considering competencies, innovation; product; and networks and relationships were identified as important competencies that SMEs should possess – the reasons for their selection are as follows.

As we have seen from the literature (Shimshoni (1970), Radtke (1997), Tidd et al (2001), Akguen et al (2004), Schramm (2004), Riedle (1989), Whitley (2002)) LCOs partner with SMEs because they perceive them as being developers of innovation and new products. Hence it would appear that *innovation* and *new product development* would be important competencies to test.

Kimzey and Kurokawa (2002:41) mention that some of the companies they investigated were shifting their focus from developing core competencies in functional or technical areas, to managerial competence in systems integration. This was being developed strategically to give them a competitive advantage. The advantage was derived from being able to produce innovative products by finding, testing, acquiring and integrating technology from worldwide sources into platform products. Furthermore the literature comments that firms with existing alliances are not only more centrally situated in the alliance network, or have more focussed networks, but they enter into new alliances more frequently (Kogut, Shan and Walker (1992), Gulati, (1993 and 1997)). Hence LCOs wishing to access new networks to access specific relationships, may find the SME's networks and relationships to be particularly attractive. The LCOs may also understand that an SME that is already part of an existing network may be more open to partnering with it (the LCO). Furthermore, an SME having a managerial competence in systems

integration could be very attractive to an LCO. Hence networks and relationships would be an important competency to test in terms of perceived successful partnership.

Having identified the reason for the selection of the competencies: innovation; product; and networks and relationships, the following arguments are put forward to explain their justification as a competence, in each case. As in the case of capabilities, the hierarchy from knowledge to core competencies (Figure 3) has been used as the reference point.

#### **2.3.5.1 Innovation competency**

Innovation has been defined in Chapter 1 as *invention plus commercialization*. Expanding on this: to invent there is a requirement for certain capabilities to pre-exist, such as technological capabilities that comprise skills and discipline knowledge, harnessed in the context of available facilities or through appropriate organization. The second part of the definition on innovation refers to commercialization, and which is the business process associated with taking a product to the market. Referring to the hierarchy, capabilities plus business processes leads to competencies, hence innovation qualifies as one of the competence variables.

#### **2.3.5.2 Product development competency**

To *develop a product* requires the existence of certain capabilities and processes that are applied to result in the final product. As the hierarchy describes a competence as comprising capabilities and processes, it can be deduced that product development qualifies as a competence.

#### **2.3.5.3 Networks and relationships competency**

Developing *networks and relationships* require a combination of skills, organization, facilities and processes. Skills would include interpersonal skills, persuasive skills and subject knowledge. Organization would imply combining skills with facilities to arrive at some type of process that would facilitate relationship building, for example, to organize a networking event using a conference venue to host a discussion on a technical topic.

Skills, organization, facilities and processes are basic elements forming a competence (see Figure 3 above), hence networks and relationships are selected as one of the competence variables.

A summary of the above in terms of the capabilities and competencies that could be influencers in the “see-saw balance” model to bring the see-saw back into equilibrium follows.

**Capabilities:**

***Ability Capabilities***

- developing and patenting intellectual property
- having expertise and/or technology
- establishing a new trend
- ability to understand:
  - the types of innovative technology the LCO sources, and innovative environment
  - market segmentation strategies for innovative technologies

***Awareness Capabilities***

- awareness of complementarity with LCO’s core business and SWOT
- awareness of the internal politics of the LCO
- being aware of the opportunities that the SME presents to the LCO
- awareness of the organizational type from whom LCOs source technologies
- preferred technology partnership form of the LCO

**Competencies:**

- innovation
- product development
- networks and relationships

**2.3.6 Relationship between competencies and capabilities and a successful partnership**

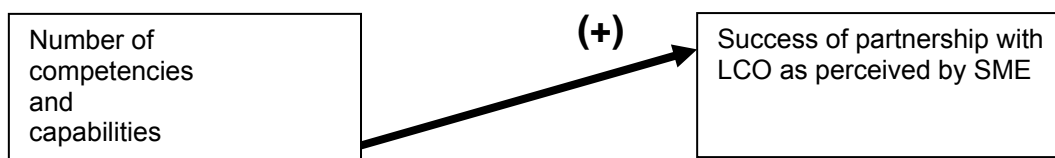
The relationship between competencies and capabilities, and a successful partnership (as perceived by the SME) is illustrated in Figure 4 below. The first view presented is the positive view, i.e. the expected viewpoint of the SME.

The positive view is describes as the more competencies and capabilities an SME has, the higher will be the perceived successful partnership. This is because, as has already

been discussed, that LCOs partner with SMEs as they hope to acquire or gain access to specific competencies and/or capabilities. The greater the competencies and capabilities specific offering of the SME, the more the LCO can potentially benefit from the partnership. For instance, an SME that offers the LCO opportunities for benefiting from its (the SMEs) competencies, namely innovation, products, as well as networks and relationships, should result in the LCO benefiting from the partnership. Similarly the LCO should benefit from the following capabilities that an SME can offer: developing and patenting intellectual property; having expertise and/or technology; establishing a new trend; ability to understand: the types of innovative technology the LCO sources, and innovative environment; market segmentation strategies for innovative technologies; awareness of complementarity with LCO's core business and SWOT; awareness of the internal politics of the LCO; being aware of the opportunities that the SME presents to the LCO; awareness of the organizational type from whom LCOs source technologies; preferred technology partnership form of the LCO.

The more the LCO can potentially benefit from the partnership, the higher the SME will expect the success of the partnership to be.

**Figure 4 : Relationship between competencies and capabilities and perceived successful partnership**



However, because competencies and capabilities are knowledge based, and because knowledge has certain characteristics, there is a potential for abuse or exploitation. The next section will focus on the characteristics of knowledge and the inherent dangers associated with collaborative partnerships based on knowledge sharing.

## 2.4 Characteristics of knowledge in a company

“In an economy where the only certainty is uncertainty the one sure source of lasting competitive advantage is knowledge. When markets shift, technologies proliferate, competitors multiply, and products become obsolete almost overnight, successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products.

These activities define the “knowledge-creating” company, whose sole business is continuous innovation” (Takeuchi and Nonaka, 2004:29). “Knowledge is now the most important factor of production for many companies and individuals” (Bahra, 2001:33).

Knowledge is therefore recognized as being key for innovation. It is the pursuit of useful knowledge that can be applied that drives collaboration between firms. Knowledge is the basis for innovation as innovation results when new knowledge is applied or existing knowledge is combined in a new way, to develop commercial products or services. Furthermore, as has been extensively discussed in Chapter 1, corporate growth requires a steady stream of innovation. Freeman and Soete (1997:200) describe innovation as comprising two components: firstly “it involves recognition of a potential market for a new product or process” and secondly “it involves technical knowledge, which may be generally available, but may also often include new scientific and technological knowledge, the result of original research activity ... and represents an institutional response to this matching”. There is therefore merit in considering the characteristics of knowledge – and specifically knowledge within a company.

Takeuchi and Nonaka (2004:32) comment that knowledge begins with the individual, and that making this personal knowledge available to others is the main activity of a knowledge-creating company. The knowledge or know-how of an individual is referred to as *tacit knowledge*. Tacit knowledge consists of technical skills, as well as “mental models, beliefs, and perspectives so ingrained that we take them for granted, and therefore cannot easily articulate them” (Takeuchi and Nonaka, 2004:33). Citing Polanyi (1966), Takeuchi and Nonaka define tacit knowledge as “personal, context-specific, and therefore hard to formalize and communicate. *Explicit* or “codified” knowledge, on the other hand, refers to knowledge that is transmittable in formal, systematic language.” Takeuchi and Nonaka (2004:53) believe that knowledge creation is based on the assumption that “human knowledge is created and expanded through social interaction between tacit knowledge and explicit knowledge. We call this interaction “knowledge conversion.” Furthermore, this conversion is a “social” process between individuals and not confined within an individual.” “Knowledge is a social product, generated by a close interaction among people” (Takeuchi and Nonaka (2004:126).

Takeuchi and Nonaka (2004:33) believe that there are four basic patterns for creating knowledge in an organization:



- Socialization (from tacit to tacit): being “socialized” into the area by, for example, observation, imitation and practice.
- Externalization (from explicit to explicit): combining discrete bits of information into a new whole, for example an accountant putting together a report on the company’s financial affairs – the report being new knowledge in that it is a synthesis of existing pieces of information.
- Combination (from tacit to explicit): where tacit knowledge is codified such that it is understandable by someone else, for example an accountant developing an innovative new approach to budgetary control based on tacit knowledge from years’ of experience.
- Internalization (from explicit to tacit): where explicit knowledge is internalized by other employees who use it to broaden, extend and reframe their own tacit knowledge.

“In the knowledge-creating company, all four of these patterns exist in dynamic interaction, a kind of spiral of knowledge” (Takeuchi and Nonaka, 2004:34).

Takeuchi and Nonaka (2004:137) believe that effective knowledge creation depends on an enabling context. “Knowledge is dynamic, relational, and based on human action; it depends on the situation and people involved, rather than on absolute truth or hard facts ... Knowledge enabling includes facilitating relationships and conversations, as well as sharing local knowledge across an organization or beyond geographic and cultural borders.” The authors are of the firm opinion that knowledge creation must happen in a caring atmosphere where organizational members take an interest in applying the insights of others. Such an environment dispels mistrust and fear and breaks down personal and organizational barriers, prompting the sharing of tacit knowledge.

“Knowledge is created through wide-ranging and fluid links between firms, as well as universities and research institutes” (Takeuchi and Nonaka, 2004:235). Commenting that many innovations that arose from Silicon Valley have resulted from interactions across firm boundaries, they refer to Saxenian (1994:112) quoting a semiconductor executive describing the process of knowledge creation: “There is a unique atmosphere here that continually revitalizes itself by virtue of the fact that today’s collective understandings are informed by yesterday’s frustrations and modified by tomorrow’s recombinations ... Learning occurs through these recombinations. No other geographic areas create recombination so effectively with so little disruption. The entire industrial fabric is strengthened by this process”. Hence an enabling environment is required for facilitating

knowledge sharing across organizational, geographic and cultural boundaries. Such an environment must be one of caring and trust for individuals to share tacit knowledge.

However, because knowledge is fluid it can be transferred between two companies intentionally (e.g. when scientists divulge the results of their research) or *unintentionally* (e.g. when inventions are imitated). Breschi and Lissoni, (2001:975) in discussing localized knowledge spillovers (LKSs) define these as “knowledge externalities bounded in space”, which allow companies operating nearby important knowledge sources to introduce innovations at a faster rate than rival firms located elsewhere”. Proximity encourages LKS as social bonds foster reciprocal trust and frequent face-to-face contacts – innovation diffusion is faster (Breschi and Lissoni, 2001:978). Furthermore, they comment that knowledge that spills over is mainly tacit, i.e. highly contextual and difficult to codify – hence the need for personal relationships although not necessarily spatial proximity.

Intentional knowledge spillovers can be promoted by labour mobility - as workers move between firms they help create a pool of knowledge from which all their previous employers are capable of drawing. “Labour mobility must be supposed to help in spreading of knowledge (in particular frontier knowledge that is immediately relevant for enhancing innovation opportunities), instead of merely shifting it from one place to another” (Breschi and Lissoni, 2001:991). The exception to this appears to be the biotechnology industry where discoveries are characterized by high degrees of natural excludability as the techniques for their replication are not widely known. Companies wishing to build on such recently generated knowledge will need to gain access to the research teams and laboratory environments that generated the knowledge. “Under these circumstances, the scientists who make key discoveries tend to enter into contractual arrangements with some existing firms or start up their own firm, in order to extract the supra-normal returns from the fruits of their intellectual capital” (Breschi and Lissoni, 2001:992, citing Zucker et al, 1998a,b). Breschi and Lissoni, 2001:999 conclude that “the most dynamic and innovative firms look for knowledge embodied in engineers and scientists wherever they are available, and are not necessarily constrained by geographical barriers. Moreover, these firms establish network relationships (alliances, joint ventures, collaborative research etc.) with customers and suppliers from all over their country, if not the world.

Hence we conclude that tacit knowledge is important for innovation. However, to encourage combination (i.e. conversion of tacit knowledge to explicit knowledge),

relationships need to be established and preferably in an enabling environment. However, such an enabling environment may also result in *unintentional* knowledge spillovers, where employees share their knowledge with employees from another company and in so doing; they share more than was intended. Particularly where an SME is trying to convince an LCO of the expertise it has to offer, it may be tempted to share much of its tacit knowledge as it demonstrates its new technology (and may even be encouraged to do so by an LCO having ulterior motives). This would result in an *unintentional* knowledge spillover. There is much anecdotal evidence to suggest that many an LCO has gained the knowledge it sought by encouraging an SME to part, unwittingly, with sensitive information by means of knowledge spillover. The LCO has achieved this by creating an enabling environment for the SME, and then encouraging the knowledge spillover process to happen. The next section will discuss knowledge spillover in more depth, and specifically the opportunities that it presents for opportunistic behaviour.

#### **2.4.1 Knowledge spillover and appropriation**

“Collaboration is competition in a different form” (Hamel et al, 1989:134). Successful companies are aware that their new partners may try to disarm them. Successful companies furthermore view the alliance as creating a window on their partner’s capabilities. “They use the alliance to build skills in areas outside the formal agreement and systematically diffuse new knowledge throughout their organizations” (Hamel et al, 1989:134). However, Hamel and Prahalad comment that if both partners are intent on internalizing the other’s skills, distrust and conflict may result and threaten the survival of the alliance. From their study they found that alliance ran most smoothly where one partner was intent on learning and the other was intent on avoidance. (However, they make the comment that the success of an alliance is where the company emerges more competitive than when it entered the alliance, rather than on whether the alliance runs smoothly or not.)

Hamel et al (1989:135) believe that for collaboration to succeed, each partner must contribute something distinctive. However the challenge is “to share enough skills to create advantage vis-à-vis companies outside the alliance while preventing a wholesale transfer of core skills to the partner ... Companies must carefully select what skills and technologies they pass to their partners. They must develop safeguards against unintended, informal transfers of information. The goal is to limit the transparency of their operations. The distinction between a technology and a competence is that a discrete,

stand-alone technology (e.g. the design of a semiconductor chip) is more easily transferred than a process competence, which is entwined in the social fabric of a company". Gulati and Singh (1988:789) in discussing the concerns of technology alliances, mention free-riding (benefiting without contributing) and possible appropriation of the key technology by the partner because of the difficulty in circumscribing, monitoring and codifying the knowledge to be included in the alliance.

When dealing with knowledge as a commodity, it is difficult to assess accurately the value of the knowledge without complete disclosure by the partner, who in turn may be reluctant to reveal such information as it is proprietary (Winter (1964), Arrow (1974), Teece (1980:28)). For instance, a company claiming that it has valuable knowledge can only prove this by disclosing detailed information on the content such that the evaluating company can understand and assess the importance and value of the knowledge on offer. However, the company that is making the claim may not wish to make a total disclosure as this would breach the "novelty" aspect, which is essential if it wishes to patent the invention (i.e. the packaged knowledge). Determining the balance of what knowledge to share and what not is important in terms of protecting core knowledge and even possibly core competencies. In the previous section, Takeuchi and Nonaka (2004) described tacit knowledge as the know-how of an individual and ascribed it as being highly personal, hard to formalize and difficult to communicate to others. However, when collaborating disclosure must take place (implicit to explicit) such that all parties can understand the issues and combine resources to address them. In this process of disclosing or sharing, extra insights may be shared unintentionally. Particularly where the environment is one of trust and mutual sharing, "more than is necessary" may be shared. In this way knowledge spills over or "leaks".

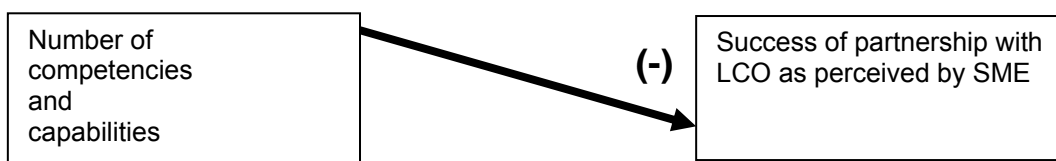
As commented earlier, Hamel et al (1989) discuss a major risk of collaboration being that the partners can also gain access to the knowledge and skills that the company uses in other business areas. Littler et al (1995:18) expand on the risks of leakage associated with collaborative product development. "Leakage of a firm's skills, experience and "tacit" knowledge may form a significant part of the basis of its competitiveness". Littler et al (1995:23) from their research found that the risk associated with giving up proprietary information to a collaborative partner to be the most frequently mentioned risk of collaborative product development. The collaborating partner might furthermore, gain information and insights into possible markets and opportunities that were previously its partner's exclusive domain (Farr and Fischer, 1992). Hamel et al (1989:138) in discussing US and Japanese alliances, comment that one of the Japanese managers noted "we don't

feel any need to reveal what we know. It is not an issue of pride for us. We're glad to sit and listen. If we're patient we usually learn what we want to know." Hamel et al (1989:139) comment that "managers are too often obsessed with the ownership structure of an alliance. Whether a company controls 51% or 49% of a joint venture may be much less important than the rate at which each partner learns from the other ... Ambiguity creates more potential to acquire skills and technologies."

Gulati and Singh (1998:789) explain that the strength of the appropriability regime in an industry also influences the level of appropriation concerns. Citing Anand and Khanna (1997) they define the appropriability regime of an industry as being "the degree to which firms are able to capture the rents generated by their innovations". Where the appropriability regime is tight, profits from proprietary resources are retained by the firm, whereas in a loose regime, involuntary leakage or spillovers to other firms affect these profits negatively. However, from their findings, Gulati and Singh (1998:807) could not establish a relationship between appropriability regimes and the choice of governance structure. They did find evidence in support of an increased likelihood of firms choosing hierarchical governance structures where there was a combination of a technology component and an alliance in a sector with a weak appropriability regime. This is because hierarchical systems would provide control mechanisms to limit involuntary spillovers.

Unintentional knowledge spillover is a major threat for an SME partnering with an LCO. This results in a second view on the relationship between competencies and capabilities and partnership success, namely the negative view. The negative view states that the more competencies and capabilities an SME has, the less successful the partnership will be. This is because the more knowledge the SME has, manifested as competencies and capabilities, the greater will be the opportunity for involuntary leakage, and the more the LCO will have to benefit from acting opportunistically and exploiting this leaked knowledge. It then follows that the more opportunistically the LCO acts, the less successful will be the relationship. This relationship is illustrated in Figure 5 below.

**Figure 5 : Relationship between competencies and capabilities and perceived successful partnership**



Having discussed the challenges for collaborating companies posed by unintended knowledge spillover, it is evident that this is an environment where opportunism can easily result. Companies therefore need to control or safeguard this knowledge spillover such that only intended knowledge is shared with partners. A definition for control will be offered next, followed by a discussion on market control mechanisms and company control mechanisms. The section concludes with a discussion on trust and the role that this plays in inter-organizational control.

## 2.5 Control systems

“Prior to transaction one is uncertain about the partner’s potential opportunism, and hence should take opportunism into account” (Nootboom, 1996:987). For the purposes of this research, opportunism is defined as ... self-interest seeking with guile (Williamson, 1975:255). Nootboom (1996:988) comments that “golden opportunities of defection are tempting, even to the trustworthy”. “If the incentives are right a trustworthy (untrustworthy) person may be relied upon to be untrustworthy (trustworthy)” (Dasgupta, 1988:54). Hence the default position in collaborative arrangements is “beware of opportunism” as it can always be lurking in the background, waiting for the appropriate conditions to surface! This highlights the need for appropriate control mechanisms to control opportunistic behaviour.

Gallivan and Depledge (2003:165) comment that control has no unified definition. There are however, numerous definitions in the literature for control, and a selection of these follows. Leifer and Mills (1996:117) define control as “a regulatory process by which the elements of a system are made more predictable through the establishment of standards in the pursuit of some desired objective or state”. Gallivan and Depledge (2003:166), refer to the work of Ritzer, (1996) in arriving at a definition of control, namely that control comprises mechanisms for rationalizing behaviour, and that any one of the following signifies control: efficiency, predictability and calculability. Efficiency they qualify as “choosing a means to reach a specific end rapidly, with the lowest cost or effort (citing Keel, 1998)”. They contend that control is a necessary condition for efficiency. Predictability they define as “the attempt to structure our environment so that surprise and “differentness” do not encroach upon our sensibilities” (citing Keel, 1998). Predictability is a reflection of control. Calculability denotes an emphasis on the “things that can be calculated, counted, quantified” (citing Ritzer, 1996:142)”.

Control is described as “fashioning activities in accordance with expectations so that the ultimate goals of the organization can be attained” (Das and Teng, 1998:493). By and large, however, the many forms of control have been grouped into either formal or informal control (Dekker (2004), Eisenhardt (1985), Simons (1996), Das and Teng (1998)). “Formal control systems are based on measurement and often lead to rewards or sanctions, depending on conformance with specified procedures. In contrast, informal control is based on socializing individuals to accept the norms, values and culture of an organization as their own, thus ensuring compliant behaviour” (Gallivan and Depledge, 2003:165, citing Ouchi (1979) and Van Maanen and Schein (1979)).

Williamson (1975:255) comments that real economic actors engage not only in activities that promote self-interest, but they also engage in “opportunism ... self-interest seeking with guile; agents who are skilled at dissembling realize transactional advantages”. This section will explain how in the ideal market where there are ample opportunities for both buyers and sellers, there is no opportunism as there is a self-regulating mechanism that constrains opportunistic behaviour. However, as the reality is that there is no “ideal market”, attention needs to be given to what institutional or social mechanisms can be put in place to constrain opportunistic behaviour.

Hirschman (1982:1473) discusses idealized markets as “large numbers of price-taking anonymous buyers and sellers supplied with perfect information ... function without any prolonged human or social contact between the parties. Under perfect competition there is not room for bargaining, negotiation, remonstrance or mutual adjustment and the various operators that contract together need not enter into recurrent or continuing relationships as a result of which they would get to know each other well.”

Granovetter (1985:484) explains that highly competitive markets discourage force or fraud and prevent individual traders from manipulation tactics. This is because where there is perfect competition, should a trader encounter a difficult relationship that is characterised by distrust or misconduct, she can simply move on to conducting business with a host of other traders willing to do business on market terms. Social relations therefore become unimportant.

Transaction Cost Economics (TCE) “provides a comparative framework for assessing alternative governance forms (Williamson, 1994), and it allows us to go beyond descriptive observations of where network governance has occurred and identify the conditions that predict where network governance is likely to emerge” Jones et al

(1997:912). Granovetter (1985:494) cites Williamson (1975) in commenting that “the organizational form observed in any situation is that which deals most efficiently with the cost of economic transactions. Those that are uncertain in outcome, recur frequently, and require substantial “transaction-specific investments” – for example, money, time, or energy that cannot be easily transferred to interaction with others on different matters – are more likely to take place within hierarchically organized firms. Those that are straightforward, non-repetitive, and require no transaction-specific investment – such as the on-time purchase of standard equipment – will more likely take place between firms, that is, across a market interface”.

Economic transactions that have a highly uncertain outcome (for example those arising from collaborative development of innovations) are internalized within hierarchies for two reasons. The first reason is “bounded rationality”, or the inability of economic actors to anticipate accurately the many possible contingencies that might be relevant to long-term contracts. Where transactions are internalized, they are governed within the firm’s structures and hence it is no longer necessary to anticipate all the contingencies and enter into complex negotiations. The second reason is “opportunism” “the rational pursuit by economic actors of their own advantage, with all means at their command, including guile and deceit. Opportunism is mitigated and constrained by authority relations and by the greater identification with transaction partners that one allegedly has when both are contained within one corporate entity than when they face one another across the chasm of a market boundary” (Granovetter, 1985:494).

Granovetter (1985:488) mentions that imperfectly competitive markets, that are characterized by “small numbers of participants with sunk costs and specific human capital investments”, the discipline of competitive markets does not mitigate deceit and misconduct. Malfeasance or misconduct is averted and discouraged by “clever institutional arrangements” that make it too costly to engage in such activities. These institutional arrangements are a substitute for trust and include explicit and implicit contracts (Granovetter 1985:489, citing Okun, 1981) and authority structures that deflect opportunism (Williamson, 1975). Granovetter (1985:489) comments that other economists support the view that some degree of trust must be assumed as force or fraud could not be entirely controlled by institutional arrangements. He comments that a common opinion is that the source of this trust could be as a result of the existence of a “generalized morality”. He cites Arrow (1974:26) in suggesting that societies, “in their evolution have developed implicit agreements to certain kinds of regard for others, agreements which are essential to the survival of the society or at least contribute greatly



to the efficiency of its working". As mentioned before, an important concern for firms entering alliances is appropriation and relates to the predictability of their partner's behaviour. Behaviour can be made predictable either by a detailed contract, or by trust. Furthermore, "familiarity between organizations through prior alliances does indeed breed trust which enables firms to progressively use less hierarchical structures in organizing new alliances" (Gulati, 1998:303).

Das and Teng (1998:501) discuss the difference between formal control and social or informal control. They comment that "formal control influences people's behaviour patterns by delineating clear boundaries". They define output control as being specific performance goals and behaviour control as being specific processes. Social control they describe as a means of "inducing desirable behavior through "soft" measures, and hence it is associated with terms such as "informal control" or "normative control". The premise on which social control is built is that the people can determine their own behaviour, and that influence can be affected by shared goals, values, and norms. There is more interpersonal respect and less mistrust in social control than in formal control. Network governance is a form of social control and will be discussed next.

In order to coordinate complex products or services in uncertain and competitive environments, as discussed in previous chapters, network governance is increasingly being used. "Customized (or asset-specific) exchanges create dependency between parties. The customization of products or services increases demands for coordination between parties. It also raises concerns about how to safeguard these exchanges, since customizing products or services makes both seller and buyer more vulnerable to shifts in markets." (Jones et al, 1997:919). Customization that involves human asset specificity (e.g., culture, skills, routines, and teamwork acquired through "learning-by-doing) is common among firms in a network, because it results from the knowledge and skills of the participants.

Network governance is where informal social systems, rather than bureaucratic structures within firms and formal contractual relationships between them, are used (Jones et al (1997:911), Piore and Sabel (1984), Powell (1990), Ring and Van de Ven (1992), Snow, Miles and Coleman (1992)). Jones cites Uzzi (1996:677) commenting that although network governance is widely seen as producing important economic benefits, the mechanisms for producing these benefits are "vaguely specified and empirically still incipient". "This vague specification lacks clarity on what network governance is, when it is

likely to occur, and how it helps firms resolve problems of adapting, coordinating, and safeguarding exchanges” (Jones et al, 1997:912).

Jones et al (1997:913) refer to the following definitions from the literature describing interfirm coordination that is characterized by “organic or informal social systems, in contrast to bureaucratic structures within firms and formal contractual relationships between them” (Gerlach 1992). “Network organization” (Miles and Snow, 1986), “networks forms of organization” (Powell, 1990), “interfirm networks,” and “organization networks” (Uzzi, 1996, 1997) include the definitions of interfirm coordination, which Jones et al call “network governance” (Jones et al, 1997:914). They refer to definitions offered by various scholars that focus on two key concepts, namely: patterns of interaction in exchange and relationships; and flows of resources between independent units. “Network governance involves a select, persistent, and structured set of autonomous firms (as well as nonprofit agencies) engaged in creating products or services based on implicit and open-ended contracts to adapt to environmental contingencies and to coordinate and safeguard exchanges. These contracts are socially – not legally – binding” (Jones et al, 1997:914). They further qualify network governance as relying heavily on social coordination and control such as occupational socialization, collective sanctions, and reputations, rather than on authority or legal recourse, for enhancing cooperation on shared tasks. “Network governance facilitates integrating multiple autonomous, diversely skilled parties under intense time pressures to create complex products or services” (Jones et al, 1997:921).

Jones et al (1997:918) specify four conditions required for network governance to emerge and thrive: “demand uncertainty with stable supply; customized exchanges high in human asset specificity; complex tasks under time pressure; and frequent exchanges among parties comprising the network”. They expand on these concepts as follows. Outsourcing or subcontracting arises from certain conditions of demand uncertainty where firms disaggregate into autonomous units. This increases the flexibility of the entity, giving it the ability to respond to a wide range of contingencies. Industries with high levels of demand uncertainty but a relatively stable supply of labour (e.g. high-technology industries) are where network governance can be found. Jones et al (1997:919) citing Barley, Freeman and Hybels (1992), Garud and Kumaraswamy (1993), Powell and Brantley (1992), Robertson and Langlois (1995), comment that demand uncertainty is also generated by rapid changes in knowledge or technology, resulting in short product life cycles, making the rapid dissemination of information critical. Network governance emerges where the following conditions are prevalent: a need for high adaptation because of a changing

product demand; a need for high coordination because of the integration of diverse specialists in complex tasks; and the need for high safeguarding due to the interests of overseeing and integrating parties in customized exchanges (Jones et al, 1997:923). From the above it is clear that network governance can be used to protect the exchanges happening between collaborating parties.

To conclude, knowledge based partnerships run the risk of spillover and appropriation. Opportunism needs to be guarded against in such an environment. Opportunistic behaviour can be constrained by market forces, as well as formal and/or informal control mechanisms. Ouchi (1979:834) describes three control mechanisms as being a market mechanism, a bureaucratic mechanism (hierarchical governance), and an informal social mechanism (network governance). The market mechanism is where competitive bids and the competitive process define a fair price; the bureaucratic mechanism is where rules, personal surveillance and direction of subordinates by superiors serve as a control; and social mechanisms can be reflected as similar values, beliefs and cultures. Organizational control mechanism should focus on achieving cooperation among individuals who may hold partially divergent objectives. Cooperation can be driven by one of the following mechanisms: “a market mechanism which precisely evaluates each person’s contribution and permits each to pursue non-organization goals, but at a personal loss of reward; a clan mechanism which attains cooperation by selecting and socializing individuals such that their individual objectives substantially overlap with the organization’s objectives; and a bureaucratic mechanism which does a little of each: it partly evaluates performance as closely as possible, and it partly engenders feelings of commitment to the idea of legitimate authority in hierarchies” (Ouchi, 1979:846). Hierarchical controls as formal control mechanisms will be considered next.

### **2.5.1 Hierarchical systems (alliances and joint ventures) as formal control mechanisms**

Collaborative [project] and product development raise unique challenges, inter alia, how to protect proprietary knowledge and how to deal with the loss of control over the product development (Littler et al, 1995:17). With inter-organizational relationships, appropriation concerns arise and partners need to safeguard their investments from the potentially opportunistic partner. Because bounded rationality prevents firms from writing contingent claim contracts covering every possible future contingency, these incomplete contracts need to be managed by alternative control mechanisms. In such cases “hierarchical controls are conceived to be particularly effective by aligning incentives, providing

monitoring and realizing control by fiat” (Dekker, 2004:29, citing Gulati and Singh, 1998). Hierarchical control mechanisms are believed to be effective in managing increasing information processing requirements (Gulati and Singh, 1998). This section deals with how hierarchical control systems that minimize “knowledge spillover” and associated opportunism.

Whitley (2002:501) comments that firms can minimize “spillover” risks by relying primarily on their own organizational resources. This would facilitate the “integration of varied skills and competences through a unified authority structure based on ownership”. However, the disadvantage of this is that it restricts access to and integration of new knowledge and skills that may not easily fit into the firm-specific technological framework. Furthermore, it restricts learning from suppliers and customers. Hence “firms that focus on developing innovation capabilities internally are more likely to have difficulties in incorporating varied kinds of new knowledge, and to produce generic rather than customer-specific products and services. Such isolation from business partners and public researchers can be particularly disadvantageous in sectors where the rate of technical change is high and dependent on a wide variety of knowledges from different fields produced with different research skills”. Horizontal linkages (i.e. between competitors) can assist firms in overcoming appropriability [where firms take over knowledge that was not intended for them] or spillover problems because the firms that benefit are likely to include a “greater portion of firms which have incurred R&D costs” (Teece, 1990:12). Hence they have contributed to the knowledge creation and are therefore justifiable beneficiaries.

Contractor and Ra (2002) proposed that if knowledge is deeply embedded or tacit, then it is not easy to copy and hence fears of opportunism are lower. Conversely, where knowledge is codified or easily observable, then the knowledge supplier’s concerns regarding possible appropriation will be high. This may result in more hierarchical forms of governance. Gulati and Singh (1998:788) refer to the work of Teece (1986), Levin et al, (1987) and Anand and Khanna, (1997) in discussing the appropriability of rents, which usually refer to the ability of firms to capture rents generated by their innovative activities in an industry. However, appropriation concerns in alliances refer to the firm’s concern in its ability in capturing a fair share of the rents from the alliance (Gulati and Singh, 1998:788). They comment that when appropriation concerns are potentially high, hierarchical structures are believed to be more applicable.

In addition to spillover and appropriation concerns, once firms enter into an alliance, a second set of concerns arises, being anticipated coordination costs. Coordination costs

are defined by Gulati and Singh (1998:782) as “the anticipated organizational complexity of decomposing tasks among partners along with ongoing coordination of activities to be completed jointly or individually across organizational boundaries and the related extent of communication and decisions that would be necessary.” Coordination costs are very relevant in strategic alliances. This is because activities need to be completed jointly or individually across organizational boundaries, tasks need to be decomposed and a precise division of labour specified across the partners in the alliance. This requires ongoing communication and decisions. The greater the need for ongoing task coordination and joint decision making, the higher will be the anticipated level of interdependence and coordination costs. Furthermore, firms will select governance structures that will provide the necessary ongoing oversight and coordination (Gulati and Singh, 1998:785).

Hierarchical elements can address the anticipated coordination costs in the following ways: “the standard operating procedures, command structure, and authority systems typically include planning, rules, programs, or procedures for task coordination” (Gulati and Singh, 1998:786 citing March and Simon, 1958). “Planning involves presetting schedules, outcomes, and targets; and rules, programs and procedures emphasize formal controls in the form of decisions made a priori for various likely scenarios. All of these serve the common purpose of minimizing communication, simplifying decision making, reducing uncertainty about future tasks, and preventing disputes” (Gulati and Singh, 1998:786, citing Pondy, 1977). “In alliances, hierarchical controls institutionalize, or formalize, interactions between partners” (Gulati and Singh, 1998:786, citing Van de Ven, 1976). Citing Galbraith (1977), Gulati and Singh comment that hierarchical controls simplify decision making as they clarify boundaries on decisions and activities. Hierarchical controls in alliances can also facilitate coordination through informal means, “by creating a sense of shared purpose that can motivate and guide individual participants and minimize conflict among them” (Barnard, 1938, Blau, 1972; Ghoshal and Moran, 1996). Together, these attributes give hierarchical governance structures superior coordination capabilities and make them appropriate in situations of high interdependence and coordination costs” (Gulati and Singh, 1998:787). Gulati and Singh (1998:806) found that “the greater the anticipated coordination costs arising from interdependence associated in a strategic alliance at the time of its formation, the more hierarchical was the governance structure used to formalize it.” They concluded that the choice of an alliance structure is influenced not only by appropriation concerns, but also by issues linked to managing coordination costs.

In determining a governance mode, two of the most influential factors are “the intentions of both the knowledge supplier and recipient, and the value placed by the supplier on the knowledge” (O’Dwyer and O’Flynn, 2005:15). If the recipient intends to acquire the knowledge, then the supplier must assess the consequences of the appropriation. If this is negative, then the supplier will express high appropriation concerns and will place a high value on the knowledge. “By assessing the type of knowledge to be exchanged, for example, tacit or explicit knowledge, and then determining the value a supplier places on the knowledge in terms of the potential for negative consequences of appropriation, the choice of governance mode can be predicted more accurately” (O’Dwyer and O’Flynn, 2005:16).

Research on contract choices in alliances and their associated hierarchical controls has been largely influenced by transaction cost economists who have focussed on appropriation concerns in alliances originating from behavioural uncertainty and contracting problems (Pisano, Russo and Teece (1988), Pisano (1989), Balakrishnan et al (1993)). Gulati and Singh (1998:782) comment that “the greater the appropriation concerns, the more hierarchical the likely governance structures for organizing the alliance. The logic for hierarchical controls as a response to appropriation concerns is based on their ability to assert control by fiat, provide monitoring, and align incentives.” In other words, hierarchical controls decree, monitor and incentivise individuals such that the desired outcome is achieved. In so doing, control is effectively exercised over the individuals of a company such that they do not unintentionally “leak” information.

Osborn and Baughn (1990:506) citing Jones (1987 (and Williamson (1985) refer to a conceptual link between uncertainty and control and technological intensity and the governance form selected for the alliance. High levels of uncertainty associated with high levels of technological intensity are associated with higher costs for monitoring, enforcing and regulating and hence the preference for selecting more hierarchical forms of alliance governance. Furthermore, the control of IP, products and services is a particular concern in technologically intensive areas. This is because in order to agree upon a price for information there must be disclosure of the knowledge concerned. However, once this knowledge has been disclosed there is no need for the buyer to pay for it (Osborn and Baughn (1990:506, citing Anderson and Gatignon (1986) and Calvet (1981)).

Because control is used by firms to ensure the attainment of goals, making them more predictable, which in turn, ensures more certain outcomes, effective control, is believed to help generated a sense of confidence (Das and Teng, 1998:493). Hence “firms in

alliances tend to be more confident about partner cooperation when they feel they have an adequate level of control over their partners” (Das and Teng (1998:493), Beamish (1988), Sohn (1994)).

Groen (2002) cites the work of Dickson and Weaver (1997) in commenting that among the various forms of networks, are strategic alliances, joint ventures, licensing arrangements, subcontracting, joint R&D and joint marketing activities. Killing (1988) suggests that arms-length contractual agreements may be preferred where firms wish to ensure that the knowledge transfer does not exceed the scope intended by the partners, and also providing time for inter-firm trust building prior to more involved activities. Contracts can, furthermore, be used to make the commitment of the partners to the relationship explicit and tangible (Klein Woolthuis, 1999:112). However, JVs can offer mutual safeguards to the partners as retaliation by one partner against the other (for example by cutting off access to its technologies, assets or know-how) is relatively easy to execute and such a threat can disincentivise the partner to act opportunistically (Park and Russo (1996:877) citing Buckley and Casson (1988)). Hence contracting would appear to be the “lightest” form of hierarchical system, and joint venturing the “heaviest” and most controlling form.

In considering the appropriateness of the various agreement structures, Hagedoorn and Sadowski (1999:93) conclude from reviewing the literature that the general picture is that contractual alliances are preferred in the high-tech sectors, whereas joint ventures are the preferred mode of agreement in the other sectors. (Their work pertains only to those alliances for which part of the alliance entails the sharing of a joint development of new technologies and joint undertaking of R&D.) However, although joint ventures offer some form of protection and control, this is associated with a substantial administrative cost (Osborn and Baughn, 1990:505). Narula and Sadowski (2002) refer to work done by Osborn and Baughn (1990) and Hagedoorn and Narula (1996), finding that non-equity forms of agreements were more efficient for research intensive activities. Equity agreements, however, were preferred where the aim was to learn and transfer tacit knowledge. This is because equity based joint ventures come with hierarchical control mechanisms that have mutual safeguards for the partners against opportunistic behaviour. Hence sharing of tacit knowledge can be encouraged in a trusting and enabling environment.

Das and Teng (1998:504) caution that potential inequalities in profit distribution could result in the partners losing confidence in and commitment to the alliance. They suggest that equity alliances such as joint ventures and minority equity investment are more

desirable if the objective is to control opportunistic behaviour. They refer to Geringer & Herbert, 1989, and Sohn, 1994, who have suggested that “shared equity ownership, rather than dominant ownership, may be a more effective control mechanism (Das and Teng (1998:506). However, Lang (1996:798) warns that joint venturing can result in the small firm being "subsumed into the larger firm's fold". Hamel et al (1989:139) comment that “companies that are confident of their ability to learn may even prefer some ambiguity in the alliance’s legal structure. Ambiguity creates more potential to acquire skills and technologies.”

Killing (2001) refers to two different types of alliances at either end of a continuum, namely: deep and shallow, in terms of the level of involvement of the partner. Common elements in a deep alliance include: cross ownership with reciprocal positions on the Boards of Directors; equally balanced or reciprocal joint ventures; multiple smaller projects that do not involve equity positions. Common elements of shallow alliances include: one-way ownership with board seat, or single joint venture, or adopting a common standard, or creating a small project that does not involve equity. A decision needs to be taken in terms of how deep the alliance should be, when entering an alliance with a competitor/ally. Killing (2001) mentions that although deep alliances are generally slower moving, more difficult to manage, more difficult to end, and carry more risk than shallow alliances, they also offer more potential rewards. However, “shallow alliances are often used by companies that want to create options in fast changing industries where the way ahead is not clear” (Killing, 2001). Killing cautions that if entering an alliance with a competitor, be aware of their strategic objective. Do they want to learn, and then exit; do they want to exit the business area and hope that the alliance partner takes over 100% of the joint venture; do they want to buy the alliance partner? He advised to assume that the alliance is temporary, and to plan and act accordingly. “Decide in advance what you are, and are not, willing to share. Misplaced trust can be very dangerous” (Killing, 2001).

In conclusion, it is apparent that different types of hierarchical structures are used in an attempt to control behaviour of a partner. The research on hierarchical controls has been heavily influenced by transaction cost economics in terms of the most effective and efficient way of transacting in an uncertain environment. Where knowledge is embedded and tacit and where there is a need for ongoing communication to decompose tasks among the partners and to share the learning, appropriation concerns arising from knowledge spillover will be high, as will coordination costs. In this instance formal or hierarchical controls, and more specifically joint venturing or equity sharing, can both reduce the risk of opportunism, as well as address anticipated coordination costs by systematizing planning and controlling.



Where contracting appears to be the “lightest” form of hierarchical control, joint venturing would appear to be the “heaviest” form.

We shall next consider an informal mechanism of control, namely “trust”.

### **2.5.2 Trust and social embeddedness as informal control mechanisms, based on social exchange theory**

Das and Teng (1998:501) comment that where formal control systems are defined as employing codified rules, goals, procedures and regulations that specify desirable patterns of behaviour, social control is defined as utilizing organizational values, norms, and cultures to encourage desirable behaviour. Gulati and Singh (1998:790), citing Bradach and Eccles, 1989, comment that there are three primary control mechanisms that govern economic transactions between firms: price, authority and trust. If there is trust, then firms no longer believe that hierarchical controls are necessary (Powell (1990), Ring and van de Ven (1992), Gulati (1995)).

Porter et al (1975:479) touch on the difficulty of defining trust, namely: “[trust} is widely talked about, and it is widely assumed to be good for organizations. When it comes to specifying just what it means in an organizational context, however, vagueness creeps in.” What follow are various definitions of trust as cited in the literature.

Das and Teng (1998:494) adopt the definition of trust as described by Boon and Holmes (1991:194), viz: “positive expectations about another’s motives with respect to oneself in situations entailing risk“. Klein Woolthuis (1999:43), having referred to several authors (Mayer et al (1995), Gulati (1995), Bradach and Eccles (1989), Gambetta (1988), McAllister (1995)) arrives at the following description of trust “trust involves a conscious choice to be vulnerable. This choice is based on the subjective probability that another’s behaviour will not be detrimental to one’s own interests, irrespective of the possibility to monitor or control this behaviour“. Similarly, Gallivan and Depledge (2003:162) define trust as “a willingness to make oneself vulnerable to potential harm from another party“. Citing Luhmann (1988), Nooteboom (1996:991) comments that trust is about choice of an action that may later lead to regret. As an example he refers to the choice of trusting a potential business partner. Should the partnership not be successful, part of the blame is attributed to oneself for engaging in the relation. “Trust is based on “fair dealing” and a sense of reciprocity, but does not imply that outcomes be divided equally between parties” (Hart and Saunders, 1997:24; Gouldner, 1959; Gulati, 1995; Ring and Van de Ven, 1994).

In discussing the dimensions of trust Nooteboom (1996:990) makes the following comments: "trust may concern a partner's ability to perform according to agreements (competence trust), or his intentions to do so (goodwill trust)". Klein Woolthuis (2003:3) builds on goodwill trust commenting that intentional trust is "the trust one has in the intentions of a partner towards the relationship, particularly in refraining from opportunism".

Klein Woolthuis (1999:41) cites several authors in describing the function of trust, namely: "reducing opportunism and destructive conflict (Anderson and Narus, 1990, Zaheer and Venkatraman, 1995), reducing the need for safeguards (Bradach and Eccles, 1989), and increasing the efficiency of the relationship (Bradach and Eccles, 1989, Zaheer and Venkatraman, 1995). Trusting relationships increase the likelihood that the partners will have "greater confidence in the predictability of each other's actions and thus anticipate lower appropriation concerns when they form an alliance" (Gulati and Singh, 1998:790, Granovetter, 1985, Gulati and Garguilo, 1999). Furthermore, there is a reciprocal relationship between trust and continuity – trust reinforces the continuation of the relationship, and the commitment to a continued relationship reinforces trust.

Additional benefits of interfirm trust are as listed by Das and Teng (1998:494), who referring to literature, include lowering transaction costs (Gulati, 1995), inducing desirable behavior (Madhok, 1995), reducing the extent of formal contract (Larson 1992), and facilitating dispute resolution (Ring and Van de Ven, 1994). Arrow (1974) suggests that trust is possibly the most efficient mechanism for governing economic transactions. Das and Teng (1998:501) refer to Hart and Saunders (1997) who emphasized the significance of sharing information with partners – leading to "information symmetry". By providing sensitive or unsolicited information, goodwill and intimacy are demonstrated. The reciprocation process should lead to sustained information flow between the partners, and should create a trusting environment. A trustful relationship reduces the vulnerability of a firm in not knowing what the partner may do with the information entrusted to it. "Trust mitigates the extent of the uncertainty that exists between organizations which cannot control one another's actions...it discourages opportunistic behaviour which would clearly reduce the opportunity for greater information sharing over time." (Hart and Saunders, 1997:30).

Littler et al, 1995:26 found from their study that trust was a "most powerful discriminator among organizations with proportionally more collaborative product development experience." In managing collaborations, it is important to balance the establishment of trust

with the need to protect the proprietary interest of the firm. Trust can also alleviate concerns regarding coordination costs. When firms trust each other, they are more likely to have a greater awareness of, or be willing to develop an awareness of the rules, routines and procedures of each other. “As a result, the presence of trust between partners is likely to promote fewer hierarchical controls in the alliances between them, not only because concerns of appropriation and behavioural uncertainty are effectively addressed but also because coordination costs are easily managed” (Gulati and Singh, 1998:791).

“While it is clearly in the interest of a group as a whole for everyone to be trustworthy and trusting, since that would greatly reduce transaction costs for all, individuals may be tempted to defect and be opportunistic while pretending to be trustworthy. The extent of this temptation increases as more people are trustworthy, and it further depends on the efficiency and reliability by which such defection can be detected and communicated, and the ensuing risk of loss of reputation that is detrimental to future partnerships” (Nooteboom, 1996:989).

Lapin (2004:13) maintains that in the present climate of uncertainty and rapid change, companies whose cultures do not inspire trust will not survive turbulence and sustain growth. Trust may, furthermore, be challenged at any time by any number of events that may occur in an inter-organizational relationship. The introduction of a shared technology is one such event as it causes a shift in the nature of the expectations of another’s performance, and because the use thereof may be undetermined or difficult to assess for one of the partners (Hart and Saunders, 1997: 24).

Lapin discusses the paradox of trust and innovation, viz: “trust is born out of predictable continuity whereas innovation breeds unpredictable discontinuity” (Lapin: 2004:13). This paradox, he believes, is the reason for there being so few resilient companies. He compares the co-existence of trust and innovation being like that of speech and music respectively. Whereas two persons speaking at the same time will result in one keeping quiet (compromising) to listen to the other, music is composed of a synthesis of two melodies into one new harmonic entity. Similarly, trust and innovation should not be forced into a compromised co-habitation, but should result in a third alternative, embracing both. Lapin (2004:13) believes that the cultural paradox is not limited to innovation versus trust that needs to be managed, but all the “never changing” and “ever changing” elements of business practice need to be identified and managed. He believes that “cultures should help organisations to frequently change their leaves, but never their roots” (Lapin, 2004:13). Where innovation requires freedom, trust needs discipline – yet another paradox. “Discipline powered by the integrity of a company’s people and the

values of its leadership rather than imposed by external rules of compliance, will achieve higher levels of trust without dampening the exuberance that breeds innovation and growth. The self-discipline of corporate character rather than the controls of corporate governance create a culture of “both innovation *and* trust” (Lapin, 2004:14).

Das and Teng (1998:491) discuss that because of the potential for opportunistic behaviour by the partners in a strategic alliance, firms need to have an adequate level of confidence in its partner’s cooperative behaviour. They define this confidence as being “a firm’s perceived level of certainty that its partner firm will pursue mutually compatible interests in the alliance, rather than act opportunistically”. They comment that the source of confidence comes from *trust* and *control*. Partner cooperation they define as “the willingness of a partner firm to pursue mutually compatible interests in the alliance rather than act opportunistically” and that partner cooperation is the opposite of opportunism in strategic alliances (Das and Teng, 1998:492). They comment that “whereas opportunistic behaviour in alliances is exemplified by cheating, shirking, distorting information, misleading partners, providing substandard products/services, and appropriating partners’ critical resources, partner cooperation is characterized by honest dealing, commitment, fair play, and complying with agreements”. Klein Woolthuis (1999:50) comments that “people who trust each other will expose themselves more easily, are more receptive to other’s ideas, accept more interdependence, and have less need to impose control on others.” Klein Woolthuis (2003:3) refers to two forms of opportunism, namely active and passive. “The passive form entails lack of dedication in performing to the best of one’s competencies. The active form of opportunism entails “interest seeking with guile” (Williamson, 1975), lying, stealing, and cheating to expropriate advantage from a partner. The absence of such active opportunism is called benevolence or goodwill.” Parke (1993:794) comments that opportunistic behaviours are “individually rational yet produce a collectively suboptimal outcome”.

Nooteboom (1996:994) makes the argument for linking power, opportunism and trust as follows: power is defined as “opportunities to act against someone’s interest in a way that he cannot control. Power is close to opportunities for opportunism. Trust is associated with the voluntary submission to power, on the belief that it will not be exercised.” On the same theme, Klein Woolthuis (2003:3) comments that trust can be a control instrument that mitigates relational risk, and that in this instance control is based on power, hence trust leads to control that leads to power.

Pyka (2002:161) discusses the role of trust in networks. Citing Freeman (1991:500) he comments that from a survey of the empirical literature, which informal networks (rather than formal networks) appear to be the most important in managing inter-organizational collaboration. Citing Hakansson (1989), Pyka comments that with time, formal contracts get increasingly displaced by more flexible informal relationships as mutual trust and confidence between the partners is built up. Even after the formal relationship has ended, the relationship between the firms and/or their employees often remains facilitating an efficient channel for knowledge flows in the future.

Klein Woolthuis refers to the work of Larson (1992:77) who examines the extent to which social control (i.e. trust) rather than contacts and formal agreements, governs transactions. During the first phase, where the preconditions for exchange are created, personal reputations, prior exchange relationships and firms' reputations are important. Knowledge of the partner reduces uncertainty whilst creating expectations and obligations, and enabling early cooperation. During the second phase, the conditions for the relationship are formed. These conditions include "the establishment of rules and procedures, the setting of clear expectations and the development of trust" (Klein Woolthuis, 1999:50). The third phase sees integration and control where "the operations of partners are integrated and the exchange relationship is governed by social control" (1999:50).

In a similar manner, Ring and van de Ven (1994:96) discuss phases for inter-organizational relationships that contain formal and informal elements, eventually leading to the development of trust. These phases they describe as follows. During the negotiation phase, there is formal bargaining concerning expectations and motivations. In effect, these are "social-psychological processes of sense-making and getting to know and understand each other". Next is the commitment stage where "agreement is reached on the obligations and rules for future action. The terms and governance structure of the relationship are either codified in a formal relational contract or informally understood in a psychological contract between the parties." And lastly there is the execution stage here the commitments and rules are applied and put into action. Initially role behaviour dominates the interaction of execution of commitments, but because of the many role-interactions, interpersonal (rather than inter-role) trust may be developed as the individuals get to know and understand each other (Klein Woolthuis, 1999:52). "Without trust the willingness to become vulnerable by committing to a deal will be absent" (Klein Woolthuis, 1999:53).

The role of social relations in bringing order to economic life is recognized by Williamson (1975:106-108): the "norms of trustworthy behaviour sometimes extend to markets and

are enforced, in some degree, by group pressures ... repeated personal contacts across organizational boundaries support some minimum level of courtesy and consideration between the parties ... in addition, expectations of repeat business discourage efforts to seek a narrow advantage in any particular transaction ... individual aggressiveness is curbed by the prospect of ostracism among peers, in both trade and social circumstances. The reputation of a firm for fairness is also a business asset not to be dissipated.” Axelrod (1984:20) demonstrated using the “prisoner’s dilemma” game theory model, that if two parties have a “sufficiently large chance to meet again so that they have a stake in their future interaction” then the behaviour of the one party is not solely focussed on self-interest, but rather on mutual cooperation (Hart and Saunders, 1997:32). Citing Doz (1996), Das and Teng (1998:502) comment that “social control often provides a supportive environment for partner firms to understand the process and objective of alliance management, which is often ambivalent at the beginning. There is therefore a strong link between social control mechanisms and trust building.”

Gulati (1998: 296) discusses the influence of social networks on companies. The first broad analytical approach focuses on the informational advantages of social networks, while the second emphasises the control benefits of being advantageously positioned within a social network – and these two approaches can overlap. Information benefits can flow through actors sharing directly with each other, or through the structure of the network itself. In the case of the latter, actors occupying similar positions are likely to be tied to the same set of other actors, even if they are not tied specifically to each other. Granovetter (1985:502) holds an “embeddedness view whereby “both order and disorder, honesty and malfeasance have more to do with structures of such relations (personal relations and networks of relations between and within firms) than they do with organizational form”. Structural embeddedness is where organizations have relationships not only with each other, but also with the same third parties. This results in many parties being linked indirectly via third parties. “Structural embeddedness is a function of how many participants interact with one another, how likely future interactions are among participants, and how likely participants are to talk about these interactions” (Granovetter, 1992:35). Gulati (1998:303) comments that an important implication of embeddedness in social networks is the enhanced trust that results between firms.

Jones et al (1997:924) refer to structural embeddedness as a social mechanism for coordinating and safeguarding exchanges in networks. Jones et al believe that structural embeddedness is critical in explaining how social mechanisms coordinate and safeguard exchanges in networks as it diffuses information about the behaviour and strategies of

parties that enhances safeguarding customized exchanges. “Structural embeddedness allows parties to use implicit and open-ended contracts for customized, complex exchanges under conditions of demand uncertainty, and it enables social mechanisms, such as restricted access, macroculture, collective sanctions, and reputation, to coordinate and safeguard exchanges. Structural embeddedness makes restricted access possible, for it provides information so that parties know with whom to exchange and whom to avoid” (Jones et al, 1997:924). Jones et al (1997:928) comment that restricted access not only reduces coordination costs, but also facilitates safeguarding exchanges. “Having fewer partners decreases the total amount of monitoring a firm must do, which allows the firm to do a better job of monitoring the relationships it does engage in, thus both reducing transaction costs and the danger of becoming the victim of opportunistic behaviour.” Furthermore increased interaction between the parties may result in a closer alignment of interests and needs, rather than in opposition, and this reduces the incentives for opportunism. Repeated interaction would furthermore encourage the parties to cooperate, again reducing the potential for opportunism. Hence social embeddedness is seen as an important safeguarding mechanism. However, Granovetter (1973) does caution that an over reliance on strong ties may result in tight, relatively isolated cliques that are not well integrated into the rest of the industry.

There is a relationship between trust and control although there are different views on this relationship. Gallivan and Depledge, (2003:161) comment that “although both the scholarly literature and the trade press view trust a critical for partnerships to succeed, researchers and consultants often provide managers with contradictory advice”. Citing Harrison and St John (1996:59) who advise managers to “avoid formalization and monitoring of contractual agreements, which lead to conflict and distrust”, but similarly they should “avoid excessive trust, which leads to its violation (e.g. fraud)”. Klein Woolthuis et al (2003:3) comment that there is a “fundamental disagreement in the literature on the relationship between trust and control.” Markus (2000) also refers to this contradiction “while it is generally recognized that too little control is bad ... too much control is also bad”. Gallivan and Depledge (2003:161) conclude as follows: “trust is perceived to be necessary for partnership success, but too much trust leaves one partner vulnerable to opportunistic behaviour, whereas too much control can lead to distrust, cheating and other problems”. Das and Teng (1998:502) refer to findings of Sitkin and Stickel (1996) whereby “formal control systems can lead to escalating distrust if they are ill-suited to the task at hand”.

This section has introduced social mechanisms for managing and controlling opportunism that may arise from inter-organizational collaboration. Arguments put forward are based

on both transactional cost theory and social exchange theory. Trust as a social control mechanism has many attributes that lead, inter alia, to discouraging opportunistic behaviour, and a more efficient relationship with reduced coordination costs. The two main “categories” of trust are competence trust and goodwill or intentional trust (Nooteboom, 1996:990; Klein Woolthuis, 2003:3). Furthermore, social networks and structural embeddedness are social mechanisms for safeguarding exchanges. Not only does social embeddedness allow for “customized, complex exchanges under conditions of demand uncertainty” (Jones et al, 1997:924), but it allows restricted access to firms that can be trusted.

The two previous sections have discussed both formal/hierarchical systems and informal control systems, i.e. trust, and their roles in minimizing opportunistic behaviour as well as transaction/coordination costs. There appears to be some sort of a continuum whereby with time, formal contracts make increasingly more way for trust based relationships (Hakansson, 1989). However, due to bounded rationality, it is not always possible to ensure that formal controls are in place for guarding against every eventuality, and in such instances trust will play an important role at the very start of the relationship. The process for forming a trusting relationship is seen to be important, and this usually contains both formal and informal elements, as the relationship is developed (Ring and van de Ven, 1994). Hence it is evident that both formal and informal controls are important in guarding against opportunism, and the emphasis on hierarchical versus social control may vary depending on the situation.

The next section integrates the theory in arriving at appropriate control mechanisms (both formal and informal) to be tested for their role in safeguarding transactions by SMEs with LCOs.

## **2.6 Safeguards moderating the relationship between competencies and capabilities, and partnership success**

Dekker (2004) comments that the main purpose of control in an inter-organizational setting is to create the conditions that motivate the partners to achieve desirable or predetermined outcomes. (A desirable outcome, in the context of this research, is where the partnership between the SME and the LCO is perceived by the SME to be successful.) Safeguarding or control mechanisms can be subdivided into *informal* and *formal*



safeguards (Dekker (2004), Ouchi (1979)). *Formal* safeguards refer to contractual obligations and formal organizational mechanisms for cooperation and can be subdivided into outcome and behaviour control mechanisms. Informal control or social control and relational governance refer to informal cultures and systems that influence the members – it is based on mechanisms that induce self-regulation (Ouchi, 1979).

Das and Teng (1998:508) believe that trust cannot be a control mechanism and they define trust as “a positive expectation about others’ motives, and control as the process of regulating others’ behaviour to make it more predictable”. Rather they believe that “trust level plays a moderating role between control mechanisms and control level”. However, Dekker (2004) is of a different view. Dekker (2004:28) discussed a framework that explains control in inter-organizational relationships (IOR), building on transaction cost economics, organization theory, and formal and social control. He comments that the choice of governance structure relates to control, which is informed mainly by transaction cost economics.

Dekker (2004:32) identifies and classifies behaviour, outcome and social control mechanisms as in Table 4 below, and an explanatory justification for these groupings follows.

**Table 4: Dekker’s formal and informal control mechanisms in inter-organizational relationships**

<b>FORMAL CONTROL</b>	<b>FORMAL CONTROL</b>	<b>INFORMAL CONTROL</b>
<b><i>Outcome control</i></b>	<b><i>Behaviour control</i></b>	<b><i>Social control</i></b>
<p><i>Ex-ante mechanisms</i></p> <p>Goal setting:</p> <ul style="list-style-type: none"> <li>• Incentive systems</li> <li>• Reward structures</li> </ul>	<p>Structural specifications:</p> <ul style="list-style-type: none"> <li>• Planning</li> <li>• Procedures</li> <li>• Rules and regulations</li> </ul>	<p>Partner selection</p> <p>Trust (goodwill/capability)</p> <ul style="list-style-type: none"> <li>• Interaction</li> <li>• Reputation</li> <li>• Social networks</li> </ul>
<p><i>Ex-post mechanisms</i></p> <p>Performance monitoring and rewarding</p>	<p>Behaviour monitoring and rewarding</p>	<p>Trust building:</p> <ul style="list-style-type: none"> <li>• Risk taking</li> <li>• Joint decision making and problem solving</li> <li>• Partner development</li> </ul>

Ex-ante mechanisms are defined as those control mechanisms that mitigate control problems by the alignments of partners’ interests and by reducing coordination needs

*prior* to the implementation of the inter-organizational relationship. Because of the incompleteness of ex-ante mechanisms, ex-post mechanisms are those that achieve control by processing information and evaluating performance during the relationship (Dekker, 2004:32; Ittner et al., 1999; Ouchi, 1979).

*Outcome control* mechanisms specify the envisaged outcomes of the inter-organizational relationship and monitor the achievement of the performance targets. “Goal setting sets directions for task performance, clarifies mutual expectations and increases goal congruence (Das and Teng, 1998), in particular when rewards are explicitly linked to goal attainment. *Behavior control* mechanisms specify how inter-organizational relationship partners should act and monitor whether actual behaviours comply with this pre-specified behavior” (Dekker, 2004:32). Citing Gulati and Singh, 1998, Dekker comments that examples of ex-ante behaviour controls are planning, programs, rules, standard operating procedures and dispute resolution procedures. Outcome and behaviour control are described by Dekker as *formal* control mechanisms and comprise contractual obligations and formal organizational mechanisms for cooperation, whereas *informal* control mechanisms refer to social control. Trust is seen to be an important form of social control. Dekker refers to goodwill trust - being the expectation that the partner will perform in the interests of the relationship, even at its own expense, i.e. not behaving opportunistically; and capability trust being the expectation that the partner has the competencies to perform a task satisfactorily. Trust building mechanisms include “deliberate risk taking and increasing interaction, for instance by joint goal setting, problem solving, decision making and partner development activities: (Dekker (2004:33), Das and Teng (1998), Kale et al (2000), Saxton (1997), Uzzi (1997)).

Dekker describes the relationship between trust and formal control as being inversely related, i.e. more trust results in less use of formal control mechanisms and vice versa. “Furthermore, the use of formal controls is argued to signal one’s distrust in another. Extensive use of formal control suggests a lack of belief in one’s goodwill or competence and therefore results in a damaging effect on relational trust” (Dekker, 2004:34; Das and Teng, 1998). However, Dekker explains that trust has a moderating effect on the relationship between control problems and the use of control mechanism. “It is the magnitude of the transaction hazards that induces the use of formal control mechanisms, while the level of trust only influences the strength of this association” (Dekker, 2004:34).

Before we define and discuss the safeguards that will be tested for their influence in controlling opportunistic behaviour and hence moderating the relationship between

competencies and capabilities and partnership success, it is worthwhile discussing the intended effect that the safeguards will have. To explain the relationship between safeguards, competencies and capabilities and successful partnerships, we consider literature referring to a “moderator effect”. This, therefore, is the following topic for discussion.

### **2.6.1 The Moderator Conceptual Model**

It is evident that one of the major motivations for LCOs to partner with SMEs is to gain access to the SMEs competences and capabilities. What is not evident in the literature is whether the number of competences and capabilities the SME has influences a successful partnership. The argument could be that the more competencies and capabilities the SME has, the more opportunities it presents for the LCO, and hence the greater the chance that a couple of these opportunities might realize and hence result in a successful partnership. Hence the more competencies and capabilities the SME has, the more successful the partnership with the LCO will be.

The next question to be answered is if the SME were to put in place certain safeguards, would this positively influence the relationship between competences and capabilities and success of the partnership? In other words, does the number and type (formal or informal) of safeguards moderate the relationship between competences and capabilities and the success of the partnership? To explain what is meant by “moderate the relationship”, a brief discussion on a moderator variable follows.

A moderator is a variable that moderates the relationship between two other variables. “Moderator variables are important, because specific factors (e.g. context information) are often assumed to reduce or enhance the influence that specific independent variables have on specific responses in question (dependent variable) ... specifically within a correlational analysis framework, a moderator is a third variable that affects the zero-order correlation between two other variables ... a moderator effect within a correlational framework may also be said to occur where the direction of the correlation changes.” (Igou, 1999, unnumbered page). As an example of the moderator effect, Igou comments that the positiveness of the relationship between changing life events and severity of illness was much stronger for uncontrollable events (e.g., death of a spouse) than for controllable events (e.g., divorce). The evidence of a moderator effect in this study would have been evident “if controllable life changes had reduced the likelihood of illness,

thereby changing the direction of the relation between life-event change and illness from positive to negative” (Igou, 1999, unnumbered page).

Examples of the moderator effect can be found in the following literature citations. Das and Teng (1998:502) in examining the relationship between control mechanisms and control level looked at trust level as moderating this relationship. They proposed that if there was a high level of trust, then control mechanisms were more likely to be effective in generating an adequate level of control, i.e. that trust would facilitate the operation of control mechanisms. Trust therefore served as a moderator for the relationship between control mechanisms and control level.

A second example of the moderator effect is reported by Dickson and Weaver (1997:407), in considering rational choice theories, comment that those such as transaction cost economics and resource dependency theory are built on the assumption that decisions are based mainly on economic efficiency. However, they go on to examine the effect of individual-level factors that affect the human agents within a firm for example, entrepreneurial orientation, and individualism and collectivism, in terms of their effect in moderating the relationship between alliance use/formation and the key manager's perceptions of each dimension of environmental uncertainty. They concluded that there was a significant interaction between key manager orientations, environmental perceptions, and alliance use. Specifically they found that the managers' response to at least two of the environmental uncertainty dimensions relating to increasing the odds of alliance use appeared to vary significantly with the managers' entrepreneurial and individualism/collectivism orientations. Hence, key managers' orientations moderated the relationship between alliance use and the key manager's perception of a dimension of environmental uncertainty.

Escher (2002:2) makes use of a moderator in developing and testing an augmentation hypothesis, viz: “a high degree of cognitive ability and planning should be highly related to economic success”. In this case “economic success” is dependent on both a high degree of cognitive ability as well as a high degree of planning. The purpose of the investigation was to determine whether planning strategy had an impact as a moderator on the relation between cognitive ability and success. From the above examples we conclude that a moderator can be used to augment a relationship between two variables.

As has been discussed extensively above, companies in the knowledge economy need to collaborate. There are, however, difficulties experienced in collaborating, and the

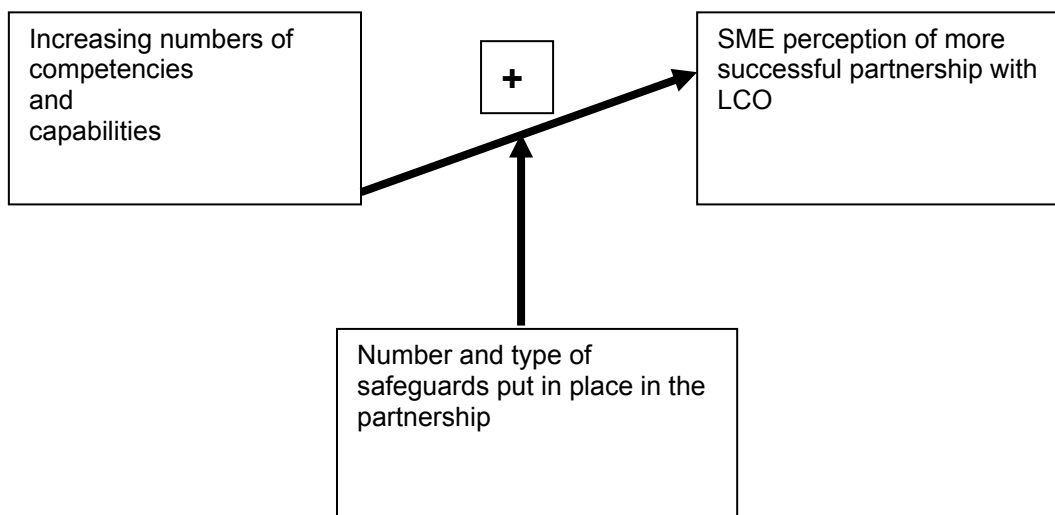
effective management of the collaboration is key. SMEs, however, negotiate from a position of weakness, and hence they need to consider special measures to strengthen their negotiation position, as well as put in place mechanisms to protect them from opportunistic behaviour of LCOs.

A theoretical model has been developed to determine:

- whether the number of competencies and capabilities affects the SME's perception of a successful partnership with an LCO,
- whether the introduction of safeguards moderates this relationship positively?

This is illustrated in Figure 6 below.

**Figure 6: Theoretical model demonstrating how safeguards moderate the relationship between competencies and capabilities and successful partnership with an LCO**



### 2.6.2 Research hypotheses and associated subhypotheses

As has been mentioned above, the relationship between the number of competencies and capabilities and partnership success as perceived by the SME needs to be determined. Furthermore, it will be determined which of the two groups of capabilities: awareness or ability, has the greatest effect on the perceived successful partnership. Thereafter the effect of the introduction of safeguards on the relationship between core competencies

and capabilities will be tested, and whether informal safeguards or formal safeguards specifically, influence this relationship.

As has been previously discussed, there is confusion in the RBV literature regarding clear definitions of resources, capabilities and competencies, and their relationships with each other. The RBV theory motivates for partnerships between SMEs and LCOs because growing firms may depend on resources from partnering companies and SMEs may have specific resources that are attractive to an LCO. The question that arises is whether the number of resources that the SME can offer the LCO is influential, i.e. the more capabilities and competencies the SME has; the more successful is its relationship with the LCO. However, as has been discussed in previous sections, the natural tendency for many, especially large, companies is to act opportunistically. Hence an SME having many capabilities and competencies might actually serve as a stimulant for LCOs to act opportunistically in the absence of safeguards. Model 1 is therefore developed to determine the relationship between capabilities and competencies, and partnership success, taking into account an eventual outcome of either a positive relationship or a negative relationship between capabilities and competencies, and partnership success.

Model 1: determining the relationship between capabilities and competencies, and partnership success

**Positive relationship:**

*H<sub>1a</sub>: Higher numbers of ability capabilities are associated with higher levels of perceived partnership success*

*H<sub>1b</sub>: Higher numbers of awareness capabilities are associated with higher levels of perceived partnership success*

*H<sub>1c</sub>: Higher numbers of competencies are associated with higher levels of perceived partnership success*

**Negative relationship:**

*H<sub>1d</sub>: Higher numbers of ability capabilities are associated with lower levels of perceived partnership success*

*H<sub>1e</sub>: Higher numbers of awareness capabilities are associated with lower levels of perceived partnership success*

*H<sub>1f</sub>: Higher numbers of competencies are associated with lower levels of perceived partnership success*

### **2.6.3 Description of formal and informal safeguards**

In arriving at an operational definition of the safeguards for the purposes of this research, the literature as has been discussed in chapters 1 and 2 was used as the basis. Using Dekker's (2004) framework of formal and informal control mechanisms, the following variables were identified as being relevant for testing in terms of serving as safeguards that moderate a relationship between competencies and capabilities, and perceived successful partnerships with an LCO. As the literature uses safeguards and control mechanisms interchangeably (Hamel et al (1989), Jones et al (1996), Littler (1995) Park and Russo (1996), Narula and Sadowski (2002), Bradach and Eccles (1989)), Dekker's *control* mechanisms framework is being viewed for the purposes of this research as a framework for *safeguard* mechanisms.

#### ***Formal safeguards used in the relationship between the SME and the LCO***

- formal partnership
- quantitative measures for determining partnership success
- the LCO had a technology strategy
- expansionist opportunities SME presents to LCO
- means by which the LCO gathered information on the SME
- documented process for monitoring quality control, delivery and support of products
- substantial equity stake in SME held by another entity

#### ***Informal safeguards used in the relationship between the SME and the LCO***

- trust the LCO
- cultural fit
- SME as project champion
- reputation of SME
- specific motivation of SME to partner with LCO
- the switching costs for LCO
- joint decision making
- recognition as being an important player in the cluster

Dekker's categorization framework of control mechanisms (Table 4) was used to categorize these variables into either formal or informal safeguards, based on whether they were viewed as outcome control, behaviour control or social control. Support from the literature was used to justify the respective categorization. For example, the variable "formal partnership" was classified as a *formal* safeguard as it would contain elements of both outcome control (goal setting; performance monitoring and rewarding) and behaviour control (structural specifications; behaviour monitoring and rewarding). Furthermore a partnership would entail structural arrangements, including rules and regulations, which would govern the partnership. According to Das and Teng (1998), structural arrangements qualify as formal safeguards, hence formal partnership would qualify as a formal safeguard.

In a similar manner each safeguard variable has been categorized, together with the rationale for its categorization.

#### **2.6.3.1 Formal safeguard: Partnership between the LCO and SME formalized**

In the previous section justification was given for this categorization. In conclusion, therefore, a formal partnership would indicate that there are expected outputs (against pre-determined goals) against which behaviour will be monitored and rewarded. Hence, (as per Dekker's framework), partnership would qualify as a formal safeguard.

#### **2.6.3.2 Formal safeguard: Use of quantitative measures for determining partnership success**

Quantitative measures such as financial success and mutual benefits can be used to determine whether the partnership is successful/unsuccessful/partially successful. Quantitative measures are measures against which the performance of the partnership can be measured and controlled and can be expressed (according to Table 4) as either outcome control or behaviour control. Use of quantitative measures therefore qualifies as *formal* safeguards.

#### **2.6.3.3 Formal safeguard: LCO has a technology strategy**

Birchall et al (1996:300) comment that from their survey, satisfaction with the innovation response of organisations appeared to be "closely associated with both competitive pressures for continuous improvement (which included creating effective organisation



structures, a shared vision, open communications both internally and externally) and the presence of strong technology management within the organisation”.

Having a technology strategy would indicate that there is a plan for acquiring/developing/deploying technology in the LCO. The plan would quantify expected outcomes against which progress would be monitored. If the strategy included partnering with an SME, then the partnership would be structured and planned, and the LCO would be committed to the outcomes and hence ensuring that the partnership were a success. Outcome control implies formal control, and the LCO having a technology strategy therefore qualifies as a formal safeguard.

#### **2.6.3.4 Formal safeguard: Expansionist opportunities SME presents to LCO**

The main reasons for the LCO to partner with the SME could be:

- To access new market segments
- To increase sales
- To pursue market dominance
- To develop a “quick win” that has a high probability of success and will probably produce an immediate pay-off

These reasons and their anticipated expectations require planning and the development of formal systems for monitoring their outcomes. Presenting market expansion opportunities can be seen as a safeguard qualifying as outcome control. This is explained as the LCO would be aware of the benefits it would derive by partnering with the SME, and would presumably not act in an opportunistic fashion but would rather nurture the relationship so long as the SME delivered against expected outcomes. Hence expansionist opportunities that the SME presents for the LCO qualify as formal safeguards.

#### **2.6.3.5 Formal safeguard: Means by which LCO gathered information on SME**

Rech (2002:1) emphasizes that the basis for successful negotiation is knowledge. An understanding of how companies acquire knowledge on their prospective partners or competitors will enable companies seeking a partnership, to distribute appropriate information in the appropriate channels.

Rech (2002:1) refers to the ever increasing realization in South Africa of the importance of conducting a thorough due diligence, and of the risks associated with failing to do this. Rech (2002:1) believes that the process of due diligence should question the assumptions behind the final approval and implementation of the deal (referring here to mergers and acquisitions). Should the seller not conduct his own due diligence, it is probable that the well informed buyer will achieve information superiority. Similarly, should a company not perform due diligence on its prospective partner, the other partner may achieve information superiority. Rech cautions against the misguided view held by many South African business people, including attorneys, that due diligence is merely a necessary evil to be completed as quickly and cheaply as possible.

The LCO, via various information-gathering channels, can accumulate information on the SME. Obtaining this information would in all likelihood have been a planned activity where the outputs are measured (qualifying as outcome control). The means by which the LCO gathered information on the SME therefore qualifies as a formal safeguard in the relationship.

#### **2.6.3.6 Formal safeguard: Documented process for monitoring quality control, delivery and support of products**

Having a structured and formal measurement system in place for monitoring outputs such as quality control of their products; reliable delivery; reliable product support, would qualify as outcome control. Hence a documented process for monitoring the quality control, delivery and support of products qualifies as a formal safeguard.

#### **2.6.3.7 Formal safeguard: Substantial equity stake in SME held by another entity**

Equity alliances are defined by Gulati and Singh (1998:791) as “an exchange agreement in which partners share or exchange equity. These include agreements in which partners create a new entity in which they share equity as well as those in which one partner takes an equity interest in the other. Equity has been considered an indicator of hierarchy because it is considered to be an effective mechanism for managing the appropriation concerns associated with partnering” (Pisano, Russo, and Teece, 1988; Parkhe 1993; Moon and Khanna, 1995). “Equity stakes provide a mechanism for distributing residuals when ex ante contractual agreements cannot be written to specify or enforce a division of returns” (Teece, 1992:20).

Alliances vary regarding their formality and governance structures where increasingly they appear to be more informal rather than contractual (Tracey and Clark, 2003:4). Gulati (1995:105) found that “R&D based alliances were more likely to be equity based than non-R&D alliances; that the larger the number of prior alliances between two firms, the less likely are their subsequent alliances to be equity based; that the larger the number of prior equity alliances across two firms, the less likely their subsequent alliances are to be equity based; and that international alliances are more likely to be equity based than domestic alliances”. He concluded that as partner firms build confidence in each other, contracting is replaced by looser practices.

If another organization were holding equity in the SME this organization would have policies and procedures (structural specifications) regulating some of the activities of the SME. The behaviour of the SME would be monitored and controlled in this way. An equity stake in the SME held by another entity therefore qualifies as *behaviour control* and hence is a formal safeguard.

Having described the variables that have been selected for this research in comprising the formal safeguards, below we shall describe those variables comprising the *informal safeguards*.

#### **2.6.3.8 Informal safeguard: Trust the LCO**

In order to establish the level of trust existing before the partnership would entail the SME establishing both the capability of the LCO, and the goodwill that it enjoys due to its reputation. Establishing the level of trust after the partnership, as well as perception the SME has of the LCO exhibiting opportunistic behaviour would form part of trust building (risk taking and joint decision making). These variables can be categorized as social control, hence trusting the LCO qualifies as an informal safeguard.

#### **2.6.3.9 Informal safeguard: Cultural fit**

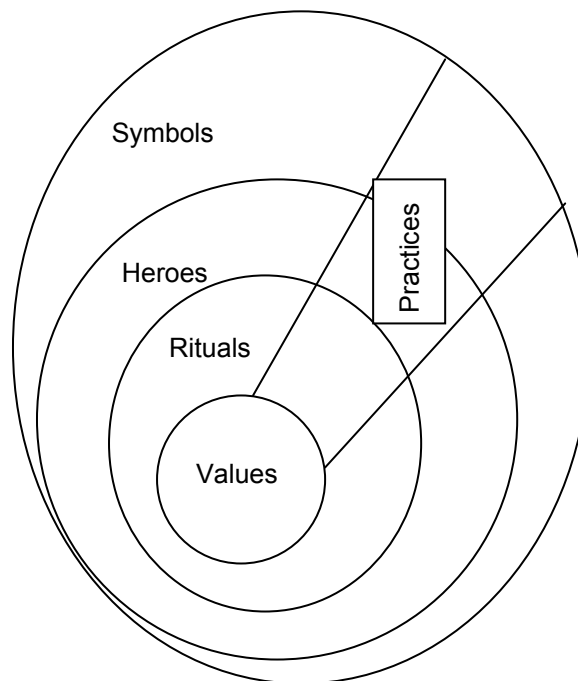
Jones et al (1997:929, citing Abrahamson and Fomburn (1992, 1994), Gordon (1991) and Phillips (1994:384)) refer to macroculture as “a system of widely shared assumptions and values, comprising industry-specific, occupational, or professional knowledge, that guide actions and create typical behaviour patterns among independent entities. Jones et al (1997:930) comment that macroculture enhances coordination between parties in three ways: “1) by creating “convergence of expectations” through socialization so that

members do not work at “cross-purposes” (Williamson, 1991:278), 2) by allowing for idiosyncratic language to summarize complex routines and information (Williamson, 1975: 99-104, 1985:155), and 3) by specifying “broad tacitly understood rules ... for appropriate actions under unspecified contingencies” (Camerer & Vepsalainen, 1988:115). “Faulkner and Anderson (1987: 92-93) comments that macroculture enables efficient exchange between the parties without the ground rules having to be re-recreated for each interaction. Slowinski et al (1996:44) comment that there must be a mutual need as well as the ability to work in the culture of another organization if the partnership is to succeed.

Das and Teng (1998:507) comment that organizational culture forms the central element of social control. Citing O’Reilly and Chatman (1996:160), they describe organizational culture as “a system of shared values ... and norms that define appropriate attitudes and behaviours for organizational members”. The shared values and norms result in people voluntarily behaving in a manner acceptable to other organizational members.

Hofstede (1991:18) classifies “the shared mental software of the people in an organization” as the culture of an organization. He expands on this definition in defining organizational culture as “the collective programming of the mind which distinguishes the members of one organization from another” (Hofstede, 1991:180). Culture comprises values, and values can be described as “broad tendencies to prefer certain states of affairs over others” (Hofstede, 1991:8). Values have a plus and a minus side e.g. abnormal versus normal, or irrational versus rational.

**Figure 7: The “onion diagram” manifestations of culture at different levels of depth (Hofstede, 1991:9)**



Many partnerships fail because of a mismatch of the cultures of the partnering companies. Klein Woolthuis and Groen, 2000:161 found that the greatest bottleneck for technological complementarity was cultural differences. These included differences in technical language, company norms and values.

“Many of the problems in business start with clashing and divergent cultures” claims David Lapin (2004:12). He maintains that if the business culture is not aligned with its strategy, even the finest strategy will fail in execution. Lapin believes that that optimal organisational performance results when employees view their work as more than a mere trading of skills for money. When an organization’s culture aligns values, ethics and strategy, its employees view their work as a means to fulfilling their own higher spiritual quests by making rare and needed contributions (Lapin, 2004:13).

Sharing the following values and norms with an LCO would be important for the SME as the basis for a successful partnership: having integrity, maintaining good relationships, being quality driven, being innovation driven, and building expertise. Determining the cultural fit informs the partner selection process and if there is alignment this will build trust and goodwill. Cultural fit is hence a form of *social* control and therefore qualifies as an informal safeguard.

#### **2.6.3.10 Informal safeguard: SME as project champion**

Groen (2002) cites the work of Brush, Greene and Hart (2001) describing an aspect of the entrepreneurial challenge as identifying, attracting and combining various resources, and transforming personal resources to organizational resources. Groen (2002) elaborates that to meet this challenge the entrepreneur must develop a network providing connections to resource providers (clients, partners, consultants, governments etc).

Littler et al (1995) discuss the importance of one or more collaboration champions, committed to making the collaboration work with a determination to overcome any difficulties. Successful collaboration between large and small companies, Klein Woolthuis and Groen (2002:165) found to be linked to who was the project champion. Where the small company was the project champion, the relationship was characterised by high partner satisfaction and long lasting, stable relationships. However, in spite of this, the technological success was below average. Where the large company was the project champion, the smaller company felt it was the underdog with limited influence, leading to frustration and conflict on both sides. The technological as well as the relational success were below average. In both situations, limited use (if any) was made of contractual arrangements, and ownership, conflict resolution and working methods were often absent and hence not supportive of the cooperation when problems arose.

A representative of the SME being the project champion would be responsible for joint decision- making and problem solving, and would ensure that the joint programme was managed appropriately. This would be a trust building exercise as the LCO builds trust in the competence of the SME. As it proves its competence, the SME would be given greater latitude by the LCO and the SME would therefore be able to exercise some control over the programme, and hence the relationship. The SME being the project champion is hence categorized as social control and therefore qualifies as an informal safeguard.

#### **2.6.3.11 Informal safeguard: Reputation of the SME**

The worth of the SME based on sales turnover; number of customers; an analysis of the SME's financial statements; a high customer to sales ratio; the longevity of the SME's average customer account; the SME's reputation in the market place; and the projected growth of profits. These measures largely give an account of the SME's past performance and reputation in the market place.

A good reputation serves as a positive social control mechanism as it demonstrates goodwill trust, and hence creates the expectation that the partner will perform in the interests of the relationship. The worth of the SME therefore qualifies as an informal safeguard.

#### **2.6.3.12 Informal safeguard: Specific motivation of SME to partner with LCO**

Slowinski et al (1996:44) believe that the selection of the right partner is crucial to the success of the relationship. The partner selection process should firstly identify companies whose needs, skills and resources complement those of the large company partner. It should, secondly, identify a partner that is financially stable and well managed. This is particularly important for the large company as if the small company is not financially stable; much of the energy of the large company may be diverted to focus on non-partnership issues like venture capital funding and negotiations with suppliers.

The main motivation for the SME to partner with the LCO was to: gain access to new markets or larger share of current market; improve/add to SME's management skills; ease pressure from investors; obtain financial support; optimize entrepreneurship value ("cashing in"); "piggy back" on the LCO's technical infrastructure and expertise; SME had moved into a mature phase and no longer provided challenges for management.

These are criteria that could be used when selecting a partner – to ensure that there is an alignment of expectations and delivery against the expectations. These items can be categorized as capability trust, i.e. that the partner has the competencies to perform the task(s) satisfactorily. Therefore the main motivation of an SME to partner with an LCO qualifies as an informal safeguard.

#### **2.6.3.13 Informal safeguard: Switching costs for LCO**

Understanding the cost of the "value add" that the SME could bring to the partnership should build credibility in the eyes of the LCO. It would demonstrate to the LCO that the SME was capable of assessing the implications associated with the acquisition and introduction of the new technology/product/service that it was offering the LCO. This would result in the establishment of capability trust. Hence being able to quantify the switching costs can be categorized as social control and hence qualifies as an informal safeguard.

#### **2.6.3.14 Informal safeguard: Joint decision making**

From their results, Birchall et al (1996:300) found a link between satisfaction with the innovation response of organizations and both competitive pressures for continuous improvement and the presence of strong technology management within the organization. Carayannis et al., (2000) believes that a key aspect of a successful alliance is continued mutual dependence on each other where no partner becomes the dominant player. It is important to establish the ground rules for the collaboration, including the establishment of clearly defined goals, objectives and responsibilities and ensuring that these are fully understood by all parties involved (Littler et al (1995:19), Anderson and Narus (1990), Farr and Fischer (1992), Lynch, R.P. (1990), Lyons (1991)).

Slowinski et al (1996:44) comment that many entrepreneurial firms have much experience in the area of partnering. A biotechnology company with 130 employees and engaged in 13 alliances considers cooperative management the norm rather than the exception, and see partnering as core competency of the company.

From their study, Akguen et al (2004:42) found that the following management practices were statistically significant between successful and unsuccessful projects:

- project visioning (clear and understandable, stable – did not change during the project and was supported by team members, management and executives)
- management support (senior managers cleared obstacles; project had an executive champion)
- new product development process proficiency (clear roadmap with measurable and trackable milestones)
- team processes (teams acknowledged conflict and worked to resolve issues; worked as a unified group towards a common goal; freely shared information with team members)
- documentation systems (effective information processing via documentation systems)
- communication (formal and informal – of which formal appeared to be more influential as long as balance was maintained)
- an established project deadline



In studying joint ventures as a common form of collaborative agreement, and in determining how to improve the probability of a successful joint venture, Büchel (2001) lists the following as being important steps in establishing joint value:

- Establishing a strategic intent
- Developing a joint intent
- Creating project teams
- Communicating joint intent
- Ensuring stakeholder support
- Establishing an implementation plan
- Developing an exit strategy

Büchel (2001) stresses the importance of establishing benchmarks in advance, against which to measure progress. Not knowing the objectives of your partner makes it difficult to identify common ground for value creation. She concludes by emphasising the importance of an exit strategy, citing L. Gynes: “the best partnerships are often those that fulfil their mission and are then ended – to the satisfaction of both partners”.

As part of the negotiation process, if the SME with its partnering LCO, established a long-term strategic intent; developed a short-term joint intent; identified and created project teams; widely communicated the joint intent; obtained stakeholder support; established an implementation plan; developed an exit strategy for the SME, this would be viewed as the management process of joint-decision making and problem solving and therefore of the relationship. As this process proceeds and the partners get to know and understand one another, trust will be built up between them. These variables can therefore be viewed as social control mechanisms, and hence qualify as informal control.

#### **2.6.3.15 Informal safeguard: Recognition as being an important player in the cluster**

Industrial clusters, as defined by Bell and Albu (1999:1722) are communities that either have similar products, or where there is a flow of goods and materials between firms. Bell and Albu (1999:1722) mention that typically industrial clusters have been defined in terms of the materials they use and the goods they produce. Horizontal clusters are defined by the similarity of the firms' products, whereas vertically linked clusters are defined in terms of the flows of materials and goods constituting the key linkages. However, they explain

that technological change is a knowledge-centred process. It is the knowledge that flows within firms, to them, and between them that drive the change in the types of goods they produce and the methods used for production. They claim that it is the structure and functioning of this “knowledge system” which generates technological change at particular rates and with particular degrees of continuity and persistence.

Understanding the format of the particular cluster in which the SME finds itself, and positioning itself to be an important player in this cluster, may provide huge opportunities for it in terms of raising its credibility in the community and hence its profile, in order for the community to adopt its technology. “Reputation involves an estimation of one’s character, skills, reliability, and other attributes important to exchanges” (Jones et al, 1997:932).

If the SME is recognized as an important player in its industrial cluster, this can form part of the selection criteria when the LCO selects a partner as it will have capability trust. Being an important player in its industrial cluster can therefore be categorized as social control, and hence qualifies as an informal safeguard.

From the above discussion, the second, third and fourth models and associated sets of hypotheses to be tested are:

Model 2: determining the relationship between capabilities and competencies, and total safeguards

H<sub>2a</sub>: The greater the number of safeguards (formal and informal) that are put in place, the more positive will be the relationship between ability capabilities and the perceived success of the partnership.

H<sub>2b</sub>: The greater the number of safeguards (formal and informal) that are put in place, the more positive will be the relationship between awareness capabilities, and the perceived success of the partnership.

H<sub>2c</sub>: The greater the number of safeguards (formal and informal) that are put in place, the more positive will be the relationship between competencies, and the perceived success of the partnership.

H<sub>2d</sub>: The greater the number of safeguards (formal and informal) that are put in place, the less negative will be the relationship between ability capabilities, and the perceived success of the partnership.

H<sub>2e</sub>: The greater the number of safeguards (formal and informal) that are put in place, the less negative will be the relationship between awareness capabilities, and the perceived success of the partnership.

H<sub>2f</sub>: The greater the number of safeguards (formal and informal) that are put in place, the less negative will be the relationship between competencies, and the perceived success of the partnership.

Model 3: determining the relationship between capabilities and competencies, and informal safeguards

H<sub>3a</sub>: The greater the number of informal safeguards that are put in place, the more positive will be the relationship between ability capabilities and the perceived success of the partnership.

H<sub>3b</sub>: The greater the number of informal safeguards that are put in place, the more positive will be the relationship between awareness capabilities and the perceived success of the partnership.

H<sub>3c</sub>: The greater the number of informal safeguards that are put in place, the more positive will be the relationship between competencies and the perceived success of the partnership.

H<sub>3d</sub>: The greater the number of informal safeguards that are put in place, the less negative will be the relationship between ability capabilities and the perceived success of the partnership.

H<sub>3e</sub>: The greater the number of informal safeguards that are put in place, the less negative will be the relationship between awareness capabilities and the perceived success of the partnership.

H<sub>3f</sub> The greater the number of informal safeguards that are put in place, the less negative will be the relationship between competencies and the perceived success of the partnership.

Model 4: determining the relationship between capabilities and competencies, and formal safeguards

H<sub>4a</sub> The greater the number of formal safeguards that are put in place, the more positive will be the relationship between ability capabilities and the perceived success of the partnership.

H<sub>4b</sub> The greater the number of formal safeguards that are put in place, the more positive will be the relationship between awareness capabilities and the perceived success of the partnership.

H<sub>4c</sub> The greater the number of formal safeguards that are put in place, the more positive will be the relationship between competencies and the perceived success of the partnership.

H<sub>4d</sub> The greater the number of formal safeguards that are put in place, the less negative will be the relationship between ability capabilities and the perceived success of the partnership.

H<sub>4e</sub> The greater the number of formal safeguards that are put in place, the less negative will be the relationship between awareness capabilities and the perceived success of the partnership.

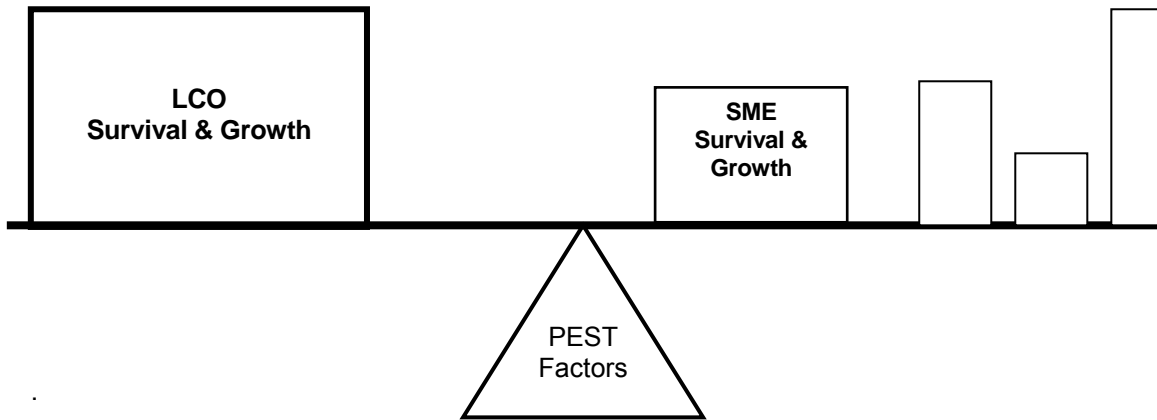
H<sub>4f</sub> The greater the number of formal safeguards that are put in place, the less negative will be the relationship between competencies and the perceived success of the partnership.

In concluding this section, therefore, an SME must consider putting in place certain safeguards to constrain opportunistic behaviour by the LCO. The see-saw model below illustrates not only the competencies and capabilities, but also the safeguards that will be investigated in this research and their function in balancing the see-saw to constrain opportunistic behaviour by an LCO. At this stage it is not clear whether the capabilities and competencies reside on the left side of the see-saw (if they are stimulating

opportunistic behaviour by the LCO), or whether they reside on the right side (where the LCO is dependent on the SME's capabilities and competencies). Ultimately, it is hoped that the safeguards can influence the balance such that equilibrium is attained, which manifests itself as a successful partnership.

Chapter 3 will describe the methodology that was used to test the described hypotheses.

**Figure 8: Expanded illustrative model for maintaining the balance for a successful SME-LCO partnership**



**Competences and Capabilities (Attractants)**

**COMPETENCES**

- 1 Being a source of innovation
- 2 Product(s)
- 3 Networks & relationships

**CAPABILITIES**

*ability capabilities*

- 4 Developing and patenting intellectual property
- 5 Having expertise and/or technology
- 6 Establishing a new trend
- 7 Having an ability to understand
  - 7.1 the types of technology the LCO sources and innovative environment
  - 7.2 market segmentation strategies for innovative technologies

*awareness capabilities*

- 8 Awareness of complementarity with LCO's core business and SWOT
- 9 Understanding of the internal politics of LCO
- 10 Being aware of the opportunities that the SME presents to the LCO
- 11 Being aware of the organizational type from whom LCOs source technologies
- 12 Preferred technology partnership form of LCO

**Safeguards (Weights)**

**FORMAL**

1. Formal partnership
2. Quantitative measures for determining partnership success
3. LCO had a technology strategy
4. Expansionist opportunities SME presents to LCO
5. Means by which the LCO gathered info on SME
6. Documented process for monitoring quality control, delivery and support of products
7. Substantial equity stake in SME held by another entity

**INFORMAL**

- 1 Trust the LCO
- 2 Cultural fit
- 3 SME as project champion
- 4 Reputation of SME
- 5 Specific motivation of SME to partner with LCO
- 6 Switching costs for LCO
- 7 Joint decision making
- 8 Recognition as being an important player in the cluster