

**HOW SMALL AND MEDIUM SIZED  
ENTERPRISES (SMEs)  
CAN INFLUENCE THE SUCCESSFULNESS OF  
A PARTNERSHIP WITH A  
LARGE COMPANY (LCO)  
IN THE TECHNOLOGY INNOVATION SECTOR**

by

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# Summary

## HOW SMALL AND MEDIUM SIZED ENTERPRISES (SMEs) CAN INFLUENCE THE SUCCESSFULNESS OF A PARTNERSHIP WITH A LARGE COMPANY (LCO) IN THE TECHNOLOGY INNOVATION SECTOR

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Small and medium sized enterprises (SMEs) are being seen by governments, increasingly, as important engines of economic growth. They are viewed as sources of innovation and employment creation.

Technology innovative SME's commercialization strategy often includes forming a partnership with a large company (LCO). This is because what the SME lacks in terms of market links, marketing and distribution channels, the LCO can often provide. LCOs, on the other hand, need to be innovative in order to survive in a dynamic and ever changing business environment. LCOs are therefore open to new ideas, being in the form of knowledge and capabilities.

The reality is, however, that many partnerships fail. For an SME whose growth is dependant on a partnership with an LCO, understanding how it can influence the partnership such that it will result in success is critically important. This research sets out to gain a better understanding of this topic.

## Research Problem

Technology innovative businesses operate in the knowledge economy where the one sure source of competitive advantage is knowledge (Takeuchi and Nonaka, 2004). However, knowledge is a high risk commodity and can be easily appropriated by an opportunistic company. A major risk in collaboration is that the partners can gain access to the knowledge and skills of the company (Littler et al, 1995) – this is termed knowledge spillover. Where this is unintentional, it can result in the company exposing its knowledge and skills being made very vulnerable. Furthermore, the high rate of partnership failure is attributed to a lack of cooperation and the opportunistic behaviour of partners (Das et al, 1998).

It is important, therefore, for SMEs wishing to partner with an LCO, to understand both what attracts the LCO to partner with them in the first instance, as well as what safeguards need to be in place to protect themselves against possible opportunistic behaviour by the LCO.

## Methodology

A sample of 43 technology innovative SMEs was interviewed by means of a structured questionnaire. The frequencies of the variables were analysed and compared with findings in the literature. In order to improve the variation of the dichotomous responses, the independent variables were compounded into the following variables: competencies, ability capabilities, awareness capabilities, formal safeguards and informal safeguards. The relationship between the number/level of competencies and capabilities and partnership success was determined, as well as the influence of formal and/or informal safeguards on this relationship. Backward conditional logistic regression was performed on the compounded variables in order to determine which model best fitted the data, in other words which predictors most affected partnership success. To better understand the negative relationship between ability capabilities and perceived partnership success, as well as the positive relationship between awareness capabilities and perceived partnership success, cross tabulations were performed on all the individual items to determine the Phi Square. An explanation was provided for those items that proved to be statistically significant.

Because of the small sample used for this quantitative study and in order to verify the major findings, four case studies were conducted on SMEs that had participated in the original survey. The findings of the survey were then compared with the findings of the case studies.

## **Main findings**

The main findings from the survey were the following:

1. SMEs' abilities rather than their competencies, appeared to influence the success of the partnership
2. the more ability capabilities an SME had, the lower the perceived success of the partnership. This was influenced by where the SME had developed its own IP; and where the SME had segmented its potential market in accordance with Moore's (1999) market segmentation strategy for hi-tech products
3. a positive relationship between awareness capability and partnership success was influenced by the SME having an understanding of the LCO's SWOT, but this same relationship was negatively affected by the LCO preferring to enter into a JV with another LCO when sourcing technology
4. the relationships listed in items 2 and 3 above were influenced by safeguards, namely:
  - 4.1 the greater the number of safeguards (formal and informal) that were put in place, the more positive will be the relationship between increasing numbers of awareness capabilities and the perceived success of the partnership
  - 4.2 the greater the number of safeguards (formal and informal) that were put in place, the less negative will be the relationship between increasing numbers of ability capabilities, and the perceived success of the partnership
  - 4.3 formal safeguards were more effective at moderating the relationship between capabilities and partnership success than informal safeguards

The main findings from the case studies were as follows:

1. having ability capabilities, awareness capabilities and competencies was associated with high levels of partnership success (not in support of the survey findings)
2. above average levels of capabilities/competencies were associated with low levels of partnership success (in support of the survey findings)

3. there is a positive relationship between the level of safeguards and the association between capabilities/competencies and partnership success (in support of survey findings)
4. both formal and informal safeguards are important in ensuring a positive association between capabilities/competencies and partnership success (not in support of survey findings).

In conclusion, the findings from the case studies did indeed validate some of the findings of the survey, namely, in the absence of safeguards, above average levels of capabilities/competencies are associated with low levels of partnership success; and there is a positive relationship between the level of safeguards and the association between capabilities/competencies and partnership success.

## **Keywords**

SME; successful partnership; inter-organizational relationships; technology innovative; competencies; capabilities; safeguards; moderator variables; small-large company partnership.

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# Chapter 1

## Introduction

### 1.1 Problem statement

“South Africa’s recent integration into the world economy provokes the question about its potential for building competitive advantage and prosperity at the local level in the context of an increasingly globalised economy. The experience of prospering localities in industrialised countries, in particular Western Europe and Japan, suggests that the small and medium-sized enterprise (SME) sector is at the forefront of local economic development. SMEs are reported to resolve the persistent problems of insufficient employment growth while being highly efficient in flexibly serving increasingly segmented consumer markets” (Kesper, 2000:1). Kesper (2000:2) refers to work done by Papoutsis (1996) which highlights that the importance of fast-growing SMEs is supported by recent research by the European Commission showing that enterprises characterised as fast-growing SMEs contribute 50% of net job creation. Schramm (2004:106) refers to research by the U.S. Census Bureau and others that found that most net new jobs are created either by start-up companies or by firms in a rapid-expansion phase. Furthermore, that new firms in the U.S. are engines of innovation and employment growth.

Start-ups<sup>1</sup> are significant drivers of change and Minshall et al (2005) citing Timmons (1998) comment that most of the radical innovations since 1945 have been driven by start-ups rather than established businesses. However, technology-based start-ups have a high failure rate – typically in the order of 60%-70% and depending on the type of venture and the time interval considered (Garnsey, 1998). The reasons for this high failure rate are multiple and varied. “The ability to identify opportunities, and to access and exploit resources and competences to create new value from this opportunity” remains a challenge for start-ups (Minshall et al, 2005). Established firms have the benefit of being able to source resources and competences either internally, or to access them by leveraging their existing resources (eg by borrowing against collateral). One of

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<sup>1</sup> Start-ups are defined here as firms less than 10 years old and that also conform to the European Commission’s definition of an SME, namely less than 250 employees, turnover less than 40 million Euros and a balance sheet total of less than 27 million Euros.

the ways that start-ups can overcome these constraints is to partner with a firm that has the much needed resources and capabilities. Furthermore, partnerships not only allow risk and reward sharing, but also afford a start-up legitimacy – or a “stamp of approval” Minshall et al (2005). Tracey and Clark (2003:1), citing Teece (1990:4) who refers to Schumpeter (1943) suggested that there were three reasons for assuming a link between firm size and innovation: “only large firms could afford the cost of R&D programs; large, diversified firms could absorb failures by innovating across broad technological fronts; firms needed some element of market control to reap the rewards of innovation”. However, during the last quarter of the Twentieth Century, with the success of the information and knowledge economy in regions such as Silicon Valley, the importance of small firm development has become an area of study.

From the above it is apparent that SMEs are important for local economic development. Furthermore, partnering with a large company can be a pragmatic solution in overcoming the constraints faced by a small company wishing to grow. The reality is, however, that many a small company has suffered at the hands of a large company. Specifically in the technologically innovative industries there is much anecdotal evidence of unsuccessful partnerships between small and medium sized enterprises (SMEs) and large companies (LCOs) where, in general, the SMEs are left in a worse off situation than prior to the partnership. It is therefore fair to question that if the risk of a partnership relationship is considered to be high, why do SMEs consider the option of a partnership at all? This chapter explains what led to an exploration of the factors affecting a successful partnership arrangement between technology innovative small and medium sized companies (SMEs) and large companies (LCOs). It reflects on literature that highlights the dynamic environment in which SMEs and LCOs operate, the need for innovation to ensure competitiveness and sustainability, strategies for surviving in a turbulent environment and the need for networks and partnerships – specifically between LCOs and SMEs, and the typical problems experienced in such partnerships. The main problem of partnership failure between LCOs and SMEs is identified and the key issues this study proposes to resolve.

Partnering with an LCO is often part of the commercialization strategy of an SME. The reason for this partnership is that SMEs typically develop their business around an innovative product or service, and the founders are usually technical experts who often lack business and marketing skills, and access to markets. By forming a partnership with a larger, more experienced company, the SME can “piggy-back” on the marketing and business infrastructure of the LCO. This opens up, inter alia, marketing and distribution

channels for the SME as the LCO already has a presence in the market (often boasts an established brand), with established sales and distribution channels. Rather than having to defocus its limited resources (financial and human), the SME can concentrate on technical development and support whilst relying on the LCO for the marketing and sales support. A symbiotic relationship where both companies perceive the partnership as a win-win situation is important for the partnership to be effective and successful. Achieving a win-win status is, however, not necessarily as simple as it sounds. What follows are two anecdotal case studies indicating how SMEs may be subject to foul-play by LCOs because of the SME's limited resources and hence inability to respond because of its poor positional power. These examples set the scene for the further discussion that follows.

#### **Case Study 1: Breach of patent by LCO**

(names of companies have been withheld to protect their anonymity)

SME X was a start-up company that joined a business incubator in South Africa. SME X developed a product that was a novel and very relevant security application for the banking sector. This product would have provided the first bank to implement the solution with a competitive advantage. SME X filed for Patent Cooperation Treaty protection, where after it initiated discussions with one of South Africa's major banks. The bank (who shall be referred to hereafter as LCO X) was very interested in the product and therefore was willing to enter into a non-disclosure agreement (NDA) with SME X for a period of 12 months, during which time SME X would disclose additional technical information to enable LCO X to make an informed decision in terms of whether to invest in the product or not.

LCO X evaluated the product and expressed keen interest, but would not commit to purchasing the product from SME X - no definitive answer could be obtained from LCO X as to its future intentions. One month after the NDA expired, however, SME X was contacted by another SME (SME Y), who indicated that they had been requested by LCO X to develop a product, the specifications of which had been supplied to them by LCO X, and having done an internet search, SME Y believed that SME X might be able to assist them in clarifying some of the specifications. SME X indicated to SME Y that they had in fact developed the product, and were awaiting PCT patent approval. SME X never heard from SME Y again.

Once SME X's PCT (Patent Cooperation Treaty) application was approved and the international provisional patent granted, SME X contacted LCO X to inform them of the provisional patent approval, also mentioning that any further development by LCO X on their (SME X's) product would be seen as a breach of the patent. LCO X ignored the warnings from SME X and introduced the product into the market as one of their own developments. The attitude that LCO X had adopted was one of "sue us if you wish", knowing full well that SME X had neither the financial nor the time resources to take them to court.

The attitude displayed by LCO X is not untypical in the South African environment, and there is considerable anecdotal evidence to suggest that South African LCO's are aware that SME's have neither the money, nor the time, to litigate in the case of a breach of patent. Aware of the lack of power of SMEs to litigate in the case of a breach of patent and or other rights, the LCOs can exploit intellectual property (IP) that has been developed by the SME without any fear of retribution.

The reader may be asking why did SME X not consider launching a media campaign to discredit LCO X for displaying such opportunistic behaviour? The reality is that such an activity would have made SME X very vulnerable and could have resulted in it going bankrupt in any litigation that might have been initiated by LCO X as a retaliatory measure. For example, should LCO X have sued SME X for defamatory remarks and should the case have ended up in court, because of the technical nature of the case the arguments for and against might not necessarily have been



properly understood by the presiding judge such that the judgement might have gone against the course of justice and hence against SME X. The chances of this happening are pretty high, considering the fact that LCO X would in all likelihood have sufficient resources to hire expert counsel, whereas SME X would not have been able to afford the best counsel.

The above case study illustrates a common problem experienced by SMEs in South Africa in particular, and this problem may well hold true for companies in other countries. For example, De Wet (2002:3) cites Ulrich Schmoch of the Fraunhofer Institute for System and Innovation Research in Germany in commenting that “large competitors often besiege small companies that hold valuable patents. The small players will regularly abandon patents when faced with costly litigation leaving the larger with all the power.”

#### **Case Study 2: Lack of bargaining power of SME**

A second anecdotal case study demonstrating the vulnerability of an SME when dealing with a large company, that appeared in “Brain Business Brief” (May 2005), is discussed below. Although this case study pertains to an exploitive *supplier* relationship rather than a *technological innovative collaborative* relationship, it illustrates the lack of recourse an SME has because of limited resources to resist opportunistic behaviour by LCOs.

“The amazing David and Goliath story of business owner Jim Foot is far from over as petrochemical giant Sasol prepares to appeal against the case they lost at the Competition Tribunal recently. Foot, who blazed a trail for South African small businesses by being the first to take a large corporate to the Competition Tribunal for anti-competitive practices, has spent nearly a year out of his business in order to fight the case. His business partner Brian Oxley shouldered the burden of running their 25-employee tar pole manufacturing business near Uitenhage in the Eastern Cape.

Foot argued that Sasol was being anti-competitive by charging him 18% more for creosote, a chemical used for the treatment of poles, because he was too small to qualify for bulk discounts. The Competition Act states that a dominant supplier - any supplier with between 35% and 45% market share - must charge the same price to small and large buyers alike, unless it actually costs them more to deliver to small suppliers. The Tribunal found that delivery to Foot's business, Nationwide Poles, did not cost Sasol any more than delivery to a large supplier, and that the higher price charged to Foot was indeed unfair. Sasol, arguing that large clients mean more stable business, thereby justifying bulk discounts, has announced that they have appealed against the Tribunal's decision.”

Reporting on the story of Foot, Timm and Terblanche (2005:14) conclude that “dominant corporates and cartels ... hurt business owners, but not so much on the bottom line of their businesses, as on an emotional level”.

The above two case studies highlight the problems that result at the partnership interface between an LCO and an SME. In the first case the problem arose because of the SME's lack of resources to enforce retribution arising from a breach of patent. In the second case an imbalance of power in the partnership affected the negotiation power of the SME such that it was unfairly disadvantaged. In both cases opportunistic behaviour was displayed by the LCO.

Given their inherently weaker negotiation and enforcement position, we may question why SMEs consider partnerships with LCOs at all? What follows is a sketch of the business environment and context in which today's companies find themselves, exploring some of

the drivers of partnerships in an attempt to understand why SMEs partner with LCOs and vice versa. In addition some of the major issues at stake affecting partnerships between SMEs and LCOs will be explored.

## **1.2 Doing business in uncertain environments**

Today's business environment is characterized by uncertainty. Dickson and Weaver (1997:406) discuss the various sources of perceived uncertainty. Citing Milliken (1987:137) they refer to "effect uncertainty" where the head of the firm is unable to assess "the nature of the impact of a future state of the environment or environmental change will be on the organization". This uncertainty includes changing product markets, changing barriers to foreign trade and investment (Auster, 1987), and changing economies of scale (Murray and Siehl, 1989). A second source of perceived environmental uncertainty is the technological environment of a firm which includes technological complexity and volatility. The third source of uncertainty is the inability to predict certain components of the environment, like the response of competitors, or customer demands. The fourth source is the growing demands for internationalization (Contractor, 1986; Koepfler, 1989). The way of doing business has changed (Siriram and Snaddon, 2004:779). Ohmae (1989:143) describes today's world as one of "converging consumer tastes, rapidly spreading technology, escalating fixed costs, and growing protectionism ... Globalization mandates alliances, makes them absolutely essential to strategy". Furthermore, sources of uncertainty encourage cooperative behaviour between firms. Oliver (1990:243) discusses collaboration with other firms being one of the ways to reduce uncertainty and bring about firm stability.

Because of improved telecommunications and modes of transport, opportunities provided by foreign markets are far more accessible to national companies than they were in the past. "Global communications were such that the distinction between local and global was economically much sharper [in the second half of the 19<sup>th</sup> century] than it is today; the ability of firms to quickly assemble and efficiently operate complex forms of interfirm agreements was severely limited. The capacity to organize and operate complex and geographically dispersed organizational forms is now widely available: with enhanced competition, the need to select efficient structures is even more pressing" (Teece, 1990:8). Ohmae (1989:144) comments that alliances are critical to serving customers in a global environment. He mentions that customers, independent of the nationality, "receive the same information, seek the same kinds of life-styles, and desire the same kinds of products". Ohmae continues by describing the importance of partners in the global game: "To compete in the global arena, you have to incur- and somehow find a way to defray – immense fixed costs. You can't play

a variable-cost game any more. You need partners who can help you amortize your fixed costs, and with them you need to define strategies that allow you to maximize the contribution to your fixed costs”.

Companies today can far easier establish a presence in a foreign country by opening up subsidiaries or branch offices and facilitating their growth into international markets. This results in their eventual change in company type from national to international. Similarly, companies can far easier source and obtain their raw materials or subcomponents from various countries, or establish manufacturing plants in foreign countries to benefit from cost effective production facilities and/or labour. In this way they globalize their operations. One of the arguments for globalization is that “local variations can easily be dealt with inside the framework of the global strategies of the multinational corporations. Indeed, globalization of R&D has already led to local adaptation and modification of products to meet national variations, as a normal and almost routine activity of TNCs (transnational companies)”. (Freeman and Soete, 1997:309). Freeman and Soete (1997:311) comment that globalization is important for continuous incremental innovation, facilitating access to a supply of local managerial and technical skills, and accumulated tacit knowledge, but it is even more important for radical innovation where TNCs are well positioned to “transfer specialized equipment and skills to new locations if they so wish and to stimulate and organize the necessary learning processes. They are also in a position to make technology exchange agreements with rivals and to organize joint ventures in any part of the world”.

Markets have changed from supply markets where companies are trying to keep pace with demand, to demand markets, where customers demand products offering variety, and tailor made for their specific purposes. Freeman and Soete (1997:199) describe how the supply markets had to produce urgently and specifically for the markets and cite as examples the following: following the two world wars, there was a demand in Germany to find a replacement for natural materials which spurred on the intense R&D efforts of IG Farben and other chemical firms; the military-space demand in post-war America stimulated many innovations based on Bell’s scientific breakthrough in semiconductors and the early generations of computers; radar was the result of the war-time requirements by Britain; and Toyota entered the truck industry as a response to the Japanese government’s request for military aims. A recent example of how the demand for a product has changed can be seen in the telephone – which until the 1960s in South Africa was only available in a couple of shapes and sizes, and all of these being offered in a standard black. Today telephones come in various shapes, sizes, colours and connectivity combinations (fixed line, wireless, Internet) and customers have, and demand, a wide range of choice.

Today's business environment is complex and dynamic: products and processes are becoming more complex, the growth rate of technological knowledge is continually increasing and firms are becoming more specialized. This is being driven largely by customers who are becoming more demanding requiring products that reduce costs, offer quality, add value and/or address an emotional need <sup>2</sup>.

Often, because of today's business environment that is so typically characterized by rapid change, company demise is the end result. Over a 40-year period, the average lifespan of an S&P 500 company has halved, and by 2020 more than three quarters of the S&P 500 will consist of companies that are not yet in existence. Even successful companies are struggling to deliver consistent performance (Lapin, 2004:12). Further evidence of the negative impact of a rapidly changing environment is provided by Laurie (2001:3) who comments that over a 40 year period from 1955 to 1998, only eight *Fortune 50* companies sustained significant growth. These were 3M, Hewlett-Packard, American International Group, Dayton Hudson, PepsiCo, Proctor & Gamble, United Parcel Service and Wal-Mart. In many instances the decline was attributed to a failure to recognize that significant corporate growth is fuelled by a continuous flow of innovation through new product research and development. The focus was on incremental improvements that could contribute to next year's operating results, rather than technologies that might cannibalise existing offerings. Hence, company survival and growth is dependant on "doing things differently" rather than merely on "improving efficiencies". Freel (2003:752) highlights the importance of continuously innovating, citing Freeman and Soete (1997), and suggesting that " ... not to innovate is to die".

"The apparent random, accidental and arbitrary character of the innovative process arises from the extreme complexity of the interfaces between advancing science, technology and a changing market" (Freeman and Soete, 1997:202). In today's competitive environment firms must differentiate themselves in order to survive. Differentiation is achieved when a company produces products and services that either focus on a niche market, offer cost advantages, or cater for variety i.e. tailor-made products to meet the customer's needs. By following one of these strategies a company can differentiate itself from the competition. Innovation is usually associated with differentiation as innovation brings about new or

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<sup>2</sup> To clarify the need of fulfilling an emotional need, we can consider the recent new range of automobiles in the four-by-four luxury range. Although these vehicles are designed to travel on rugged and difficult terrain, the majority of these vehicles is used for travel on national, provincial and local roads and is seldom used for their features of road-holding on difficult terrain. The market for these vehicles is not necessarily to appeal to the individual requiring an "off-road" vehicle, but rather the individual who *perceives* he/she may require an off-road vehicle and hence because of the lifestyle that the vehicle portrays. The decision to purchase such a vehicle is therefore based on emotion rather than on technical competence.

improved products/processes/services and is usually associated with a different way of doing things.

It is important for companies to develop effective strategies for growth and the capabilities to execute on them efficiently in this high risk environment (Lapin, 2002:12). Innovation plays an important role in helping companies to “do things differently”. Innovation is recognized as critical to the survival and sustainability of companies. “Innovation is the only insurance. If you are not writing the new rules you are slowly becoming irrelevant” (Hamel, 2004:1). Hamel further comments that “companies that miss a key trend may never catch up”. He believes that company survival is dependent on “innovative strategic business models that keep pace with the accelerating change around them” Hamel (2004:4).

Having examined the importance of innovation to companies, and understanding that it is companies comprising industries that make countries competitive (Porter, 1998), understanding the importance of innovation to countries merits some discussion. The innovativeness of companies has a knock-on effect in the environment in which they operate, and this ultimately affects the country(s) from which they operate. In the context of globalization, we shall therefore consider the importance of countries being innovative.

### **1.3 The need for countries to innovate**

“Innovation” is a term that is often used in the context of economic development and growth. As was discussed in the previous section, a change in environmental drivers affecting business development must be taken into account when considering why companies need to innovate. This change in the environment does not only affect companies, but also countries. As we shall see below, a country’s competitiveness is closely linked to that of its industries.

Pistorius (1998:2-1) discusses how the world order has moved from a focus on military and security concerns, to economic concerns and an emerging “global economic war”. Support for this can be illustrated by an excerpt from a report by the US Department of Commerce (1996): “a new battlefield has emerged in the form of a global marketplace, and able competitors from around the world are fighting for a share”. In South Africa, economic growth and development are national strategies, where economic decline, poverty and associated social problems are national threats. Economic security, Pistorius believes, will become an increasingly important component of national security and a

critical path to achieving economic security will be to become globally competitive. Porter (1998) believes that a nation's competitiveness is dependant on the capacity of its industries to innovate. Wealth, he believes, is governed by productivity. To achieve competitive success, firms must have a competitive advantage in the form of either lower costs, or differentiated products that command premium prices. Porter focused his research on industries where complex technology and highly skilled human resources offer the potential for high levels of productivity as well as sustained productivity growth (Porter 1998:10). From the above, there appears to be a golden thread linking innovation, competitiveness and economic wealth of nations.

In South Africa this golden thread has also been recognized. The focus on innovation and improving the competitiveness of South Africa leading to economic wealth is emphasized by the comments by President Thabo Mbeki in describing the context for South Africa's National Research and Development Strategy of 2002 "... we have to devote the necessary resources to scientific and technological research and development ... we must further encourage innovation among our people and ensure that we introduce new developments into our productive activities. ... While ensuring that we continue to develop a balanced economy, we must also identify and develop the lead sectors that will help us further to expand the base for creation of wealth and give us the possibility to compete successfully within the dynamic world economy." (South Africa's National R&D Strategy: 2002:3). We now move on to discussing what are technological innovation and its role in driving economic growth.

Technical innovation is defined by economists as "the first commercial application or production of a new process or product" (Freeman and Soete, 1997:201). According to Pistorius, (1998:3-4) technological innovation is defined as the "creation of new products, processes, services, techniques and the acceptance in the market" (Pistorius, 1998:3-4). Pistorius, (1998:3-4, citing Roberts, 1988:12) elaborates: "invention + market exploitation = innovation". In clarifying the difference between invention and innovation, Pistorius (1998: 3-5) explains that whereas inventions create new knowledge, innovations create new wealth; and whereas the criterion of success of an invention is a technical one, the criterion for success of an innovation is an economic one. Pistorius refers to the work of Sahal (1977) that explores the mechanisms for diffusion of a technology, building on this as follows: "an invention is essentially the creation of a new device. An innovation additionally entails commercial or practical application of the new device ... first application of an invention." Technological innovation, concludes Pistorius (1998:3-6) encompasses idea generation, development, manufacturing and diffusion into the market.

Having defined technological innovation we shall discuss its role in promoting economic growth.

Pistorius (1998:2-5) comments that “economists generally attribute the greater part of measured growth to technological progress rather than to increases in the traditional input of labour and capital”. He cites Freeman (1986) “macro-studies of technical progress...almost invariably find technical progress as the prime determinant of the rate of growth” and Porter (1998) “an upgrading economy demands a steadily rising level of technology ... technological change, in the broadest sense of the term, accounts for much of economic growth.” However, it is not only technology, but technological innovation that puts a country on the path to being globally competitive: “the changing character of technology and specifically, technological innovation has become the strongest engine driving society...” (Kash, 1989:7). “To be internationally competitive technologically a country needs a heavy enough concentration of high technology sectors, employees and the appropriate infrastructure in one or two regions to generate the spill-over effects from research and other advantages of agglomeration on a scale sufficient to generate benefits for the national economy” (Sternberg and Tamasy, 1999:386).

It is clear innovation is important for economic wealth both at a microeconomic level, as well as a macroeconomic level. Countries and companies need to understand and manage innovation to be competitive. Innovation does not happen in isolation but it requires networks and inter-firm collaboration. Such linkages happen in the context of a knowledge economy. An explanation of “the knowledge economy” and its characteristics follows in the next section.

## **1.4 Technological innovation in context: knowledge management in the knowledge economy and inter-organizational collaboration**

### **1.4.1 The knowledge economy**

As discussed above the business environment of the 2000's is dynamic and ever changing. Companies therefore need to be flexible and adaptable to cope with this environment. Those that succeed do so by innovating and differentiating themselves from their competitors. Innovation requires companies to apply knowledge and to manage knowledge and technology appropriately. This is usually done in collaboration with other

partners as no one firm has all the knowledge required to bring about the desired level of innovation. In summary, in order to cater for variety, more knowledge is required. This knowledge needs to be managed within some organizational form. What follows below is a discussion on knowledge management and the associated organizational forms within which this knowledge is managed.

For the purposes of this research we understand the knowledge economy as being where the main production factor of the economy is knowledge. Within this knowledge economy knowledge needs to be managed. Toffler (1981) describes a third wave of technology that will change the way that firms function. He believes that information, technology and knowledge form the pillars of the third wave. The source of power of this third wave will arise from ideas, information and knowledge, where the pace of change is driven by knowledge and application of ideas.

Scarborough et al (1999:2) define knowledge management as “any process or practice of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organizations”. Siriram and Snaddon (2004:784) describe knowledge management as encompassing the areas of information flow, knowledge transfer and the integration of new and emerging technologies.<sup>3</sup> They use the logic that the subsets of knowledge management should lead to improved communication within and between companies. Improved communication should result in managers having relevant information timely to make necessary decisions quickly. Quick decision making concerning market threats and opportunities, i.e. being responsive to a competitive environment, may give a company a competitive advantage. They cite Hamel et al (1996:595) who stated that “knowledge transfer depends on how easily knowledge can be transported, interpreted and absorbed” Siriram and Snaddon (2004:785).

Knowledge can be defined as both tacit (tangible) and explicit (intangible). Explicit knowledge can further be defined as easily communicated, articulable knowledge – the opposite of tacit knowledge. Siriram and Snaddon (2004:785) cite the following authors in defining tacit knowledge: “the implicit and non-codifiable accumulation of skills that results from learning by doing” (Reed and DeFillipini, 1990:89); “knowledge, which can easily be communicated and shared, is highly personal, deeply rooted in action and in an individual’s involvement within a specific context” (Simonin, 1999:598, citing Nonaka, 1994). Siriram and Snaddon (2004:785) believe that specialized knowledge (that

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<sup>3</sup> Author’s comment: The management function is mainly that of facilitation, i.e. planning, leading, organizing and controlling. Hence the definitions by Scarborough et al and Siriram and Snaddon of knowledge management should be seen in terms of the facilitation of the described processes.



acquired from being in an industry), which may include detailed steps of production, as well as specialized skills, are mainly acquired through learning by doing. They believe that tacit knowledge may improve a company's capabilities.

Hamel (2000:13) believes that organizational learning and knowledge management are closely associated with continuous improvement – “they are more about getting better than getting different.” Siriram and Snaddon (2004:787) comment that organizational learning is dependent on knowledge management. Organizational learning considers the absorption of knowledge from outside the firm and diffusing this knowledge within the firm. They comment that information flow, knowledge transfer and new and emerging technologies may assist a company in learning and developing capabilities faster than their competitors. Absorptive capacity (a company's ability to learn), also plays a role.

In considering *learning*, Lane and Lubatkin (1998:462) categorize three different types:

- “Passive learning occurs when firms acquire observable knowledge about technical and managerial processes through journals, seminars and consultants.”
- Active learning includes benchmarking and competitor analysis, which provide a broader view of other firm's capabilities
- Interactive learning is where a student firm gets close to the teacher firm and learns from face-to-face interaction.

To conclude, therefore, knowledge can be viewed as a critical resource for innovation, and hence for technology innovative companies. The absorption of this knowledge, or the learning that transpires, would demonstrate the existence of a competence in a firm.

Having considered the knowledge economy, we shall discuss the organizational form that promotes organizational learning, and the related motivations for these organizational forms.

#### **1.4.2 Reasons for networks and inter-organizational relationships**

Since the 1980s, globalization has been driving multinational enterprises to engage in strategic technology alliances at an unprecedented pace (Narula and Sadowski, 2002:600). These alliances often include linkages with competitors. New forms of inter-firm cooperation, particularly with respect to innovative activities where the risks and costs are very high, have been particularly important. This section spells out the reasons for firms to engage in inter-organizational relationships and networks.

Narula and Sadowski (2002:601) suggest that most cooperative agreements have two possible motivations: a cost economising motivation, whereby at least one firm within the relationship enters with a view of minimising its net costs; and a strategic motivation – aimed at long-term profit optimisation by trying to enhance the value of the firm's assets.

An alliance is defined as “any voluntarily initiated cooperative agreement between firms that involves exchange, sharing, or co-development, and it can include contributions by partners of capital, technology, or firm-specific assets (Gulati and Singh, 1998:781, Parkhe 1993, Harrigan, 1986). Strategic alliances take the form of OEM contracts, joint R&D and technology licensing agreements, joint sales, support, services and marketing deals, or a combination of these.

The decision to enter a relationship with another organization is usually based on multiple contingencies. For example, in attempting to achieve environmental stability, attempts may be made to control the relationship, or, alternatively, suppression of power in the hope that equity, reciprocity and harmony will facilitate stability. Oliver alludes to a research gap that exists in terms of how the contingencies interact to explain why organizations choose to enter relationships with one another (Oliver, 1990:260). These contingencies are (Oliver, 1990:243):

- Necessity – to meet necessary legal or regulatory requirements, and need for resources
- Asymmetry – the potential to exercise power or control over another organization and/or its resources. Oliver cites literature proposing that resource scarcity may either motivate organizations to cooperate with each other, or alternatively, prompt organizations to exert power, influence, or control over organizations that possess the required scarce resources.
- Reciprocity – which emphasises cooperation, collaboration and coordination, rather than domination, power and control, for the purpose of pursuing common or mutually beneficial goals or interest. The anticipated benefits far exceed the disadvantages.
- Efficiency – the anticipation of increases in return on assets or reductions in unit costs, waste, or downtime.
- Stability – prompted by uncertainty, organizations try to manage relationships to achieve stability, predictability and dependability in their relations with others.
- Legitimacy – justification of their activities or outputs and appearing to comply with the prevailing norms, rules, beliefs, or expectations of external constituents.

“Strategic alliances help technology companies to improve product lines, access new technologies, source manufacturing capacity and extend their market reach while containing the risks of expansion and their investments into infrastructure and R&D” (Harris, 2005:59). Hagedoorn and Sadowski (1999:89) comment that strategic alliances can be used to scan the environment wherein companies operate, looking for new opportunities. They allow companies to maintain an arm’s length from new product markets, monitoring these markets before deciding on whether to enter them. Strategic alliances also provide a mechanism for sharing the risk and uncertainty, and costs, associated with R&D projects. Moore (1995:164) believes that companies should question their motives for a partnership. Of the typical motivations: a single revenue opportunity; a potential revenue stream; to capture market leadership, he believes that the only strategic objective worth pursuing is market leadership. Moore (1995:163) highlights that companies controlling the customer relationship are those with the greatest leverage.

Hagedoorn (1993:372) discusses a motive for strategic (technology) alliances being “the sharing and further advancement of research and the restricted diffusion of some basic scientific and/or technological knowledge amongst participating companies”. Large and diversified firms may lack some competence in a number of scientific and technological fields, and by cooperating with other companies and obtaining the necessary complementary technology inputs, the large companies can capitalize on economies of scope through these joint efforts. Companies need to monitor the evolution of technologies, continuously assessing potential technological synergies, near-future results of general scientific knowledge and relevant complementarities of technologies. This is necessary as no company will have an all-embracing competence in every field of technology, and hence an evaluation of possible synergies with another company which may warrant a joint undertaking, is important. Alliance formation may be driven by the need to access technological advantages – especially for intangible technologies. “In such cases firms form networks with other firms” (Siriram and Snaddon, 2004:787).

Partnering with other vendors is seen as an attractive alternative to mergers and acquisitions because the partnerships carry less risk and allow the partners flexibility in terms of strategic change if necessary. Kevin Hurwitz, managing director of AMVia is quoted as saying “Customers are looking for one-stop shops, and as a result, we’re seeing our suppliers enter into more and more partnerships. Since there is no one supplier that can do everything, alliances are going to become more and more important”. The demand by customers for integrated solutions and interoperability between products is driving vendors to form strategic alliances (Harris, 2005). The growing multi-disciplinary

nature of technological innovation, as well as the need to specialize because of the fast technological development, cause knowledge based entrepreneurial activities often to be carried out in networks of large and small firms, universities and other knowledge institutes (Groen (2002), citing the work of Groen et al (2002), Rip and Groen (2001), and Huff (2000)).

Freel (2003) refers to the dominant network theory of innovation that holds that individual firms are seldom capable of innovating independently, and never innovate in a vacuum. Companies, including leading companies, in industries where technology provides the competitive advantage, can no longer rely solely on their own resources to meet all the costs and develop the many different capabilities required for a totally independent strategy (Nardeosingh (2000:12) citing the work of Dussage and Garrette, Lam, 1996:973; Oerlemans et al, 2001). Ohmae (1989:145) comments that the many different critical technologies comprising today's products are driving company alliance formation. Klein Woolthuis and Groen (2000:158) examined collaboration in the hi-tech industry and concluded that, because of their highly uncertain and complex character, technological competences and personal relationships were critically important in hi-tech partnerships. They referred to the work of Boer and During (1999) which explained that the innovation process is characterised by uncertainty (unpredictability), complexity (comprehensibility or analysability), diversity (the variety of work), and interdependence (dependence on another). Because most companies do not have all the required expertise for innovation, they are forced to cooperate with complementary specialists.

“Networks are seen as a central determinant in the industrial creation of novelty, and are therefore a decisive co-ordination mechanism. In networks new technological opportunities are created via technological complementarities and synergies by bringing together different technological and economic competencies” (Pyka, 2002:153). Partnering where this will result in expanding the company's resource base is therefore a logical strategy to ensure survival and growth in a dynamic environment.

Linder et al (2003) found that leading companies approach innovation strategically. Rather than choosing partners in an ad hoc manner, or on a case-by-case basis, they create innovation channels appropriate to their needs that lead to long-term, well-managed relationships. Advocacy by the company's management in terms of creating a culture that accepted external innovation contributions was viewed as an important component. (What was missing in the companies surveyed by Linder et al (2003) was critical information about where and how, or even if - externally sourced innovation was paying off. Hence, although

there is recognition that external capabilities are necessary for innovation, the benefits of this do not appear to have been quantified.)

Freel (2003:767) cites recent literature that states that “the economic network approach overstates the role of external factors in the innovation process.” He concludes by commenting that “one is tempted to accept Oerlemans et al (1998:308) contention that, in most instances, “...innovation is primarily a process built on internal capabilities”, which may, more occasionally, be complemented by external agency.” “To be successful, innovating organizations must form linkages, upstream and downstream, lateral and horizontal. Advanced technological systems do not and cannot get created in splendid isolation” (Teece, 1990:22). This allows them to innovate successfully despite internal resource limitations (Oerlemans et al., 2001).

The importance of networks has been recognized in recent years because of their presumed importance for learning and innovation. “Networks are thought to encourage interactive learning between participating organizations through the sharing of knowledge and information, which is itself facilitated through trust, shared values and ways of working. Ultimately, the aim is the development of new products and processes, but it may also include the exploitation of new technology, the introduction of new skills, and/or the development of new markets (Tracey and Clark, 2003:4). Nardeosingh comments (2000:12) that “whenever a technological innovation requires specific and highly sophisticated knowledge that one single firm cannot afford, there will be a tendency to form networks”.

Tracey and Clark (2003:4), citing Hotz-Hart (2003:434) summarize the potential benefits of networks of interaction as offering:

- *Better access to information, knowledge, skills and experience.* In particular, networks provide opportunities for learning about new ways of operating and about new forms of technology, and can reduce the development time and cost of new products and production processes.
- *Improved linkages and cooperation between network members,* particularly between users and suppliers....Effective networks can encourage interactive learning, synergy and complementarity between key specialist groups across participating firms, such as design, production, marketing and finance.
- *Improved response capacity.* Networks allow participating firms to respond more quickly and to anticipate changing competitive circumstances, and to learn about new forms of technology

- *Reduced risk, moral hazards, information and transaction costs.* Networks of firms with complementary assets allow resources to be shared and reduce costs. Risks can also be assessed and shared throughout the network leading to more informed decisions and further costs reductions.
- *Improved trust and social cohesion.* Alliances encourage shared values, goals, norms, and ways of working which facilitate problem-solving, collective action and innovative behaviour, often through a complex combination of competition and cooperation.

Competition is increasingly becoming knowledge-based as companies endeavour to learn and develop capabilities faster than their competitors (Lane and Lubatkin, 1998, Prahalad and Hamel, 1990). Oerlemans et al (2003:18) in citing Hakansson (1993) discuss the importance of knowledge and learning and resource mobilisation, clarifying that in transforming resources, knowledge about their uses is important, and learning is a way to accomplish this. They elaborate that knowledge can be acquired either internally, or externally. Internal learning occurs through R&D or “learning by doing”, and external learning can be achieved by interacting with other firms: firms making use of other economic actors. Oerlemans et al (2003) concluded from their research findings that the use of internal *and* external resource bases resulted in a better innovative performance of firms, hence stressing the importance of including network variables in analysing innovation.

Dierickx and Cool (1989:1509) believe that the sustainability of a firm’s asset position is dependent on how easily its assets can be replicated. If the assets cannot be bought in factor markets, competitors may either try to imitate them by accumulating similar asset stocks of their own, or they may try to substitute them with other assets. It is in responding to problems that companies do not always have sufficient time to develop the knowledge and capabilities to respond effectively (Lane and Lubatkin, 1998, citing Dierickx and Cool, 1989). This has resulted in a shift from the more traditional resource or risk-sharing alliances to alliances offering learning from partners (Hamel, 1991). By forming “learning alliances” companies can speed up their learning by acquiring and exploiting the knowledge developed by others, hereby developing new capabilities to minimize their exposure to technological uncertainties (Lane and Lubatkin citing Grant and Baden-Fuller, 1995). “The importance of learning alliances to capability development places a premium on a firm’s ability to identify, assimilate, and utilize a partner’s knowledge (Lane and Lubatkin, 1998: 461).

Hagedoorn (1993:373) comments that during collaboration, one or more of the partners can have as an objective the secret acquisition of some of the capabilities, knowledge or technologies of the partners. The hidden agenda therefore is to quickly absorb some innovative capabilities from the other partner(s). A more transparent approach is that of an agreed technology transfer arrangement where one or all partners will benefit by leap-frogging their competitors because of the technology that is transferred.

An example of a strategy to capture organizational learning is as follows. In explaining the reasons for companies to *invest in the next great business* (where companies choose to invest in ideas that aren't their own (Laurie 2001:67), Laurie cites Intel which employs PhD's rather than MBA's, and whose function it is to move in alongside selected entrepreneurial optical-network companies, and assist them with manufacturing know-how. "We are using our investments to gain organizational learning and to understand where the opportunities are and where we can add value. Now we're starting to position some senior people to capitalize on these opportunities" (Laurie, 2001:77).

As discussed, companies must form relationships with other companies to improve knowledge management and organizational learning. Furthermore, relationship management, which may be formed through social networks and embedded ties, and supported by supplier closeness, communications, trust and goodwill, and risk, may increase awareness of the competitive environment. "Therefore, firms should form networks with other firms in order to leverage advantages in terms of supplier closeness, communications, trust and goodwill. Social networks and embedded ties may reduce risk associated with network structures (Siriam and Snaddon, 2004: 789). Siriam and Snaddon (2004) conclude that relationship management links to knowledge management, which in turn leads to opportunities in the competitive environment. Furthermore, the impact of competitive advantages is in the linking of technology management (technologies, technological resource skills and firm's competencies), transaction processes, and governance structures (technological sourcing, knowledge management, organizational learning and relationship management).

Pyka (2002:153) discusses two approaches for explaining networks, viz: incentive based and knowledge based. In examining the history of industrial organization, he cites Williamson (1975) for introducing a theoretical explanation in terms of transaction costs. "Transaction costs comprise costs of search and evaluation, costs of setting up governance prior to transactions and costs of control and redesign of the relation" (Nooteboom, 1996:986). Williamson (1985) concluded later that "firms are assumed to

engage in co-operative relationships in order to minimise their transaction costs” (Pyka, 2002:154). Pyka (2002:154) comment that where well-defined property rights exist and where technology is quite stable, is a situation here markets are most efficient in co-ordinating the transactions and become close to perfect competition. At the other extreme where there is technological uncertainty and weak intellectual property rights, hierarchically structured organizations, i.e. firms appear to be well suited. This is because in a firm “the creation and transfer of know-how takes place within the organisation and are therefore perfectly internalised and appropriated. However, there are many in-between cases which offer the possibilities of innovation networks to emerge and, the real existence of this kind of network points to the fact that specific forms of inter-organisational linkages are also well-suited for innovation processes and the respective transactions” (Pyka, 2002:154). This is supported by Hagedoorn and Schakenraad (1992) who identified innovation networks as a common organizational form in the knowledge intensive sectors where high uncertainty and low appropriability prevailed.

In moving from an incentive-based to a knowledge-based approach for explaining networks, Pyka (2002:157) considers a change in innovation processes which has occurred with time. Citing Dosi (1988) he explains that “innovation processes mutate from optimal cost-benefit considerations to collective experimental and problem solving processes”. Because the knowledge base of a firm is no longer perfect, a gap develops between the competencies of the firm and the difficulties that need to be mastered. Two reasons are responsible for this gap, namely: “on the one hand technological uncertainty introduces errors and surprises in firm behaviour. On the other hand, the very nature of technological knowledge avoids an unrestricted access. Knowledge in general, and new technological know-how in particular, are no longer considered as freely available, but as local (technology specific), tacit (firm specific), and complex (based on a variety of technology and scientific fields). To understand and use the respective know-how specific competencies are necessary, which have to be built up in a cumulative process in the course of time” (Pyka, 2002:157).

Pyka (2002:158) mentions that improvements in one technology may create very different applications in other technologies, or even completely new technological opportunities. Because of the increased complexity of modern innovation processes a firm must master many different knowledge fields. This requirement for providing for an additional broad knowledge base in addition to their specific competencies, drives firms to increase their absorptive capacity (Cohen and Levinthal, 1989) enabling them to react flexibly on external developments and external knowledge. Networks enable the pooling of different



competencies and enhance the process of resource creation by exploiting complementary effects. Pyka (2002:158) explains that technological knowledge cannot be exchanged via markets, even if the right incentives exist. A common knowledge-base and shared experience is necessary for a simple know-how transfer. Pyka (2002:159) summarized by commenting that “within the knowledge-based approach innovation networks thus are considered to have here major implications: first, they are seen as an important co-ordination device enabling and supporting inter-firm learning by accelerating and supporting the diffusion of new technological know-how. Second, within innovation networks the exploitation of complementarities becomes possible, which is a crucial prerequisite to master modern technological solutions characterised by complexity and a multitude of involved knowledge fields. Third, innovation networks constitute an organisational setting which opens the possibility of the exploration of synergies by the amalgamation of different technological competencies. By this, innovation processes are fed with new extensive technological opportunities, which otherwise would not exist, or whose existence would at least be delayed.”

Narula and Sadowski (2002:602) refer to work done by Freeman and Hagedoorn (1994) confirming that most of the strategic technology alliance activity in the 1980s was primarily by firms from North America, Europe and Japan. Developing countries contributed marginally to strategic alliance formation – less than 5% during the period 1980-1989. This, they believed, suggested that the majority of developing countries were increasingly lagging behind, and specifically in the new and emerging technological sectors. However, Narula and Sadowski (2002:611) believe that a good opportunity exists for strategic technology partnering for developing countries, viz to partner with industrialized countries and both advance and modify a product, developed in a developing country environment for developed country market conditions and requirements. From the industrialized country perspective, this represents a low-cost technology development option.

Having discussed the need for inter-organizational relationships and strategic relationships, the different forms and associated benefits of these forms, and specifically as options for SME-LCO partnerships, will be discussed next.

## **1.5 Forms of partnerships between LCOs and SMEs**

O'Dwyer and O'Flynn (2005), citing Contractor and Ra (2002), Kogut (1988), Mowery et al (1996) and Oxley (1997), found that the type of governance structure was determined by the nature of the knowledge to be exchanged. They therefore hypothesised that “the

more capable the knowledge receiving partner, the less help they would need to absorb the knowledge imparted. This would lead to the choice of a governance mode requiring less hierarchical control (e.g. contracts). Conversely they argue that if the absorptive capacity of the knowledge recipient is lower, a governance mode requiring more interaction with the knowledge supplier is needed (e.g. and equity joint venture)” (O’Dwyer and O’Flynn, 2005:4). Three inter-related issues affect the choice of alliance governance mode, namely: “the absorptive capacity of the knowledge recipient; the appropriation concerns of the knowledge supplier; and the type of knowledge being exchanged” (O’Dwyer and O’Flynn, 2005:4).

Slowinski et al (1996:42) comment that traditional strategies for growth and diversification focused on mergers and acquisitions. These were later supplemented by a variety of joint-venture arrangements, leveraged investments, licensing and royalty agreements, and others. Hayhow and Ressler, (1996:280) list some of the most common forms of partnership as follows:

- **Joint ventures** “The most common and classical way large companies are willing to deal with small companies. Joint ventures are a viable option in the current economy, in which it is difficult to raise equity capital. They make a good marriage if both parties understand the strengths of the other. For the small company, these strengths are typically in creativity and innovation; for the large company, strength lies in having in place manufacturing, marketing and distribution systems
- **Equity participation** ...The large company gets stock and future value in exchange for providing operating capital that will allow the small company to expand its business
- **Licensing deals** Small firms should look at licensing deals cautiously, even though they often are the first deals offered by a large firm. Licensing agreements have two major drawbacks: first, they return less income to the small company than a joint venture or other arrangements would because with a licensing deal, the small firm gets only a royalty; second, they do not give the small firm much, if any, control in the decision-making process
- **Subcontractor relationships** Becoming a subcontractor to a major corporation can be an especially effective way for a small company to enter the large industrial market”

Joint ventures can be used to assess the value of a new technology, product, or the capabilities of a partner, and depending on greater clarity being obtained on the future success, the option to acquire is likely to be exercised (Kogut, 1991). Joint ventures

provide an opportunity for developing a roadmap for joint value creation, which is key to a successful long-term cooperation (Büchel, 2001).

An alternative to partnering is licensing the small firm's technology. However, the disadvantage of licensing is that it prevents involvement by the large company in the direction of the development or in which technical elements need to be emphasized. Furthermore, transferring the technology from the small firm to the large firm is a difficult process. By involving the large firm in all phases of research, partnering helps overcome these obstacles (Slowinski et al, 1996:43).

Mowery et al. (1996) propose that inter-firm knowledge transfers should be limited in unilateral contract-based alliances such as licensing agreements and that such agreements should create fewer opportunities for inter-firm knowledge transfer. Equity joint ventures, on the other hand, appeared to be effective for transferring complex capabilities. Oxley (1997) found that equity joint venture outperformed alternatives in supporting inter-firm learning.

From a LCO perspective, outsourcing to an SME is an attractive option. Kimzey and Kurokawa (2002:36) in support of outsourcing as an option by LCOs list the following responses they received from large corporates in reply to the question: why outsource technology?:

- “To make the bottom line look better
- Because no one can do everything
- It is the only way to break up an inefficient bureaucracy
- The great equalizer enabling the firm to leverage new-product development resources
- To be the technology leader but not the technology driver
- Reduced R&D budgets”

Candalino and Knowlton (1994:26) comment that for outsourcing to be effective, a type of partnership was required in which a clear understanding of how the customer defines value is essential for value to be delivered. Small firms sell their company based not only on the services they can provide, but also on the alliances they can engineer. Large companies creatively look at new alliances and hence this is an attractive option for them.

Referring to Pedersen and McCormick (1996), Kesper (2002:3) mentions that whereas in South Korea where large firms function as catalysts of growth to their subcontractors, in Africa corporate subcontracting to SMEs (and mostly “informal” firms), is usually to reduce costs by exploiting labour-surplus conditions and circumventing regulations and trade union organisations.

The last 10 years has seen strategic alliances coming to the fore (Slowinski, 1996:42). A strategic alliance is an attractive option where an LCO has identified a significant opportunity in one of its existing markets and has most of the capacity to address the opportunity but lacks the technology. By forming a partnership with a world class SME the LCO hopes to speed up entry into the emerging market hence gaining a competitive advantage (Slowinski et al, 1996:42). Laurie (2001:127) believes that large companies can adopt one of the following venturing strategies to acquire new innovation:

1. Invent the next great business
2. Invest in the next great business
3. Venture the next great business
4. Partner the next great business
5. Acquire and integrate the next great business

Hence, it is apparent that SMEs are important for innovation and job creation, and governments of today are increasingly recognizing them for their important role in economic growth. However, because of their lack of access to sufficient resources, they have a high failure rate. Gaining access to such resources via, for example, a partnership arrangement with a large company becomes an important focus for a growing SME. Similarly, there are many reasons for an LCO to partner with an SME, including accessing new technologies.

However, partnerships do not only have a positive side – many partnerships end in failure. The next section will consider some of the reasons for partnership failure.

## **1.6 Partnership failure**

Cooperative ventures are difficult to manage and have a high failure rate. The difficulties associated with cooperative ventures are even greater where technology transfer and knowledge sharing is involved – for example joint R&D and product development (Lam, 1997:974). The difficulties are often attributed to problems of control, risk and competitive

tension and governance structures that promote stability, trust and boundary permeability between the partners have been suggested. Citing Morgan, (1997), Tracey and Clark (2003:8) comment that the functioning of networks may be constrained by political factors. “Networks (and their constituent organizations) contain a number of individuals, interest groups and coalitions that often come into conflict with one another and whose ambitions may or may not coincide with the “best” interests of the network as a whole. Conflict may manifest itself through the manipulation of information, through hostility and a lack of trust between participating organizations (or individuals and groups within them), and through an unwillingness to cooperate with partners. This may be exacerbated by specialization and departmentalization within and between firms that create sub-units with separate goals and tasks. Often, these sub-units develop their own commitments and outlooks based on values, attitudes, and beliefs that are self-reinforcing. The decision-making process thus involves negotiation or bargaining between interest groups with different levels of influence ... it could be argued that power differentials within networks of firms can facilitate decision-making and help to resolve disputes. However, more extreme power differentials within networks may lead to expediency and unscrupulous behaviour (Bathelt 2002:589, Granovetter, 1985)”.

The odds of failure are great in the technology business, in which the obstacles are very large due to the industry’s rapid pace of change and need for constant innovation (Stein, 2002:59). Park and Russo (1996:877) citing Coopers and Lybrand, 1986, Kogut, 1989, Porter 1987, claim seven out of ten joint ventures and other strategic alliances fail. Frick and Torres (2002:1) refer to studies which confirm that in at least 50% of the cases, mergers and acquisitions (M&As), spin-offs, and alliances have destroyed value for the acquiring company. However, they go on to say that in spite of this, those companies which are most successful in the high-technology industry are also those which are active deal makers. Their research established that whilst the average merger or acquisition destroyed value for the acquirer, those companies which undertook such activity strategically added value to their companies. Moore (1999:126) claims that strategic alliances usually fail, whereas tactical alliances, which focus on delivering a “whole” product, i.e. a total solution for the customer’s problem (which could include service offerings, etc.) usually succeed.

A 2001 study done by Accenture indicated that only 20% of corporate alliances in the IT industry succeed, 30% fail, and the remaining 50% remain in a state of underperformance. Among the reasons given for failure were cultural issues, failure to deliver on what was expected by one or both of the parties, or a change in strategic priorities (Harris, 2005:63). Büchel (2001) lists unclear expectations, hidden agendas and

lack of management support as some of the reasons for surprises, and failure, of joint ventures. She comments on recent studies stating that 25% - 50% of joint ventures fail within six years.

A relatively high rate of failure of alliances is attributed to a lack of cooperation and the opportunistic behaviour of partners (Das et al. 1998:491). Referring to the work of Hamel (1991) and Hennart & Reddy (1997), Das et al (1998:998) comment that “partners often use JVs as a cover to learn the other firms’ know-how”. Furthermore, alliances are often used as a cover by partnering firms for appropriating firm-specific resources (Das et al (1998) referring to the work of Inkpen and Beamish, (1997)). Parker (2000) cites Hamel et al (1989) in referring to the following risks when collaborating in product development: “leakage of a firm’s skills, experience, and knowledge that may form the basis of its competitiveness; the danger that its partners not only acquire the competencies that the firm brings to the product development, but also gain access to the knowledge and skills that the firm uses in other business areas”. Although the reason for collaboration is often to reduce product development time and cost, the negative aspects included financial and time costs relating to the management of the collaboration that may offset any gain (Farr and Fischer, 1992); and the loss of direct control over the product development process (Ohmae, 1989). Parker’s findings (2000) were that frustration where the other party became less committed or changed his priorities, was the greatest negative aspect of collaboration. Furthermore, there was a fine line between leaking too much proprietary company information and not supplying sufficient information for collaborative product development to be successful.

Joint ventures (jv’s) are designed to meet the objectives of both the participating companies and of the collaborative partnership, and will be determined as successful if the value of the outcomes exceeds the opportunity costs incurred by the partners, and where there has been a fair distribution of both the outcomes and the costs (Park and Russo, 1996:878 citing Jarillo 1988). However, should “this system of balanced and equitable contributions, benefits, and safeguards” be jeopardized, then so is the JV itself (Park and Russo, 1996:878 citing Porter and Fuller, 1985). There may then be more incentives to cheat and act opportunistically to achieve their own competitive goals rather than those of the partnership (Park and Russo 1996:878).

According to Peter Killing (2001), “entering an alliance with a competitor is a risky and difficult proposition. The risk, of course, is that your ally of today may again be your outright competitor tomorrow – now strengthened with knowledge of your technology, your

markets, and your way of operating. But refusing to enter into an alliance with a competitor ... carries its own risks. Will (the company) be big enough to survive?”. Park and Russo (1996:887) comment that cooperating with competitors is especially risky. “Protecting key specific know-how from one’s competitors is difficult indeed, as the incentives to act opportunistically appear to motivate actions that threaten and frequently undermine joint ventures with them. We would posit that these incentives are intensified by the abilities to competitors to recognize and appropriate key technologies and know-how under these conditions.” In a JV relationship the partner can identify, appreciate and assimilate the know-how (Cohen and Levinthal, 1990).

The negatives associated with strategic alliances in the IT industry include:

- alliances are a risky proposition with a high rate of failure
- companies may become overly dependent on their alliance partners, which may pose a problem if the relationship or the business performance of one of the partners deteriorates
- surrendering a certain amount of control to business partners
- flexibility to pursue other partnerships and acquisitions may be limited
- problems may arise when partners’ goals or vision starts to diverge
- many alliances become a drain of human and financial resources rather than contributing to the bottom line (Harris, 2005:62).

In considering the evolution of strategic alliances, Slowinski et al (1996:43) describe that in the past when a large company wished to enter a new product line quickly or wished to rapidly acquire a new technology, it would do so by acquiring the small company that had developed it. Often the owners of the small company would become “rich” employees of the large company. However, with time the former entrepreneurs would become frustrated with the bureaucracy of the large company and would leave. This resulted in the objectives of the acquisition not being realized, mainly because “the entrepreneurial spirit and incentives of the small company were incompatible with the culture of the large firm”. The end effect was that the innovation incentive for the SME had, in fact, been killed. Alliances between SMEs and LCOs therefore became a more attractive option Radtke (1997:95). Da Silva (1995) refers to literature wherein assumptions are that small firms are more innovative in process and product development; they generate a greater number of jobs at a lower cost; they are more flexible and able to adjust rapidly to shifts in product demand; they are more price competitive due to lower overhead costs. However,

she comments that these assumptions have not gone unchallenged and work has been published questioning some of these assumptions, e.g., small firms do not have significant innovative capacity due to a number of constraints e.g. a lack of technical and financial resources, limited personnel and access to information. Because of these constraints, small firms “survive by means of self-exploitation, low wages, bad working conditions, and the suppression of trade unions and workers’ rights” (Da Silva, 1995:46).

Too often partnerships between large companies and SMEs fail and such partnerships present a particular set of management issues. Minshall et al (2005) comment that often the larger, established firm is able to appropriate most of the value from the relationship and the general performance of the start-up may be adversely affected. Furthermore, although the resources or competences of the LCO (from the start-up’s perspective) formed the basis for the partnership and were crucial for the success of the partnership, this enthusiasm may not be reciprocated by the individuals within the LCO. The reasons for this apparent lack of enthusiasm could result from a lack of entrepreneurial attitude, or the collaborative project has little effect on the growth strategy of the LCO. (Minshall et al, 2005). Moore (1999:125) comments that partnerships between large companies, with established distribution channels but an ageing product line, and SMEs with an innovative technology, seldom work. This is mainly because of the divergent cultures, and the decision cycles which are typically out of sync with each other. Tracey and Clark (2003:11) citing Moss Kanter and Corn (1994:6) commented that cultural heterogeneity was overstated as it was an easy explanation for explaining tensions whose actual causes were much more deep-rooted. They referred to Europe where ties between firms are increasingly taking on an international flavour because firms in small jurisdictions seek appropriate partners that can improve their competitive position, regardless of their geography. Such firms are increasingly overcoming the barriers of culture and distance.

The fear of acquisition of the SME by the LCO is a very real fear. An alliance between a very small and large partner is unlikely to be successful long term as the smaller one may be acquired by the larger one (Klofsten and Schaerberg, 2000:142) referring to the work of Faulkner (1995)). They cite the work of Doz (1988) confirming that hidden agendas are “commonplace in technological partnerships”. There was evidence in the research he conducted to support the fear expressed by the small companies that co-operation with a larger partner was the first step towards being acquired.



Porter (2003:14) cautions that alliances should only be used on a very selective basis – and as part of a transitional strategy rather than a permanent solution. These alliances should not block the company’s ability to gain competitive advantage.

The following table summarizes the most important reasons as discussed above for partnership failure between and SME and an LCO:

**Table 1: Reasons for partnership failure between an SME and an LCO**

Founding members of SME left with their tacit knowledge
Constraints of SME including: lack of human and financial resources, limited access to information
LCO can appropriate most of the value from the SME
LCO does not deliver on what was promised
Collaborative project has little impact on growth strategy of LCO
Lack of entrepreneurial attitude by LCO
Divergent cultures
Fear of SME being acquired by the LCO

The fear of acquisition and opportunistic behaviour by LCOs fosters an atmosphere of distrust between the SMEs and the LCO. Although there is a need to partner with each other, it appears that the SME has more to lose in such a partnership. The imbalance in power between the two, as well as the vulnerability of the SME, being largely at the mercy of the LCO, further enhances the level of anxiety and distrust experienced by the SME. We shall examine this imbalanced relationship in more detail below.

## 1.7 An illustrative representation of an SME-LCO partnership

It is assumed that an SME has more to lose in a partnership between and SME and an LCO: firstly because the SME is in a much less powerful position when negotiating with an LCO, and secondly because it has fewer resources to enforce the terms of the partnership agreement. This is expanded on as follows where, unlike the LCO, the SME will be relying on input from fewer experienced managers; this may be a once-off experience and hence the CEO/management of the SME may lack previous experience in such negotiations; the SME might be cash-strapped, the owner/manager weary, etc, and therefore more desperate to reach an agreement, and hence willing to “bare all” in an attempt to attract a partner timely; the SME lacks resources to litigate in the event of breach of contract by the LCO, placing it in a very compromised position; the SME may not have a powerful presence in the market place and hence not have allies upon which to rely for support.

Anecdotal evidence suggests that there is a common perception by SMEs is that the large company has ulterior motives and does not negotiate in good faith. This perception might

lead to an atmosphere of distrust and fear for the SME. Negotiating with a large company is a daunting experience for most SMEs and often they feel exposed and very vulnerable. From discussions with SMEs it appears that dealing with a large company can be a “black box” experience for the SME, namely there are inputs and outputs, but limited real understanding of the factors, some of which they may have control that can positively influence the successful conversion of inputs to outputs. This apparent lack of understanding by the SMEs can create an atmosphere of fear and distrust.

Theory (Das et al. 1998, Doz 1988, Hamel, 1991, Hennart and Reddy, 1997), refers to opportunistic behaviour by large companies and this is encouraged by the imbalance of power between large companies and SMEs. This view supports the common perception SMEs have of large companies viz. that they often are powerful and opportunistic. In discussing key differences between small and large power distance societies (such as in South Africa), Hofstede (1991:43) mentions that “might prevails over right: whoever holds the power is right and good ... the powerful have privileges; power is based on ... ability to use force.” Extrapolating this theory from a society framework to a company framework, large established companies, having existing product ranges, serving existing markets and being financially strong, would have more “might” in a negotiation with an SME that lacks the product range, market access and financial clout. Inter alia, the LCO would be able to exert force on the SME such that its (the SME’s) position is compromised in favour of the LCO. It appears, therefore, that given the appropriate circumstances, large companies are perfectly positioned to act opportunistically.

A diagrammatic model has been developed that defines the major categories as **attractants** (those SME features that attract the interest of an LCO), and **weights** (those considerations that will shift the balance of power in favour of the SME) (see Figure 1). It is assumed that this happens in the context of the political, economic, sociological and technical environment, these factors are therefore not explicitly tested in the research.

Figure 1 below illustrates main theme and ideas of this research project. As can be seen, the assumption is that survival and growth are the prime overarching business objectives of both LCOs and SMEs. Companies are continuously developing strategies to survive in today’s dynamic environment as well as to grow their company’s share value. These two ingredients are essential for company sustainability. For a company that is technologically innovative, part of its business strategy could include forming partnerships with other companies (large or small).

However, as touched on above, partnerships can be “risky business”. Particularly as we have seen above where partnerships between South African companies often include competitors, this can be a very sensitive and possibly vulnerable relationship. From the anecdotal case studies already discussed it appears that SMEs, when partnering with LCOs are particularly vulnerable, and that the balance of power is heavily in favour of the LCO. Power is defined by Hart and Saunders (1997:24) as “the capability of a firm to exert influence on another firm to act in a prescribed manner”. In commenting on the dyadic relationship between a buyer and supplier, Hart and Saunders (1997:26) describe power as a function of “1) dependence on the other party, and 2) the use of dependence to leverage change in accord with the intentions of the less dependent firm”. Hart and Saunders (1997:27) discuss the varying types of power. Persuasive power they explain focuses on “the rewards or benefits of making a change desired by the more powerful firm,” whereas coercion focuses on “punishment rather than benefits or inducements”. Persuasion is more effective than coercion in building long-term relationships. Coercion tends to reflect a short-term perspective.

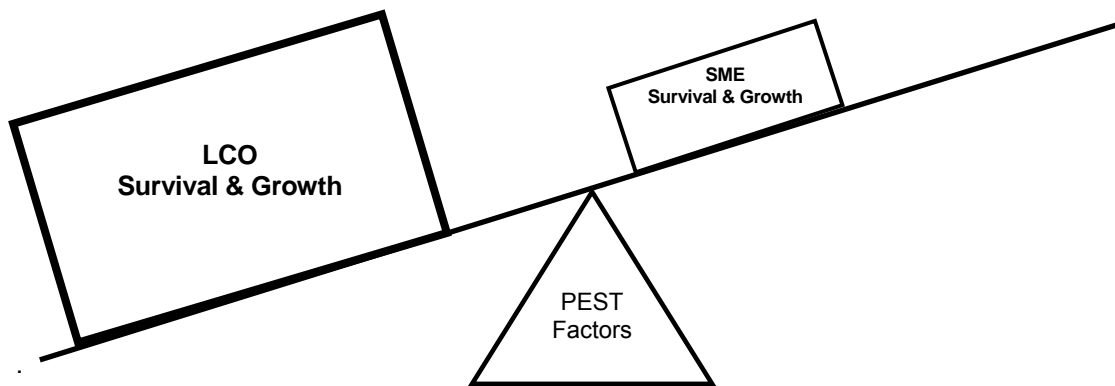
There is a large power difference between SMEs and LCOs, and there can be considerable dependence of SMEs on LCOs. This is illustrated in Figure 1 by the large block versus the small block on a see-saw. Because of the factors in its favour, the LCO has total control of the equilibrium position, tilting it severely in its favour. The SME is left suspended in the air, very exposed and largely at the mercy of the LCO (the LCO might even elect to bounce the SME off the see-saw!).

The SME needs to identify what would shift the balance of power in its favour and hence not only strengthen its position such that it can negotiate a fair deal, but also minimize the need for enforcement of the terms and conditions of the partnership agreement. Not only should the SME understand its own competences, capabilities and hence its capacity for offering the LCO business opportunities, but it should understand any additional considerations that would facilitate a successful partnership. The adage “knowledge is power” should not be underestimated in this environment of SME-LCO negotiation.

In the absence of adequate resources to protect itself, this research proposes that an understanding of as much as possible about the prospective large company partner strengthens the negotiation position of the SME, and can shift the balance of power in the SME’s favour. The assumption is that not only should the SME understand its own offering and why it is of interest to the potential partnering large company, but it should also understand the environment and what motivates the large company to partner with it.

It should understand those variables that are responsible for successful partnerships, such that it can correctly align itself with the most important variables. Furthermore, it needs to get the “recipe” for a successful partnership correct in order to minimize the need for enforcement of the terms of the partnership.

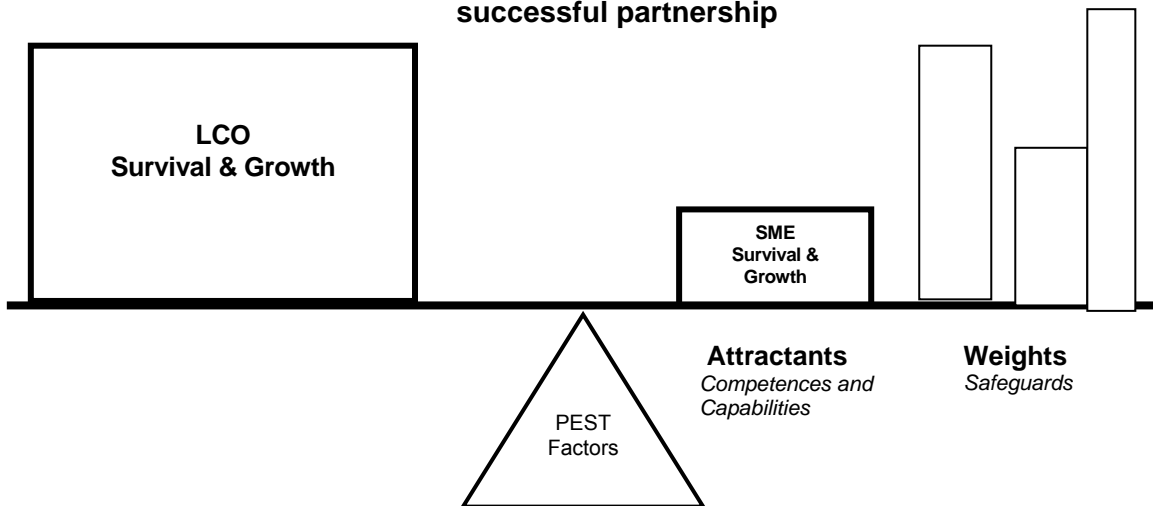
**Figure 1: Imbalance between an SME and an LCO**



The LCO may engage with the SME drawing it closer to itself because of the various opportunities that the SME presents. These opportunities that are categorized as “attractants” would typically be the *competencies and capabilities* that the SME has and for which it has been recognized.

One way that the SME can return the see-saw to equilibrium is by adding additional weights to its own side to compensate for the “heavy weight” LCO on the other side (Figure 2). These “weights” can be better described as *safeguards* or considerations that would empower the SME to negotiate and manage the relationship with the LCO with more authority and assertion, and that would encourage a successful partnership hence minimizing the need for enforcement of the partnership terms and conditions. By having much additional weight, or a high level of these safeguards, the SME should be able to return the see-saw to equilibrium.

**Figure 2: Restoring the balance between an SME and an LCO to facilitate a successful partnership**



## 1.8 Summarized problem statement and research goals

Figures 1 and 2 illustrate the problem and the solution that will be researched. To reiterate, the balance is tilted unfavourably for an SME when it partners with an LCO. This imbalance can result in opportunistic behaviour being displayed by the LCO that will lead to the need for enforcement by the SME in terms of the partnership. However, the SME, due to the limitations associated with its small size, is not well positioned to enforce the terms of the partnership, and hence may not be able to prevent the LCO from acting opportunistically. The end result of this behaviour would be an unsuccessful partnership.

The aim of this research is therefore two-fold, namely, firstly it is to gain insight as to the variables affecting the balance in position between an SME and an LCO, and secondly, to arrive at a set of recommendations for SMEs that wish to partner with LCOs in terms of how best to prepare for and manage the relationship.

The above variables (competences and capabilities, and safeguards) will be identified, described and empirically related to partnership success. Furthermore, their relationships with each other will be determined. Questions to be answered include:

- to what extent does the number of competences and capabilities that the SME has affect the success of the partnership?
- does the level of safeguards (weights) enhance the relationship between competences and capabilities (attractants) and the success of the partnership?

Restoring the “balance” has been discussed earlier as a means of empowering the SME to minimize the need for enforcement of the partnership terms and conditions. The additional weights to bring the see-saw back into equilibrium have been labelled “safeguards” and it is suggested that if the SME has a high level of these safeguards it should be able to return the see-saw to equilibrium.

The next chapter will discuss the context of the “see-saw” model. The main research question and the practical and scientific relevance of the research will be expanded upon.

## 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.

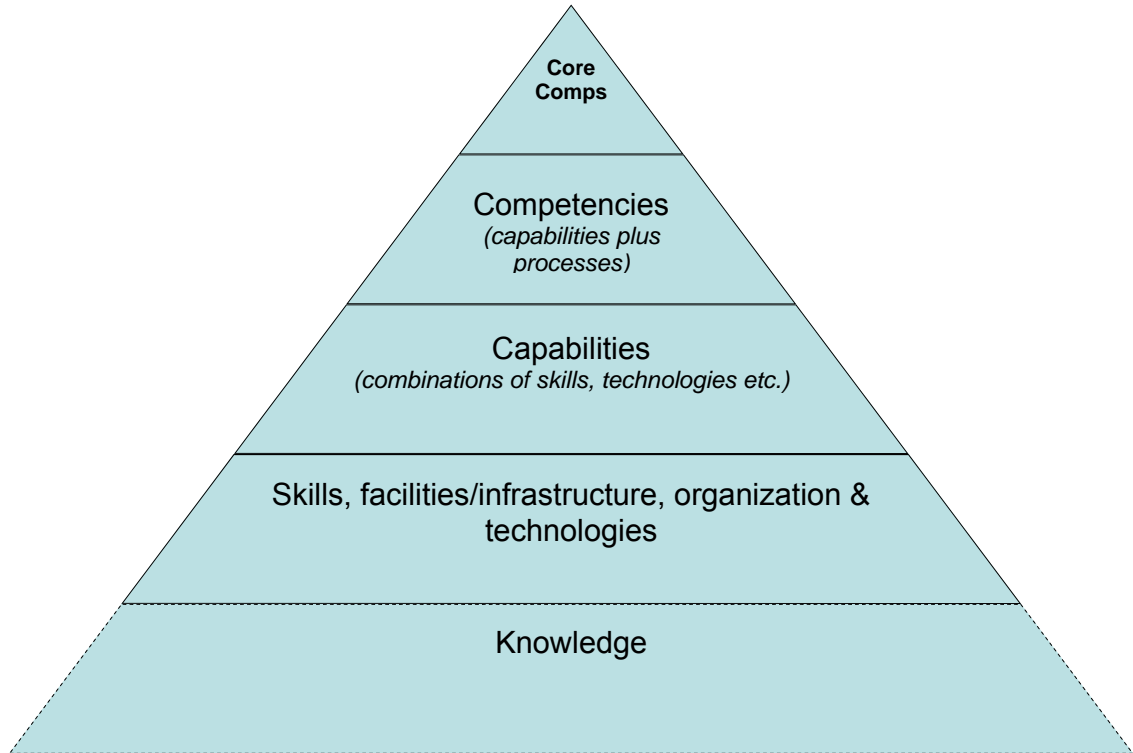
In line with the hierarchical description of capabilities and competencies is a definition paper (unpublished) by Ela Romanowska (2001). Romanowska refers to *skills* as being the basic building blocks of the ability of individuals. She cites the Generics Group who defines *capabilities* as “the combination 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**

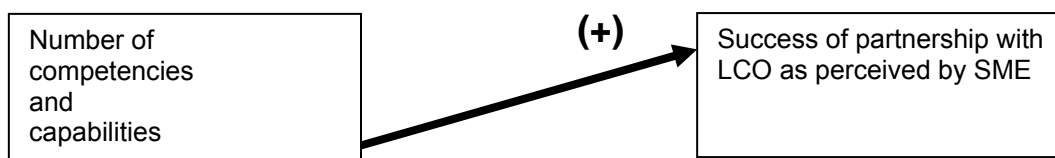
The relationship between competencies and capabilities, and a successful partnership (as perceived by the SME) is illustrated in Figure 4 below. The first view presented is the positive view, i.e. the expected viewpoint of the SME.

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".

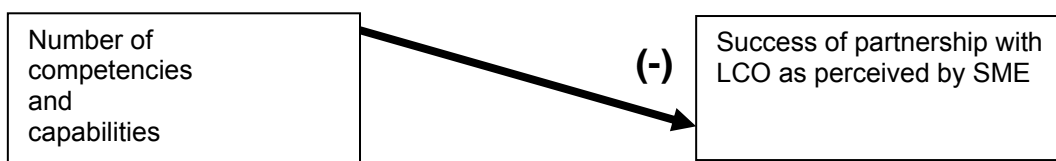
As commented earlier, Hamel et al (1989) discuss a major risk of collaboration being that the partners can also gain access to the knowledge and skills that the company uses in other business areas. Littler et al (1995:18) expand on the risks of leakage associated with collaborative product development. "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

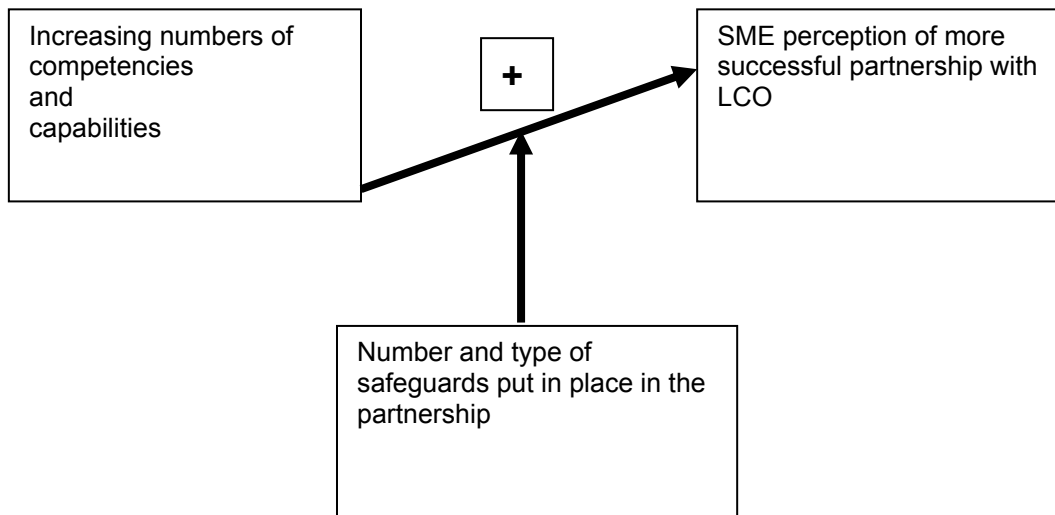
effective management of the collaboration is key. SMEs, however, negotiate from a position of weakness, and hence they need to consider special measures to strengthen their negotiation position, as well as put in place mechanisms to protect them from opportunistic behaviour of LCOs.

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**

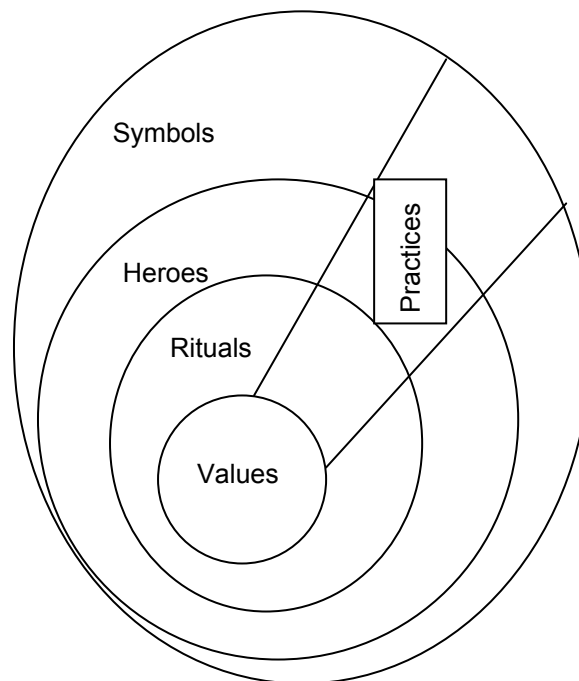
Jones et al (1997:929, citing Abrahamson and Fomburn (1992, 1994), Gordon (1991) and Phillips (1994:384)) refer to macroculture as “a system of widely shared assumptions and values, comprising industry-specific, occupational, or professional knowledge, that guide actions and create typical behaviour 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.

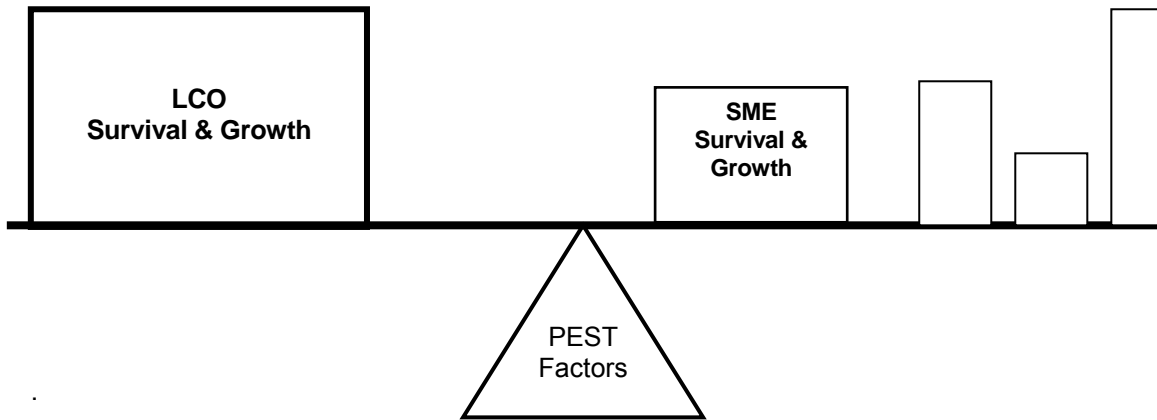
H<sub>4f</sub> The greater the number of formal safeguards that are put in place, the less negative will be the relationship between competencies and the perceived success of the partnership.

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

## Chapter 3

### Research Design and Methodology

This chapter discusses the research design as well as the methodology that was used to capture and analyse the data. The measurement tools are discussed in some depth. This includes a description of the questionnaire and the structuring of the questions; and the decision on the selection of items for introducing variation to the key variables used in the empirical research. The selection of an appropriate sample is explained, as are the methods used in collecting, capturing, and analysing the data. Finally the use of case studies for verifying the findings of the survey is introduced.

An overview is given below on the measurement tools and the selection of the key variables.

#### 3.1 Measurement and key variables

“Data sometimes lie buried deep within the minds or the attitudes, feelings, or reactions of men and women” (Leedy, 1997:191). Leedy comments that the best way of accessing this type of data is by means of a questionnaire. In selecting the design of the questionnaire, the following comments from Leedy influenced the final choice of questionnaire type being quantitative: “quantitative researchers tend to use experimental or correlational designs to reduce error, bias, and extraneous variables. Underlying these research designs is the belief that there is a relatively stable reality “out there” that can be measured through well-designed questionnaires or instruments. Generalizations are enhanced if the instruments are shown to be valid and reliable“. It was therefore decided to design a questionnaire for capturing quantitative data. This data would pertain to the competencies and capabilities (CCs) that the SME believed it had, and whether with an increasing number of CCs the perception by the SME of a successful partnership, increased. In addition data would be captured to determine whether the safeguards that the SME were put in place in the relationship moderated the relationship between CCs and a perceived successful partnership.

Having designed the questionnaire, it would be forwarded to a non-probable sample of SMEs. A non-probable sample is where the researcher cannot forecast, estimate or guarantee that each element in the population will be represented with the same probability in the sample. A convenience or accidental sample is a subcategory of a non-probable sample (Leedy, 1997:106). A non-probable convenience sample was decided upon as there are no comprehensive databases on technology innovative companies in South Africa and hence existing databases listing companies that fell into the desired categories that were accessible, would be used. However, it could not be claimed that companies captured by these databases were necessarily representative of South African technology innovative companies. Because the sample would be one of convenience, it was highly likely that the data would be skewed and hence did not necessarily represent the entire population. As the objective of the research is to identify trends rather than arrive at conclusive statements regarding a whole statistical population, it was decided that a convenience sample would, in this instance, be appropriate.

The questionnaire was examined by three experts to check, inter alia, for bias, research expectancy effect and clarity. Thereafter it was pilot tested on 3 SMEs and in each case where greater clarity was required in terms of the questions being asked, refinements were made in order to arrive at the final questionnaire. Three examples of such refinements follow:

- In testing the SME's perception of the success of the partnership, the following question was posed:  
"Did your company perceive the partnership/acquisition to be a success?" Only two possible answers were given – "yes" or "no". However, the company being interviewed felt uncomfortable with either of these answers as it believed that the partnership had been "partially successful". Hence, in the final questionnaire, the possible answers to this question were changed to be: "successful", "not successful", or "partially successful".
- In enquiring the criteria that SME's used to determine the worth of their company, "projected growth of profits" was added to the existing list.
- In enquiring what was the main motivation for the SME to partner with the LCO, it was agreed that the two independent possible answers: "gaining access to new markets", and "increasing your company's market share" could be collapsed into a single question: "gaining access to new markets or larger share of current market", as both questions related to a single concept, namely gaining access to a larger market.

These companies were again interviewed later using the final questionnaire.

Section 2.6.2 has described the hypotheses and associated subhypotheses to be empirically explored. To recap, two key relationships would be tested, namely:

- whether the more competencies and capabilities the SME has, the more (or less) successful the partnership with the LCO is perceived to be (in the eyes of the SME)
- whether safeguards moderate the relationship between competencies and capabilities and perceived successful partnership (in the eyes of the SME). In other words, the more safeguards that are put in place in the relationship between SMEs and LCOs, and specifically whether the more *informal* safeguards or the more *formal* safeguards that are put in place, the more successful the partnership with the LCO is perceived to be (in the eyes of the SME).

A questionnaire was constructed to capture the perspectives of SME's on the above relationships. Questions were designed to capture a response pertaining to either competencies, capabilities or safeguards (see Table 5 below). The responses were measured in each case using a 2-point scale: 1 = yes; 2 = no. The independent variables were categorized as competencies and capabilities, and the moderating independent variables were described in terms of formal and informal safeguards.

The first group of independent variables related to capabilities that the SME believed it had, and were grouped as ability capabilities or awareness capabilities. The ability capabilities related to the IP developed by the company; the main reasons for the LCO to partner with it (the SME); the LCO's preference for disruptive versus incremental technology; the type of innovative environment in which the SME operated; and an ability to segment the market for a technology product. The awareness capability variables included: complementarity of SME's technological offering with the LCO's core business; main reasons for the LCO to partner with the SME; the type of organization from which the LCO sourced innovative technologies; an awareness of the internal politics of the LCO partner; an understanding of the SWOT of the LCO and whether the SME had a complementary offering; and the preferred sourcing strategy for a technology of the LCO.

The second group of independent variables related to the competencies that the SME believed it possessed. In this case the SME was asked to indicate whether it believed that the main reason for the LCO to partner with it was to access a source of innovation; to acquire the product; or to access its (SME's) network and relationships.

The third group of independent variables were those that moderated the relationship between competencies, capabilities and perceived successful partnership, and were

safeguards that were put in place in the relationship between the SME and the LCO. These were grouped as either formal safeguards or informal safeguards. The formal safeguards included: the existence of a formal partnership; quantitative measures for determining whether the partnership was successful; the existence of a technology strategy for the LCO; the main reasons for the LCO to partner with the SME; the manner in which the LCO gained information on the SME; the existence in the SME of a documented process for monitoring quality and reliability of products; and that a substantial equity stake of the SME was held by another organization. The informal safeguards included: a high level of trust by the SME in the LCO prior to the partnership; a high level of trust by the SME in the LCO after the partnership; classification of the LCO as being opportunistic; cultural fit, namely: the LCO being a South African company, and the main core values to which the LCO ascribed; the SME being the project champion; the criteria used to determine the worth of the SME; the main motivation for the SME to partner with the LCO; the approximate cost for the LCO to switch to/acquire the SME's technology; the process used in managing the partnership; and the position of the SME in its industrial cluster.

**Table 5: Questions used to capture the variables to be analysed**

<b>Ability capability</b>
1. Has your company developed proprietary information during the period 1995 – 2003?
2. If yes, has this IP been patented?
3. What do you believe were the main reasons for the LCO to partner with you: <i>to acquire the expertise?</i>
4. What do you believe were the main reasons for the LCO to partner with you: <i>to acquire the technology?</i>
5. What do you believe were the main reasons for the LCO to partner with you: <i>not to miss a trend, which could result in falling behind other competitors?</i>
6. When sourcing innovative technologies, your LCO partner sources 6.1 disruptive technology 6.2 incremental technology?
7. Is the sectoral environment in which your company operates one of: 7.1 incremental innovation 7.2 spasmodic innovation 7.3 repetitive innovation 7.4 incessant innovation?
8. Do you segment your potential market using, inter alia, the following categories of potential clients: early innovators, early adopters, early majority, late majority, and laggards?
<b>Awareness capability</b>
9. Did you have an adequate understanding of the strengths and weaknesses of your LCO partner?
10. Was your offering complementary to the LCOs SWOT?
11. Was your technological offering complementary to the LCO's core business?
12. Were you aware of the internal politics of your LCO partner?



13. What do you believe were the main reasons for the LCO to partner with you: to take advantage of financial synergies
14. What do you believe were the main reasons for the LCO to partner with you were to satisfy managerial motives such as: 14.1 increasing profitability 14.2 technical economies of scale 14.3 recognition of management expertise for proposing cooperation?
15. Does your LCO partner source innovative technologies from: 15.1 SMEs specifically 15.2 LCOs specifically 15.3 research institutions specifically 15.4 combination of the above?
16. When sourcing a technology, the preferred strategy of your LCO partner is: 16.1 to wholly acquire the technology 16.2 to enter into one of the following partnership arrangements with an SME: 16.2.1 a joint venture 16.2.2 a license 16.2.3 becoming a “reseller of the technology” 16.3 To enter into one of the following partnership arrangements with a LCO: 16.3.1 a joint venture 16.3.2 license 16.3.3 becoming a “reseller of the technology”
<b>Competencies</b>
17. What do you believe were the main reasons for the LCO to partner with you: to access a source of innovation?
18. What do you believe were the main reasons for the LCO to partner with you: to acquire the product?
19. What do you believe were the main reasons for the LCO to partner with you: to access your network and relationships?
<b>Formal safeguards</b>
1. Have you during the period 1990-2003 cooperated and/or partnered with a large company (LCO)?
2. Did you use quantitative measures to determine whether the partnership was successful/unsuccessful/partially successful? 2.1 financial success 2.2 mutual benefits 2.3 no 2.4 other
3. Did the LCO have a technology strategy?
4. What do you believe were the main reasons for the LCO to partner with you? 4.1 To access new market segments 4.2 To increase sales 4.3 To pursue market dominance 4.4 To develop a “quick win” that has a high probability of success and will probably produce an immediate pay-off
5. Do you think that the LCO gathered information on your company by: 5.1 Scanning relevant technological magazines? 5.2 Formal business appointment(s) with the owner(s) and/or staff of your company? 5.3 Informal meetings/lunches with the owner(s) and/or staff of your company? 5.4 Word of mouth? 5.5 Relationship building at networking event(s)?
6. Do you have a documented process for monitoring: 6.1 quality control of your products 6.2 reliable delivery 6.3 reliable product support?

7. During negotiations with the LCO, was a substantial equity stake in your company held by:
7.1 a venture capital company
7.2 another company viz:
7.2.1 another SME
7.2.2 an LCO
7.3 an angel investor
7.4 an incubator
7.5 a bank?
<b>Informal safeguards</b>
8. What was your level of trust in the LCO prior to the partnership – high?
9. What was your level of trust in the LCO with whom you partnered after the partnership – high?
10. Would you describe the LCO as being an opportunistic company, viz: seeking self-interest with guile?
11. Was your LCO partner a South African company?
12. List the main core values to which your LCO partner ascribes:
12.1 integrity
12.2 maintaining good relationships
12.3 quality driven
12.4 innovation driven
12.5 building expertise
13. Was a representative from the SME the project champion?
14. Is the worth of your company (SME) based on:
14.1 your sales turnover
14.2 your number of customers
14.3 an analysis of your financial statements
14.4 a high customer sales ratio
14.5 the longevity of your average customer account
14.6 your reputation in the market place
14.7 projected growth of profits\
15. What was the main motivation for your company to partner with the LCO:
15.1 gaining access to new markets or larger share of current market
15.2 improving/adding to your management skills
15.3 easing pressure from investors
15.4 obtaining financial support
15.5 optimizing entrepreneurship value (“cashing in”)
15.6 “piggy backing” on the LCO’s technical infrastructure and expertise
15.7 your company had moved into a mature phase and no longer provided challenges for management.
16. Can you quantify the approximate cost for the LCO to switch to/acquire your technology
17. As part of the negotiation process, did you, with your partnering LCO:
17.1 establish a long-term strategic intent
17.2 develop a short-term joint intent
17.3 identify and create project teams
17.4 widely communicate the joint intent
17.5 obtain stakeholder support
17.6 establish an implementation plan
17.7 develop an exit strategy for the SME
18. Are you recognized as an important player in your industrial cluster?

In order to test whether the SME perceived the partnership to be successful or not, the following question was asked “did your company perceive the partnership/acquisition to be a success?” This was selected as the dependent variable. Three response options were offered: “successful”, “not successful”, and “partially successful”. The “partially

successful” option was included to ensure a response, rather than have companies decide not to answer this question as they were uncomfortable with a choice of only two possibilities at either end of the scale, namely “successful” or “not successful”. In analysing this data, “partially successful” was grouped with “not successful” as it was clear that “partially successful” certainly did not equate with “successful”, but could imply “not successful”.

The questions were dichotomous and did not allow for much variation. Hence, in order to improve the variation of the variables, the variables listed in Table 5 were treated as items and in consultation with field experts, were compounded into new variables. The new variables were described as *ability capabilities*; *awareness capabilities*; *competencies*; *formal safeguards*; and *informal safeguards*.

Having discussed the measurements used, including the variables and the compounding of the items into new variables, the research design will be described next.

## **3.2 Sample design**

### **3.2.1 Original research design**

The original plan was to interview companies (small and large) by means of a “mirror” questionnaire. The questionnaire would be similar and would ask the same questions, rephrasing them when appropriate, and designed to capture the perspectives of senior management of both the large companies, and the SMEs respectively. The two sets of data would then be compared and analysed for similar, as well as differing views. Where differences were apparent, it was envisaged to explore these by means of structured interviews with a smaller sample of the original sample population. However, this strategy had to be changed due to the extremely poor response rate of the large companies. What follow is therefore first a description of the execution of the original research plan, followed by a description of the new research plan that was developed and its execution.

Having developed the questionnaires for the large companies, and in an attempt to secure a good response rate, a small “response rate test survey” was conducted during July 2003. The process for identifying participants in the “test” survey is described below. Data from the South African Innovation Survey 2001 for Manufacturing and Services was screened for those companies responding positively to the following question: “5a: Did your firm have technological innovations in the period 1998 – 2000?” Six of these respondents were

randomly selected and telephoned to test whether they would be willing to complete a questionnaire. All six responded in the affirmative, but a couple of the respondents requested that the conversation be confirmed per telefax. Rather than duplicate effort in terms of both a telephone conversation and a telefax follow-up, a second approach (telefax only) was adopted, using a different dataset. This second dataset comprised the awardees of 2003 SPII (Support Programme for Industrial Innovation) grants. Awardees were telefaxed a preliminary questionnaire (see Appendix 1) providing background on the research topic and enquiring whether they would be willing to fill in a questionnaire. Of the 27 targeted companies, only two responded (both being SMEs).

It was therefore felt that rather than expend effort on preliminary questionnaires probing the expected response rate, companies should be targeted using the final questionnaire. The large companies were the first to be approached. A database of 113 companies (duplicates having been removed) was compiled comprising the following:

- 2003 SPII awardees (21 companies)
- Companies participating in the South African Innovation Survey 2001 for Manufacturing and Services, indicating a positive response to the question: Did your firm have technological innovations in the period 1998 – 2000?, as well as having indicated that they were classified as a large company (27 companies)
- 2002 Technology Top 100 finalists (62 companies)
- Selected well known South African large technology companies (3 companies)

In an attempt to secure a good response rate, companies were telephoned to identify the appropriate respondent. The incentivization for participation in the survey would be a summary of the main research findings. The telephonist identifying the appropriate respondent, was incentivized as follows: R500 to phone all the companies; an additional R300 if more than 80% agreed to fill in the questionnaire; and an additional R200 if 70% of those that agreed actually completed and returned the questionnaires.

113 large companies indicated that they would fill in the questionnaire and in August 2003, e-mails were forwarded to the targeted companies - they were given three weeks to respond. Only 1 response was received by the due date (and a couple of companies indicated that as this research was not relevant to them they would not be participating). Reminders were forwarded to the non-respondents, and a time extension of a further two weeks was given. This led to responses being received from an additional 4 large companies.

Because of the low response rate, it was decided that a review of the current approach was required. An assumption was then made that this research would be of greater relevance to SMEs than to large companies, and that SMEs would therefore most probably be more inclined to respond to the questionnaire as it was in their interests to contribute to a survey that would produce meaningful results from which they would benefit. A second assumption made was that most large companies would act opportunistically given circumstances permitting such behaviour, and that there was therefore little point in trying to get them to admit to their predisposition to engage in such opportunistic behaviour, and hence trying to extract their “real motives” for a partnership would be very challenging. For these reasons it was decided that technology innovative SMEs only, would be surveyed.

### 3.2.2 Revised research design

As intensive one-on-one interviews were planned, a decision was made to use databases where the companies had already been pre-screened to ensure they complied with the stipulated requirements, namely being an SME, being technology innovative and having partnered with a large company.

The sources for SMEs that were finally selected had already been screened by the respective application processes (2002 Technology Top 100 finalists; 2003 THRIP SME grant-holders; tenants of business incubators) or by the “referral network”, in terms of ensuring that they complied with the selection criteria of being both an SME, and being technology innovative. SMEs were defined in accordance with the South African National Small Business Act of 1996 for the manufacturing sector for an SMME (see Table 6 below):

**Table 6: Definition of an SME as per the South African National Small Business Act of 1996 for the manufacturing sector**

Size	Full-time employees	Annual Turnover	Total gross asset value (fixed property excluded)
Medium	200	R40 million	R15 million
Small	40	R10 million	R3,75 million
Very small	20	R4 million	R1,5 million
Micro	5	R0,15 million	R0,10 million

A small or medium sized company in South Africa for the purposes of this research was therefore defined as having equal to or less than 200 full-time employees, an annual turnover of equal to or less than R40 million, and a total gross asset value (fixed property excluded) of equal to or less than R15 million.

To ensure that the SMEs in the sample were indeed SMEs, were technology innovative, and had experience of a partnership with an LCO, compliance with the following criteria being posed as questions in the questionnaire (and indicated by a positive answer), was essential for participation in the data analysis:

- Classification as an SME (compliance with at least two of these criteria essential):
  - Approximate number of full time employees in your firm on 31 March 2003 (less than or equal to 200)
  - Annual turnover of your firm on 31 March 2003 (less than or equal to R40 million)
  - Total gross asset value (excluding fixed property) (less than or equal to R15 million)
- Has your company developed proprietary information during the period 1995-2003?
- Have you during the period 1990 – 2003 cooperated and/or partnered with a large company?

Using largely the same databases as those for the large companies, but this time selecting SMEs rather than LCOs from the databases, a non-probable, convenience sample of technology innovative SMEs that had some recent experience of partnering with a large company, was targeted. As mentioned above, in addition to the original databases used, SME grant-holders from the 2003 Technology and Human Resources for Industry Programme (THRIP); word of mouth referrals; and SMEs participating in two business incubation programmes were targeted. The final list comprised 180 companies once the duplicates had been removed, and the number of companies from each source is listed in Table 7 below:

**Table 7: Sources of SMEs surveyed**

Source	Number of SMEs targeted
2003 SPII awardees	5
Companies participating in the South African Innovation Survey 2001 for Manufacturing and Services, indicating a positive response to the question: Did your firm have technological innovations in the period 1998 – 2000?, as well as having indicated that they were classified as a large company	1
2002 Technology Top 100 finalists	33
2003 SME grant-holders from Technology and Human Resource for Industry Programme (THRIP)	57
SMEs referred by word of mouth	15
SMEs participating in a Gauteng based business incubator	5
SMEs participating in a Cape Town based business incubator	64

Only one SME that had already been verified as indeed a technology innovative SME, was used from the list of SMEs that had participated in the South African Innovation Survey 2001 for Manufacturing and Services. The rest of this list was not used for the following reasons:

- The focus of the planned research was not necessarily only on manufacturing and services companies, but on any SME that had demonstrated technology innovation
- The integrity of the data on “size of company” was questionable as a closer examination of the companies that had indicated they were “small or medium-sized”, had revealed that they did not necessary fall into this category but were, in fact, large companies as per the definition of our research.

The survey would rely on the SME’s perception of the behaviour of its partnering large company, i.e. the SMEs interpretation and perception of the situation. Using a perception to present a reality is supported in the literature by Pfeffer et al (1976:229), citing the work of Festinger (1954), in stating that “in the absence of objective, agreed-upon standards, social comparison is used to stabilize opinions and decide on actions”. Pfeffer et al also cite earlier work of Festinger (1950:273) “it also follows that the less “physical reality” there is to validate the opinion or belief, the greater will be the importance of the social referent, the group, and the greater will be the forces to communicate.” “When you don’t know what to do because there are not clear standards to guide your behaviour, you look around and observe what others like yourself are doing, and you then employ this social standard to reduce your uncertainty (Pfeffer et al, 1976:230 citing Festinger (1950 and 1954)).

As mentioned above, the decision to use a non-probable, convenience sample is because the SME technology innovative community in South Africa is not well organized structurally, i.e. not easily accessible as there are no national, integrated databases for this category of firms. Probability sampling, whereby each segment of the population is represented in the sample, is therefore extremely difficult, if not impossible in the absence of good databases. For this reason, a convenience sample was selected from existing databases of SMEs that were participating in national programmes for technology innovation, as well as from personal and “word-of-mouth” networks (as listed in Table 7 above).

### **3.3 Data Collection**

Because of the bad experience in very poor response rates from the original research design that surveyed LCOs, and in an attempt to secure an acceptable response rate, one-on-one interviews by means of a structured questionnaire were conducted during the period October – December 2003. (The pilot survey on the 3 SMEs was conducted by the researcher herself, during September 2003.) Because of the one-on-one interviews and the logistic constraints associated with conducting the interviews, for convenience purposes companies

that were based in Pretoria and Johannesburg were approached. In addition, a few of the companies that were referred by “word-of-mouth” and were based in Durban and Stellenbosch were also approached as they had already been sensitized regarding the research. The Durban and Stellenbosch companies were approached telephonically and requested to complete the questionnaire electronically – i.e. no one-on-one interviews were held. Furthermore 64 start-up companies that were resident in a business incubator in Cape Town were also targeted. In this case the Manager of the incubator was approached with a request to sensitize her tenants to the research and encourage them to fill in the questionnaire. One-on-one interviews would be conducted with those start-ups that were willing to participate in the survey.

Seven second and third year students from the School of Management and Economic Sciences of the University of Pretoria, who were studying Entrepreneurship, were recruited and trained in terms of the research objectives of the study; how to identify the appropriate person and set up an interview; how to interview the candidate; and how to clarify questions when necessary. The students were financially incentivised to hand in fully completed questionnaires (they were remunerated per completed questionnaire). In addition, the researcher herself interviewed over 11% of the total sample (that translated to almost 50% of the respondents).

### **3.4 Data capturing and data editing**

Appointments were made with the CEO/Director of the SME and the candidate was interviewed by means of a structured questionnaire. The students conducting the interviews had been trained regarding how to pose and clarify if necessary the questions, as well as how to capture the information. Each question was coded such that each quantitative question was treated as a separate, dummy variable (item). Answers to the qualitative questions were quantified by grouping into common categories and each category was then treated as a dummy variable. The groupings of qualitative common categories and compilation of these dummy variables were ratified by consensus by two field experts.

As already mentioned in section 3.1, because the quantitative questions were mostly dichotomous, they were treated as dummy variables. In order to improve the variation of the variables, the dummy variables were “grouped” into compounded variables, namely competences, capabilities (comprising ability capabilities and awareness capabilities), or



safeguards (formal or informal). The selection of dummy variables comprising each compounded variable was controlled by consensus first having been reached by two field experts.

Data from the completed questionnaires was captured using the statistical software package, SPSS. Once the data had been captured, the entries were cross-checked for correctness against the original questionnaires by the researcher and an assistant. A field expert (and also an expert in SPSS) also checked the entries for possible inconsistencies. Once there was agreement that the data had been correctly captured, the analysis began.

### **3.5 Data analysis**

The frequencies of responses to the various questions “dummy variables” were first examined. This would give an indication of perceived importance of the issue from the viewpoint of the SME. Thereafter, backward conditional logistic regression would be performed on the data to explore empirically the hypotheses. Finally, in order to understand which dummy variables specifically affected the relationship between competencies, capabilities and successful partnership, a Phi test was done on all the dummy variables

In explaining the reason for selection of logistic regression, what follows is a description by Field (2000:163-204) of the reasoning behind logistic regression. He begins by listing several assumptions that must be valid in order to use multiple regression analysis. The assumptions that were prevalent in this research were:

- Variable types must be measured at the interval level and there should be no constraints on the variability of the outcome
- The predictors should have some variation in value
- There should be no perfect linear relationship between two or more of the predictors, i.e. the predictor variables should not correlate highly
- The residuals in the model are random, normally distributed, variables with a mean of zero.
- All the values of the outcome variable are independent
- The relationship being modeled is linear.

The dummy variables were compounded into the variables competencies, capabilities (ability capabilities and awareness capabilities) and safeguards (informal safeguards and formal safeguards). Having examined the frequencies of the variables, logistic regression using the backward conditional regression method was decided upon as the statistical method to be used in order to establish the relationship of competencies and capabilities, and safeguards, with the perceived success of the partnership. Logistic regression rather than ordinary regression was selected for the following reasons:

- The dependent variable was nominal (dichotomous)
- Some of the variables of the independent variable were bimodal and hence did not have a normal distribution. Furthermore some of the variables although not bimodal, did not have a normal distribution.

Because the assumptions for ordinary or normal regression analysis are violated, logistic regression analysis was selected as it allows for a nominal dependent variable and not normally distributed independent variables – logistic regression is a distribution-independent statistical technique.

Backward conditional regression analysis was used for analysing the data in order to determine which model best fitted the data. Field (2002:169) comments that backward conditional regression is appropriate when no previous research exists on which to base the hypotheses for testing and one is merely trying to find a model to fit the data – as was the case with this research. Furthermore, because we wished to examine the effect of a predictor when another variable was held constant, this method was deemed to be appropriate (Field, 2000:169). This will be elaborated on below.

Multiple regression, in which there are several predictors, can be described by the following formula (Field, 2000:164):

$$Y = b_0 + b_1 x_1 + b_2 x_2 + \dots b_n x_n + e_1$$

where:

Y is predicted from a combination of each predictor variable multiplied by its respective regression coefficient;

$b_n$  is the regression coefficient of the corresponding variable  $x_n$  ;

and  $e_1$  is the residual value (where the higher the residual value, the worse the result). However, because this research attempts to find a model that fits the data rather than trying to predict what happens when certain conditions prevail, residual values are not that important a consideration in this case.

In logistic regression, the probability of Y occurring given known values of  $x_n$ , is predicted. Where there are several predictors, the multiple logistic regression formula is:

$$P(Y) = \frac{1}{1 + e^{-z}}$$

where  $z = b_0 + b_1 x_1 + b_2 x_2 + \dots + b_n x_n + e_1$

Linear regression can only be used where the relationship between the variables is linear. When the outcome variable is dichotomous, however, this assumption is usually violated. By transforming the data using the logarithmic transformation, the form of the relationship is made linear whilst leaving the relationship itself as non-linear. Hence logistic regression expresses the multiple linear regression equation in logarithmic terms and overcomes the problem of violating the assumption of linearity.

The resulting value from the above equation is a probability value that varies between 0 and 1. If the value is *close to zero* it means that Y is very *unlikely* to have occurred, whereas if it is *close to 1* it means that Y is *very likely* to have occurred. As in linear regression, each predictor variable in the logistic regression equation has its own coefficient. In running the analysis the value of these coefficients must be estimated in order to solve the equation. “These parameters are estimated by fitting models, based on the available predictors, to the observed data. The chosen model will be the one that, when values of the predictor variables are placed in it, results in values of Y closest to the observed values. Specifically, the values of the parameters are estimated using the maximum-likelihood method, which selects coefficients that make the observed values most likely to have occurred. So, as with multiple regression, we try to fit a model to our data that allows us to estimate values of the outcome variable from known values of the predictor variable or variables” (Field, 2000:166).

Introducing the moderator effect, the components of a moderator model are:

$$Y = b + d_1 x_1 + d_2 x_2$$

where  $d_1$  is the “pure” effect on y, given the effect of  $d_2$  on the other variables (Field, 2000)

To test for the moderator effect, the *backward conditional regression method* was used for analyzing the data. In this case testing begins with all predictors (independent variables) included. “The computer then tests whether any of these predictors can be removed from the model without having a substantial effect on how well the model fits the observed data. The first predictor to be removed will be the one that has the least impact on how the model fits the data” (Field, 2000:169). Field (2002:169), citing Menard (1995), further comments that stepwise methods (as in the backward conditional regression method) are appropriate “when used in situations in which no previous research exists on which to base hypotheses for testing, ... and you merely wish to find a model to fit your data”. Furthermore, the backward method takes into account suppressor effects that occur “when a predictor has a significant effect but only when another variable is held constant” (Field, 2000:169).

In analyzing the filled in questionnaires, only those questions that were coded as dummy variables were analysed. The dummy variables were initially analysed in terms of frequency of response – which would indicate those issues that the SME perceived to be important. Thereafter logistic regression was performed on the data to test the hypotheses. This included not only the effect of the numbers of core competencies and capabilities on perceived partnership success, but also the interaction or moderator effect of formal and informal safeguards (individually and combined) on perceived partnership success. Lastly, cross tabulations with *perceived partnership success* as the y (dependent) variable, and certain dummy variables falling into the category *capabilities* as the x (independent) variable, were performed to clarify some of the logistic regression findings.

### **3.6 Verification of the survey findings by means of case studies**

As the sample number of the survey was relatively small for the purposes of conducting multivariate analyses, and as limited qualitative data could be captured by means of a questionnaire, case studies were conducted on a sample of four SMEs that had participated in the survey. This approach was adopted in order to verify the findings from the survey. (An expanded explanation for the use of case studies, as well as the methodology used is discussed in Chapter 5: Case studies.)

Having described the methodology that was used, the next chapter will focus on the results obtained.

## Chapter 4

### Results of the survey

This chapter discusses the analyses of the empirical findings of the survey. It begins with a description of the sample in terms of the source databases; the sample's geographic distribution, and the size of the companies in the sample. The response rate of SME's that perceived the partnership to be (un)successful is given. Thereafter, the frequencies of the individual items and the distributions of the compounded variables "number of capabilities", "number of competencies" and "number of safeguards" in the relationships are discussed. The results of the logistic regression tests on the relationship between number of competencies and capabilities and perceived partnership success; as well as the effect of safeguards, formal, informal, and a combination of the two, on the relationship between the number of competencies and capabilities and partnership success are presented. Lastly, in an attempt to arrive at more in depth insights pertaining to the relationships that are discovered, the association of individual items with the dependent variable are explored by means of Phi tests on those significant variables are presented, with an associated interpretation in each case.

A description of the sample of respondents follows.

#### 4.1 Description of the responding population

Of the 180 companies that were approached with questionnaires, 43 responses were received, giving a response rate of 23.9%. This is a fair response rate, considering that companies were contacted and interviewed by appointment. The following table indicates from where the respondents were sourced:

**Table 8: Source of respondents**

<b>Data source</b>	<b>Number of respondents</b>
2003 SPII awardees	1 (5)
Companies participating in the South African Innovation Survey 2001 for Manufacturing and Services, indicating a positive response to the question: Did your firm have technological innovations in the period 1998 – 2000?, as well as having indicated that they were classified as a large company	0 (1)
2002 Technology Top 100 finalists	10 (33)
2003 SME grant-holders from Technology and Human Resource for Industry Programme (THRIP)	11 (57)
SMEs referred by word of mouth	14 (15)
SMEs participating in a Gauteng based business incubator	5 (5)
SMEs participating in a Cape Town based business incubator	2 (64)

Numbers in brackets = original number of companies approached (taken from Table 8)

From the table above it is clear that there was a very high representation of companies who were referred by word of mouth or who were participants in the Gauteng based business incubator. Where there was no relationship and companies were merely cold-canvassed, the response rate was far lower (e.g. SPII, TT100, THRIP grant-holders, and SMEs in the Cape Town based business incubator).

The geographic distribution of the respondents is given in Table 9. By far the majority of the companies was based in Gauteng (91%), with most of these companies (59%) based in Pretoria. The external validity of the research findings (i.e. the generalizability of the findings to the population at large) would therefore be low. A more representative sample of the entire geographically distributed population would be required to ensure a high external validity.

**Table 9: Geographic distribution of respondents**

<b>Geographic area</b>	<b>Number of companies</b>
Pretoria	23
Johannesburg	16
Cape Town/Stellenbosch	3
Durban	1

In reporting on the size of company in the survey sample, 32.6% of the companies that responded had five or fewer full time employees, and the majority, 86%, had 40 or fewer full time employees (see Table 10). Most of the companies interviewed, therefore were small rather than medium sized.

**Table 10: Number of full-time employees during 2003**

		<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Valid	<=5	14	32.6	32.6
	<=20	13	30.2	62.8
	<=40	10	23.3	86.0
	<=200	6	14.0	100.0
	Total	43	100.0	

From Table 11 it is evident that the largest percentage (41.9%) had an annual turnover during 2003 of between R0.15 million and R4 million, and only 7% had a turnover of more than R40 million.

**Table 11: Annual turnover of firm as at 31 March 2003**

		<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Valid	<= 0.15 mln	3	7.0	7.0
	<=4 mln	18	41.9	48.8
	<=10 mln	6	14.0	62.8
	<=40 mln	13	30.2	93.0
	>40 mln	3	7.0	100.0
	Total	43	100.0	

The largest percentage of companies interviewed (60.5%) had a gross asset value of R1.5 million or less (see Table 12).

**Table 12: Gross asset value of firm**

		<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Valid	<=R0,1mil	9	20.9	20.9
	<=R1,5mil	17	39.5	60.5
	<=R3,75mil	8	18.6	79.1
	<=R15mil	8	18.6	97.7
	>R15mil	1	2.3	100.0
	Total	43	100.0	

From the tables above it is clear that the majority of the respondents could be classified as small, rather than medium sized companies. This size of company would be very vulnerable to opportunistic behaviour of LCOs and hence the sample selected was indeed relevant in terms of the size of company being studied.

The next section will discuss the frequencies of the responses, starting with those companies that had indicated that they perceived the partnership to be (un)successful (the dependent variable). Thereafter the frequencies and distributions of the following independent variables and their composition will be reported on: the ability capability variable; the awareness capability variable; the competency variable; the formal safeguard variable; and the informal safeguard variable.

## 4.2 Perception of successful partnership (dependent variable)

The frequency of the dependent variable: successful partnership - as perceived by the SME is given in Table 13. 60,5% of the SMEs considered the partnership to be a success and 39,5% considered it to be partially or not successful. This result is somewhat surprising as a lower result for successful partnership was expected. As LCOs can act opportunistically in accessing the knowledge and expertise of an SME when partnering, and the anecdotal evidence (see case 1) suggests that they do, a lower response rate in terms of perceived successful partnership by the SME was anticipated. If LCOs do abuse their power in a partnership with an SME, one could have expected more SMEs to indicate that they believed the partnership to be NOT successful.

**Table 13: SMEs indicating that they perceived the partnership to be successful**

		<b>Frequency</b>	<b>Valid Percent</b>
Valid	No	17	39,5
	Yes	26	60,5
	Total	43	100,0



### 4.3 Capabilities, competencies and safeguards (independent variables)

Next to be considered do the frequencies of the variables comprise competencies, capabilities and safeguards, being the independent variables. Thereafter their respective distributions are discussed.

#### 4.3.1 Ability capability variable (X1 first independent variable)

##### 4.3.1.1 Frequency of ability capability

The ability capability variable refers to a number of abilities of the SMEs to produce, utilize and protect inherent technological knowledge and information. This variable includes the following abilities: developing and patenting intellectual property; expertise and technology ability; ability to establish a new trend; ability to understand different types of innovative technology, as well as the innovative environment; and an ability to segment the market for innovative technologies. The variables comprising the ability capability variable and their frequencies are listed in Table 14 below.

**Table 14: Frequency of responses: ability capability variables**

Ability capability variables	Frequency (%)
1. The company developed proprietary information during the period 1995 – 2003	86
2. This IP was patented	35
3. SME had expertise	79
4. SME had technology	54
5. Ability of SME to establish a new trend	67
6. When sourcing innovative technologies, SME's LCO partner sources	
6.1 disruptive technology	26
6.2 incremental technology	81
7. The sectoral environment in which SME operates is one of:	
7.1 incremental innovation	47
7.2 spasmodic innovation	28
7.3 repetitive innovation	44
7.4 incessant innovation	35
8. SME segments its potential market using, inter alia, the following categories of potential clients: early innovators, early adopters, early majority, late majority, and laggards	54

In examining the variables comprising ability capabilities as listed in Table 14, the following observations can be made:

Most of the companies interviewed (86%) had developed *proprietary knowledge* (IP), although only 35% had patented this IP. Kwak (2002) believed that possessing at least one patent – which would give an indication of an ability capability, increases a start-up's probability for collaboration. The high percentage of companies that indicated having developed IP confirmed that most of the companies interviewed were in fact developing technology innovations and hence had an ability to apply knowledge and expertise. The high percentage of SMEs developing IP appears to follow the trend described by Arundel (2001:611) where because of a shift from competition based on price towards competition based on technical innovation, economic importance is attached to IP that encourages its development. A second reason given by Arundel (2001:611) for the increase in the development of IP is that IP is associated with the rise of new technologies, e.g. biotechnology and information technology – and many of the SMEs interviewed were in the information technology sector.

The relatively small percentage that had patented their IP could be as a result of the industry that they were in (in South Africa patenting of software is not permissible), or because the costs of defending a patent are very high for a small company and hence patenting is not an attractive option for an SME. It could also be as they did not wish to fully disclose their inventions as this could “release valuable information to competitors on potentially profitable research areas or how to invent around the patent” (Arundel, 2001:612), or because of the high costs associated with patenting, or the fact that most of the innovations were of an incremental nature and therefore not patentable (Arundel, 2001:213).

Most of the SMEs (79%) believed that it was their *expertise* that had attracted the LCO to partner with them. This finding is in support of findings reached by Kimzey and Kurokawa (2002) who stated that one of the reasons for LCO's to outsource was because they wished to be the technology leader rather than the technology driver. To be seen as a technology outsource partner, would be dependent on the level of expertise residing in the SME, i.e. an expertise ability that would ultimately support technology development. This specialist knowledge that the SME had could be viewed by the LCO as an ability, which they (the LCO) sought. 67% of SMEs believed that they had an ability to *establish a trend*, whereas only 54% believed that it was their *technology* that attracted the LCO.

Hence expertise appeared to be the most important ability capability that motivated an LCO to partner with an SME.

81% of SMEs believed that their LCO partner sourced incremental technology, and only 26% believed their LCO partner sourced disruptive technology. Christensen (2002) commented that leaps in growth were accompanied by radical innovation. Hence it is fair to assume that the opportunities for SMEs were largely in providing incremental, rather than radical technology solutions. Furthermore, 47% of SMEs were of the opinion that the sectoral environment in which their company operated was one of incremental innovation, (44% believed it was one of repetitive innovation, 35% believed it was one of incessant innovation, and 28% believed it was one of spasmodic innovation). These results indicate an ability by the SME to understand the innovative environment in which it operated. Furthermore, the results are consistent with Burgelman et al's findings (1995) that technology evolves through long periods of incremental innovation, punctuated occasionally by disruptive innovations. It would seem that not only is the environment largely one of incremental innovation, but that LCOs expect to source incremental, rather than radical innovation. Hence the fact that the findings of this research appear to support the findings in the literature (Burgelman et al, 1995) would confirm that the SMEs did appear to have an ability to understand the types of technology that the LCOs source, as well as the innovative environment in which they operate.

More than half (54%) of SMEs segmented their potential market using, inter alia, the following categories of potential clients: early innovators, early adopters, early majority, late majority, and laggards. This supports the findings of Moore (1999) confirming the importance of companies wishing to access markets with new products, to identify and understand the paradigms and needs of the market players and thereafter to align their marketing strategies with the paradigms of the players. Hence an apparent ability to segment the market to introduce new innovations was prevalent in the majority of the SMEs.

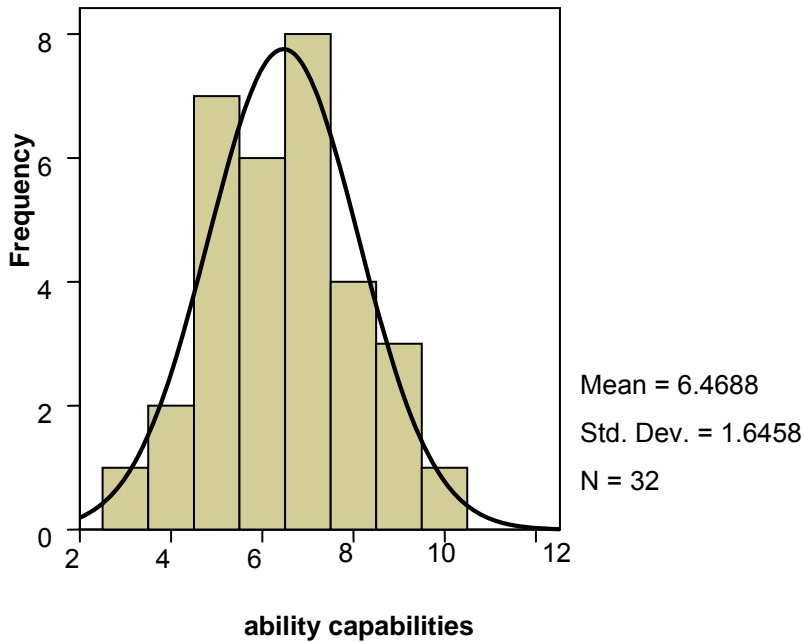
In concluding this section, it appears that nearly all the SMEs had developed IP and had sought after expertise; the SMEs had an ability to understand that the environment in which they operated was one of incremental innovation, and that the LCOs were by and large sourcing incremental innovation from this environment; and that more than half of the SMEs had an ability to understand the market segmentation required for introducing a new innovation to the market.

#### 4.3.1.2 Distribution of ability capability

As discussed in Chapter 3, in order to improve the variation of the variables, compounded variables were constructed by grouping the individual ability capability variables together to create a single ability capability variable. Hence items 1 – 8 of Table 14 were compounded into a single variable: the ability capability variable. In considering the distribution of the ability capability variable, it is apparent from Table 15 and Figure 9 that on average SMEs have 6.5 ability capabilities. The compounded ability capability variable has a normal distribution in which 7 abilities is the most frequent score. Only a few (2%) SMEs score on all abilities. The standard deviation is relatively low and a considerable number of the SMEs have 5 – 8 abilities.

**Table 15: Distribution of ability capability variable**

Number of ability capabilities		Frequency	Percent
Valid	3,00	1	2,3
	4,00	2	4,7
	5,00	7	16,3
	6,00	6	14,0
	7,00	8	18,6
	8,00	4	9,3
	9,00	3	7,0
	10,00	1	2,3
	Total	32	74,4
	Missing	System	11
Total		43	100,0

**Figure 9: Distribution of ability capability variable**

#### 4.3.2 Awareness capability variable (X2, second independent variable)

##### 4.3.2.1 Frequency of awareness capability

The awareness capability variable refers to the level of awareness that the SME has relating to the environment in which it operates, and the needs of the LCO. This variable includes the following awareness capabilities; understanding of LCO's SWOT, and complementarity of technological offering with the LCO's SWOT and core business; awareness of the LCOs internal politics; awareness of opportunities SME presents to the LCO in terms of providing opportunities for financial synergy, increasing profitability, technical economies of scale, recognition of management expertise for proposing the cooperation; awareness of organizational type from whom LCO sources technologies; and awareness of the technology sourcing strategy of LCO.

Table 16 lists the frequencies of the items comprising the awareness capability variable.

**Table 16: Frequency of responses: awareness capability variables**

Awareness capability variables	Frequency (%)
9. SME had adequate understanding of the strengths and weaknesses of their LCO partner	72
10. Complementarity of SME's offering with LCO's SWOT?	88
11. Complementarity of technological offering with LCO's core business	86
12. Awareness of the internal politics of LCO partner	58
13. Opportunities SME presents: take advantage of financial synergies	35
14. Opportunities SME presents in terms of satisfying managerial motives such as:	
14.1 increasing profitability	67
14.2 technical economies of scale	49
14.3 recognition of management expertise for proposing cooperation	47
15. Organizational type from whom LCO partner sources innovative technologies:	
15.1 SMEs specifically	14
15.2 LCOs specifically	19
15.3 research institutions specifically	12
15.4 combination of the above?	74
16. Technology sourcing strategy of LCO is:	
16.1 To wholly acquire the technology	30
16.2 To enter into one of the following partnership arrangements with an SME:	
16.2.1 a joint venture	42
16.2.2 a license	40
16.2.3 becoming a "reseller of the technology"	54
16.3 To enter into one of the following partnership arrangements with a LCO:	
16.3.1 a joint venture	37
16.3.2 a license	28
16.3.3 becoming a "reseller of the technology"	44

In examining the items comprising *awareness capabilities* as listed in Table 16, the following observations can be made:

72% of the SMEs indicated that they had an adequate understanding of the strengths and weaknesses of their LCO partner, and 88% believed that their offering was complementary to the LCO's SWOT. This need for an alignment of offerings is supported in the literature by Klein Woolthuis and Groen, 2000; Hitt et al, 1998, Gadiesh et al, 2001, Klofsten and Schaerberg (2000); Bakker et al (1994); Hart and Saunders, 1997; Hlavacec (1977); Teece, 1986; and Niosi (2003). Being aware of the LCO's SWOT would hence indicate an awareness capability. Furthermore, the large majority of SMEs (86%) believed that their technological offering was complementary to the LCO's core business. These findings are in accordance with the literature (Klein Woolthuis and Groen, 2000), where technological complementarity was found to be a strong motive for partner choice.

More than half (58%) of SMEs indicated that they were aware of the internal politics of their LCO partner. The expectation would be that the greater the awareness of the internal politics, the more successful the relationship would be and an awareness would enable the SME to align itself correctly, politically.

Only 35% of SMEs believed that the LCO could take advantage of financial synergies such as the high growth potential the SME offered, although hampered by being cash strapped. However, 67% believed that they presented the LCO with an opportunity of increasing profitability (supported by the literature: Laurie, 2001; Barber et al, 1995); 49% believed the opportunity was technical economies of scale, and 47% believed it was to satisfy the managerial motive of recognition of management expertise for proposing cooperation. An understanding of the opportunities the SME offers to improve the LCO's profitability indicates the presences of an awareness capability by the SME.

74% of SMEs believed that LCOs sourced innovative technologies from a combination of SMEs, LCOs and research institutions, whereas only 19% believed it was sourced from LCOs specifically, 14% believed it was sourced from SMEs specifically and 12% believed it was sourced from research institutions specifically. This finding of few partnerships with a single organization is in support of the findings of Oerlemans et al (2003:73) where most South African firms (82%) had innovated on their own, and the percentage of innovating firms actively partnering with other South African firms was low - and considerably lower than those firms in the European Union (18% versus 26%). In addition they found that the larger the firm, the higher the percentage of innovative partners the firm had (approximately 36% of firms of 500 and more employees collaborated with domestic partners versus only 15% of firms of less than 50 employees).

Evidence from the literature is that companies tend to collaborate with single, rather than a combination of institutions, for example, Whitley (2002) comments that firms relying on new generic knowledge will either develop this in-house, or develop close alliances with research teams in the public science system. Furthermore, the findings of this research that LCOs seem to source innovative technologies from a combination of different sizes and types of organizations could appear to be contrary to the findings of Klein Woolthuis and Groen (2000) who found that LCOs preferred to collaborate specifically with other LCOs, as did SMEs with other SMEs. Their research was based on surveying European companies, where there is more selection and hence companies have the choice in terms of with which companies they wish to collaborate – large or small. South Africa is a small market with a relatively small number of technology companies, hence the selection in

terms of with whom to partner is not so great. The reality may therefore be that in South Africa LCOs need to source innovative technologies from a variety of players, inter alia, SMEs, LCOs and research institutions, rather than any single organizational type. In conclusion, therefore, having such an awareness capability would enable the SME to develop the necessary linkages with other organizations to ensure it was “on the radar screen” of the LCO sourcing technologies.

*Entering into a partnership with the SME and becoming a reseller of the SME's technology* appeared to be the most preferred strategy of the LCO partner when sourcing a technology as reflected by the majority (54%) of the SMEs. This finding would support the earlier finding (see Table 14) that one of the motivations for LCOs to enter partnerships with SMEs is to access their technologies (54% of LCOs partnered with the SME because of their (SME's) technology). 44% believed that *becoming a reseller of the LCO's technology* was the most preferred strategy of the LCO. This finding, rather than the previous finding, is supported in the literature where, for example, Klein Woolthuis and Groen (2000) found that LCOs preferred to collaborate with other LCOs, and SMEs with other SMEs. 42% believed that *entering into a joint venture with an SME*; 40% believed that *entering into a license agreement with an SME* (supported in the literature by Lang, 1996) who found that subcontracting was a good way for an SME to do business with an LCO); 37% believed *entering into a joint venture with an LCO*; and 28% believed *entering into a license agreement with an LCO* was the most preferred strategy of the LCO partner. From these results it is clear that the SMEs were of the opinion that LCOs preferred to partner with SMEs rather than LCOs.

To conclude this section the following awareness capabilities are most prominent: most of the SMEs understood the SWOT of the LCOs and had aligned their technological offerings in a complementary fashion with the LCOs core business. Furthermore, more than half of the SMEs understood the internal politics of their LCO partner. The greater majority of the SMEs (67%) were aware that they presented an opportunity for increasing the profitability of the LCO. Most of the SMEs (74%) believed that LCOs sourced innovative technologies from a combination of sources, namely, SMEs, LCO, and research institutions. The majority of SMEs believed that the preferred technology sourcing strategy for an LCO was to become a reseller of an SME's technology.



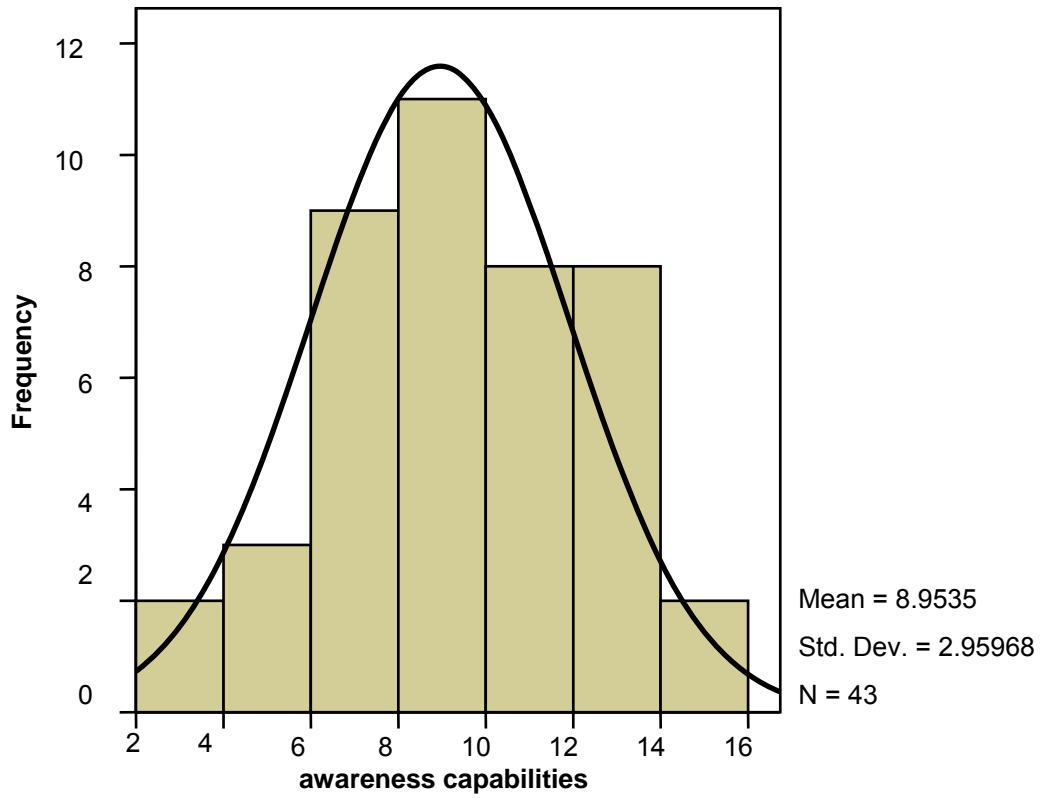
#### 4.3.2.2 Distribution of awareness capability

The distribution of the awareness capability items is as follows. From Table 17 and Figure 10, it is evident that the level is on average 8.9 and the variable has a normal distribution in which the score 7 is the most frequent score. Only a few SMEs (4.7%) score on all awareness capability items. Furthermore only a few SMEs (4.7%) have a very low level of awareness. Most SMEs are located close to the average.

**Table 17: Distribution of awareness capability variable**

Number of awareness capabilities		Frequency	Percent
Valid	2,00	2	4,7
	5,00	3	7,0
	6,00	1	2,3
	7,00	8	18,6
	8,00	6	14,0
	9,00	5	11,6
	10,00	5	11,6
	11,00	3	7,0
	12,00	6	14,0
	13,00	2	4,7
	15,00	2	4,7
	Total	43	100,0

Figure 10: Distribution of awareness capability variable



#### 4.4 Competencies variable (X3, third independent variable)

Competencies comprise capabilities plus processes. The competencies variable refers to a bundle of skills, technologies and processes for innovation, product, and networks and relationships. The frequencies of these items are listed in Table 18 below.

**Table 18: Frequency of responses: competency variables**

Competency variables	Frequency (%)
17. What do you believe were the main reasons for the LCO to partner with you: to access a source of innovation?	74
18. What do you believe were the main reasons for the LCO to partner with you: to acquire the product?	42
19. What do you believe were the main reasons for the LCO to partner with you: to access your network and relationships?	35

From Table 18 it can be seen that from the variables comprising competencies, the SMEs believed that the main reason for the LCO to partner with them was because they were seen to be *a source of innovation* (this variable had a frequency of 74%). Only 42% believed that the reason for the LCO to partner with them was to *acquire their product* and 35% believed that the LCO sought their *network and relationships*. The highest ranked competence therefore was *innovation* – more specifically, being seen as a source of innovation.

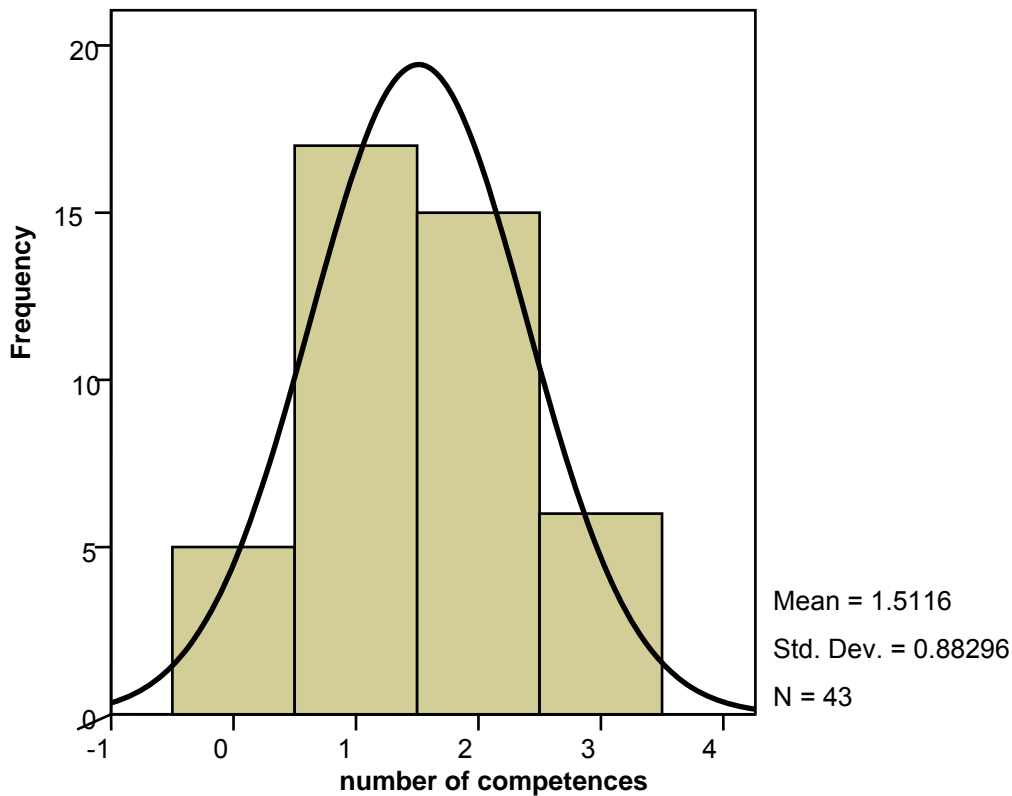
From Table 19 below, this variable can range from 0 to 3 and most SMEs have one or two of the competences included in the variable. Very few SMEs have either no competencies, or all three competencies.

From Figure 11 it is evident that the distribution seems normal.

**Table 19: Distribution of competencies variable**

	Frequency	Percent
Valid		
,00	5	11,6
1,00	17	39,5
2,00	15	34,9
3,00	6	14,0
Total	43	100,0

Figure 11: Distribution of competencies variable



#### 4.5 Moderator variables -- Number of safeguards in the LCO-SME relationship

Tables 20 and 22 below lists the frequencies of responses to the questions pertaining to safeguards (both formal and informal), i.e. the variables that comprise formal and informal safeguards. In the theoretical model, the safeguards that are put in place in the LCO-SME relationship are classified as the moderator variables.

##### 4.5.1 Number of formal safeguards in the LCO-SME relationship (Z1, first moderator variable)

###### 4.5.1.1 Frequency of formal safeguards

This variable refers to the number of formal safeguards that are put in place to manage and control the relationship with between the SME and the LCO. The variables comprising this

variable are: a formalized partnership; use of quantitative measures to determine partnership success; LCO had a technology strategy; expansionist opportunities SME presents for LCO; means by which LCO gathered information on SME; documented process for monitoring quality control, delivery and support of products. The frequencies of these items are listed in Table 20 below.

**Table 20: Frequency of responses: formal safeguard variables**

<b>Formal safeguard variables</b>	<b>Frequency (%)</b>
1. Existence of a collaboration/partnership with an LCO.	93
1. Quantitative measures used to determine whether the partnership was successful?	
1.1 financial success	51
1.2 mutual benefits	12
1.3 no	42
1.4 other	7
3. LCO had a technology strategy	60
4. Expansionistic opportunities SME presents for LCO:	
4.5 to access new market segments	47
4.6 to increase sales	72
4.7 to pursue market dominance	70
4.8 to develop a "quick win" that has a high probability of success and will probably produce an immediate pay-off	51
5. Means by which LCO gathered information on SME:	
5.5 scanning relevant technological magazines?	16
5.6 formal business appointment(s) with the owner(s) and/or staff of your company?	77
5.7 informal meetings/lunches with the owner(s) and/or staff of your company?	65
5.8 word of mouth?	67
5.9 relationship building at networking event(s)?	58
6. Documented process for monitoring:	
6.1 quality control of your products	81
6.2 reliable delivery	82
6.3 reliable product support	77
7. Substantial equity stake in SME held by:	
7.1 a venture capital company	9
7.2 another company viz:	
7.2.1 another SME	5
7.2.2 an LCO	14
7.3 an angel investor	14
7.4 an incubator	2
7.5 a bank?	7

The following observations can be made, referring to Table 20 above, concerning the frequencies of the variables comprising formal safeguards:

93% of the companies indicated that they had cooperated or partnered with a large company during the period 1990-2003. Although 7% had not filled in this variable, they had filled in the sub variables, which indicated the basis for the partnership, hence, confirming that they had indeed cooperated or partnered with a large company. Hence all

SMEs surveyed had cooperated or partnered with an LCO. This would imply that all SMEs surveyed had indeed been subject to the monitoring of performance against certain milestones and hence had been subject to this formal safeguard.

The majority of companies (51%) indicated that they had used the quantitative measure: *financial success* to determine whether the partnership was successful or not successful. Only 12% indicated that they used *mutual benefits* as a quantitative measure. 42% had indicated that they did NOT use quantitative measures to determine whether the partnership was successful/not successful. However, the majority of SMEs had applied quantitative measures as a way to control the relationship, which qualifies as a formal safeguard.

60% of the companies indicated that their LCO partner had a technology strategy. A technology strategy would imply monitoring outcomes against a pre-determined plan and hence served as a formal safeguard.

72% of the companies believed that the main expansionistic opportunity that they presented for the LCO was to *increase sales* and almost as many (70%) believed it was to *pursue market dominance*. 51% believed that it was to *develop a “quick win” that has a high probability of success and will probably produce an immediate pay-off*, and 47% believed it was to *access new market segments*. Hence the focus of LCOs (from the SMEs' perspective) appears to be on growing an existing market rather than on breaking into a new market segment. Working to pre-set targets would therefore serve as a formal safeguard.

Rech (2002) stresses the importance of conducting due diligence on a future partner. Regarding the way the information was gathered, 77% of the SMEs believed that the LCO gathered information on their company by *formal business appointment(s) with the owner(s) and/or staff of their company*; 67% by *word of mouth*; 65% by *informal meetings/lunches with the owner(s) and/or staff of their company*; and 58% by *relationship building at networking events*. Only 16% felt that the LCO gathered information on their company by *scanning relevant technological magazines*. Hence it appears that contact with the SME's people is an important means that the LCO uses to gain information on the SME. Furthermore, it is assumed that this accumulated information was against a pre-determined plan, and hence served as a formal safeguard.

82% of companies indicated that they had a documented process for monitoring *reliable delivery* of their products; 81% for *quality control* of their products; and 77% for *reliable product support*. Hence a documented process for monitoring quality control, delivery and support of products seemed to be a popular form of formal safeguard.

Very few of the companies interviewed indicated that a substantial equity stake in their company was held by another entity, during negotiations with the LCO, namely: 14% indicated that a stake was held by *an LCO*; 14% by *an angel investor*, 9% by *a venture capital company*, and 7% by *a bank*. This finding is contrary to the literature that indicates that equity is an effective mechanism for managing appropriation concerns that are associated with partnering (Pisano, Russo and Teece, 1988: Parkhe, 1993; Moon and Khanna, 1995). In spite of the literature, however, it appears that equity is not a common formal safeguard mechanism for inter-organizational relationships in South Africa.

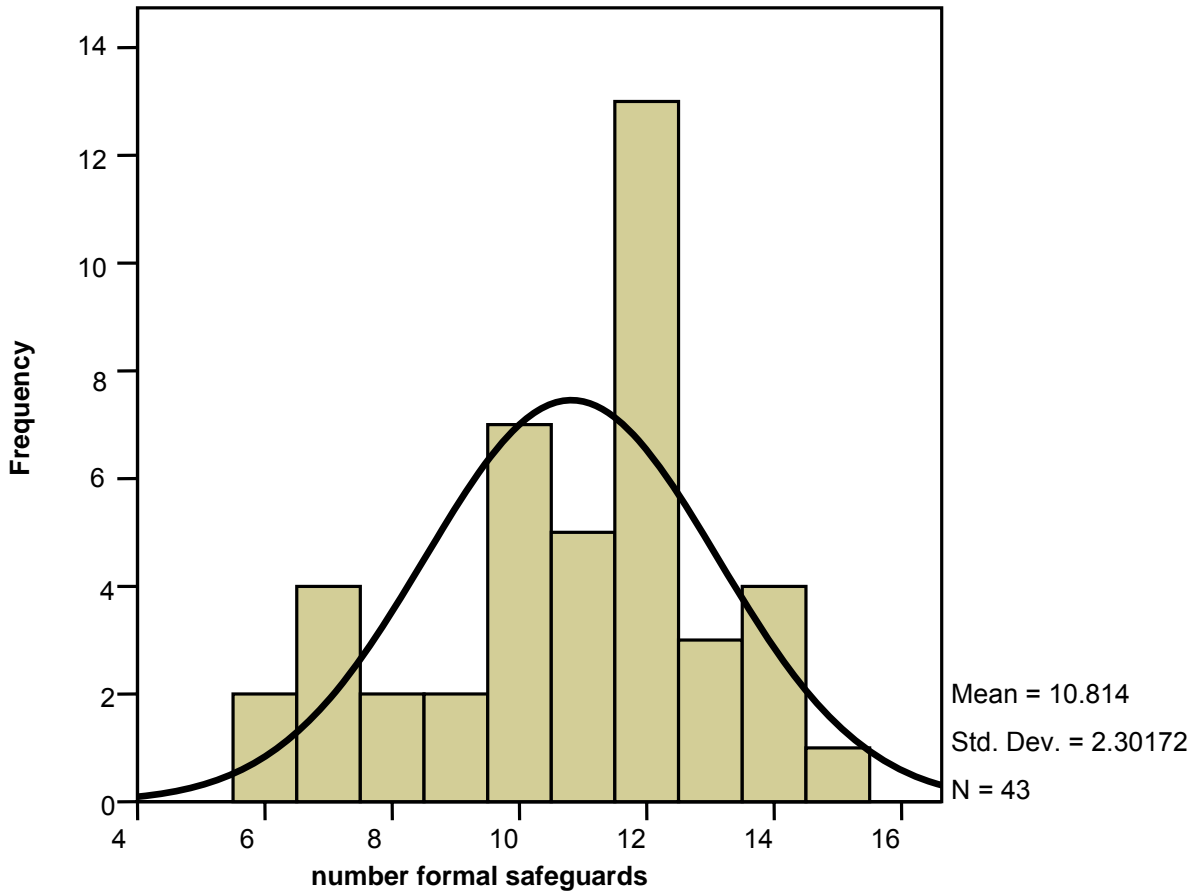
#### 4.5.1.2 Distribution of formal safeguards

In considering the distribution of the formal safeguards, from Table 21 and Figure 12, about 30% of the SME-LCO partnerships used 12 formal safeguards. On average the partnerships used about 11 formal safeguards. The variable does not appear to have a normal distribution and is somewhat skewed to the right.

**Table 21: Number of formal safeguards in the LCO-SME relationship**

		Frequency	Percent
Valid	6,00	2	4,7
	7,00	4	9,3
	8,00	2	4,7
	9,00	2	4,7
	10,00	7	16,3
	11,00	5	11,6
	12,00	13	30,2
	13,00	3	7,0
	14,00	4	9,3
	15,00	1	2,3
	Total	43	100,0

**Figure 12: Distribution of formal safeguards**



#### **4.5.2 Number of informal safeguards in the LCO-SME relationship (Z2, second moderator variable)**

##### **4.5.2.1 Frequencies of informal safeguards**

This variable refers to the number of informal safeguards that are put in place to manage and control the relationship between the SME and the LCO. The items comprising this variable are: trust in the LCO; cultural fit; SME as project champion; reputation; specific motivations for SME to partner with LCO; LCO's switching costs; management of the partnership; and being an important player in the industrial cluster.



**Table 22: Frequency of responses: informal safeguard variables**

<b>Informal safeguard variables</b>	<b>Frequency (%)</b>
8. Level of trust in the LCO <i>prior</i> to the partnership – high	63
9. Level of trust in the LCO with whom SME partnered <i>after</i> the partnership – high	56
10. The LCO was an opportunistic company	63
11. LCO partner was a South African company	79
12. The main core values to which SME's LCO partner ascribes:	
12.1 integrity	23
12.2 maintaining good relationships	21
12.3 quality driven	23
12.4 innovation driven	16
12.5 building expertise	16
13. Representative from the SME was the project champion	73
14. The worth (reputation) of the SME was based on:	
14.1 their sales turnover	63
14.2 their number of customers	44
14.3 an analysis of their financial statements	54
14.4 a high customer to sales ratio	26
14.5 the longevity of their average customer account	63
14.6 their reputation in the market place	91
14.7 projected growth of profits	67
15. Specific motivations for the SME to partner with the LCO was to:	
15.1 gain access to new markets or larger share of current market	81
15.2 improve/adde to their management skills	26
15.3 ease pressure from investors	16
15.4 obtain financial support	49
15.5 optimize entrepreneurship value (“cashing in”)	40
15.6 “piggy back” on the LCO's technical infrastructure and expertise	47
15.7 SME had moved into a mature phase and no longer provided challenges for management.	9
16. Can quantify the approximate cost for the LCO to switch to/acquire your technology	63
17. As part of the negotiation process, SME, with partnering LCO:	
17.1 established a long-term strategic intent	81
17.2 developed a short-term joint intent	61
17.3 identified and created project teams	49
17.4 widely communicated the joint intent	61
17.5 obtained stakeholder support	49
17.6 establish an implementation plan	72
17.7 developed an exit strategy for the SME	37
18. SME recognized as an important player in industrial cluster?	77

The following observations can be made, referring to Table 22 above, concerning the frequencies of the items comprising informal safeguards:

63% of the SMEs indicated that their level of trust in the LCO *prior* to the partnership was high, and slightly fewer (56%) indicated that their level of trust in the LCO *after* the partnership was high. Interestingly enough, 63% indicated that they would describe the LCO as being an opportunistic company. This would indicate that although the SMEs

were aware of the opportunistic possibilities, they still generally trusted the LCO. Furthermore it can be derived that the “before” and “after” experience was not radically different. This is supported by a “cross check” variable that had posed the question: “would you consider partnering with this large company again?” and that gave an 81% “yes” response rate.

79% of the companies indicated that their LCO partner was a South African company. This would be an informal safeguard as there would be some cultural fit. In listing the main core values to which their LCO partner ascribes, 23% listed *integrity*; 23% listed *quality driven*; 21% listed *maintaining good relationships*; 16% indicated *innovation driven*; and 16% *building expertise*. An alignment of the SME with the core values of the LCO would indicate a cultural fit, which would serve as an informal safeguard.

These results are somewhat surprising as although 79% of SMEs had indicated that they believed that the reason for the LCO to partner with them was to acquire their expertise (see Table 14), their perception was that only 16% of LCO’s indicated “building expertise” as a core value to which they ascribed. There appears to be a mismatch as although the SMEs have expertise “on offer”, they are of the opinion that this is not the reason for the LCO’s to partner with them! What these results could indicate, however, is that the core values listed, in the eyes of the SME, are not very high on the LCOs’ priority list. The low percentages allocated to the respective core values implies that either these values are not necessary that prevalent, or that the SME does not have a good understanding of the LCOs core values and hence cannot comment with confidence on their (the LCO’s) core values.

73% indicated that a representative from the SME was the project champion. This might account for the higher than expected perception of successful partnership, and would support the theory (Klein Woolthuis and Groen, 2002) of high partner satisfaction being linked to the SME being the project champion. Being the project champion would enable the SME to exert some social control and hence serve as an informal safeguard.

Almost all the companies (91%) believed that the worth of their company was based on *their reputation in the market place*. 67% believed that this was based on *projected growth of profits*; 63% on *their sales turnover*; 63% on the *longevity of their average customer account*; 54% on *an analysis of their financial statements*; 44% on *their number of customers*; and only 26% on *a high customer to sales ratio*. The reputation of the SME is a positive social control mechanism and hence an informal safeguard.

By far the majority (81%) stated that the main motivation for their company to partner with the LCO was *to gain access to new markets or larger share of current market*. 49% stated that the main motivation was *to obtain financial support*; 47% to *“piggy back” on the LCO’s technical infrastructure and expertise*; 40% *to optimize entrepreneurship value (cash in)*; 26% *to improve/add to their management skills*; 16% *to ease pressure from investors*; and only 9% because *their company had moved into a mature phase and no longer provided challenges for management*. Growing their market therefore was clearly the main motivator for the SME and if the LCO delivered on this expectation it would reinforce a capability trust. This therefore served as an informal safeguard in the SME-LCO relationship.

63% of SMEs could quantify the approximate cost for the LCO to switch to/acquire their technology, hence building capability trust with the LCO, which served as an informal safeguard.

81% had, as part of the negotiation process with their partnership LCO, *established a long-term strategic intent*; 72% had *established an implementation plan*; 61% had *developed a short-term joint intent*; 61% *had widely communicated the joint intent*; 49% had *identified and created project teams*; 49% had *obtained stakeholder support*; and only 37% had *developed an exit strategy for the SME*. (Büchel (2001) had listed these activities as being important when establishing the joint value for entering the partnership.) This formed part of the joint decision making process building trust between the partners, and hence served as a social control mechanism or an informal safeguard. It also appears from the results that although the “big picture” was in place, the more detailed management that was required, the fewer SMEs had achieved this.

77% indicated that they were recognized as an important player in their industrial cluster. Bell and Albu (1999) comment that the flow of materials and goods constitute key linkages in a cluster. Hence being positioned as a linkage in the cluster would imply a good reputation, i.e. being a reliable supplier of materials and goods. Having a good reputation in the market place would build competence trust with the LCO and hence serve as an informal safeguard.

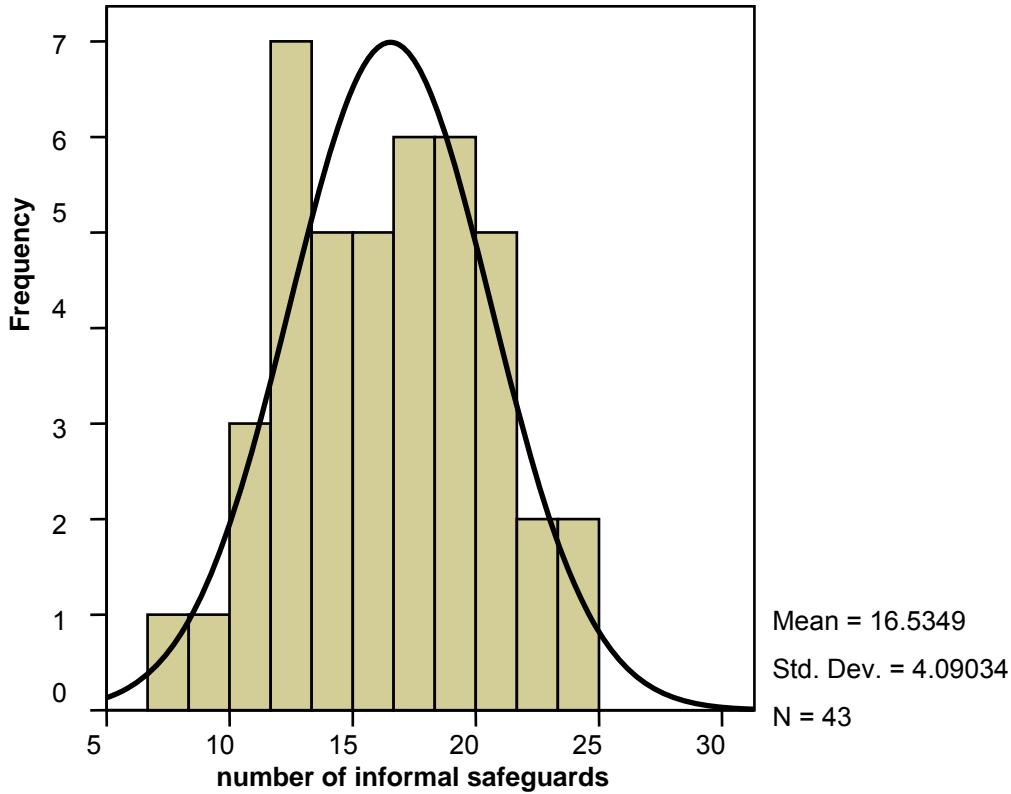
#### 4.5.2.2 Distribution of informal safeguards

In considering the distribution of informal safeguards, Table 23 and Figure 13 shows that, on average, SMEs use about 17 informal safeguards to manage their relationship with the LCO. Furthermore, this appears to be a normal distribution.

**Table 23: Number of informal safeguards**

		<b>Frequency</b>	<b>Percent</b>
Valid	8,00	1	2,3
	9,00	1	2,3
	11,00	3	7,0
	12,00	1	2,3
	13,00	6	14,0
	14,00	3	7,0
	15,00	2	4,7
	16,00	5	11,6
	17,00	5	11,6
	18,00	1	2,3
	19,00	3	7,0
	20,00	3	7,0
	21,00	5	11,6
	22,00	2	4,7
	25,00	2	4,7
	Total	43	100,0

**Figure 13: Distribution of informal safeguards**



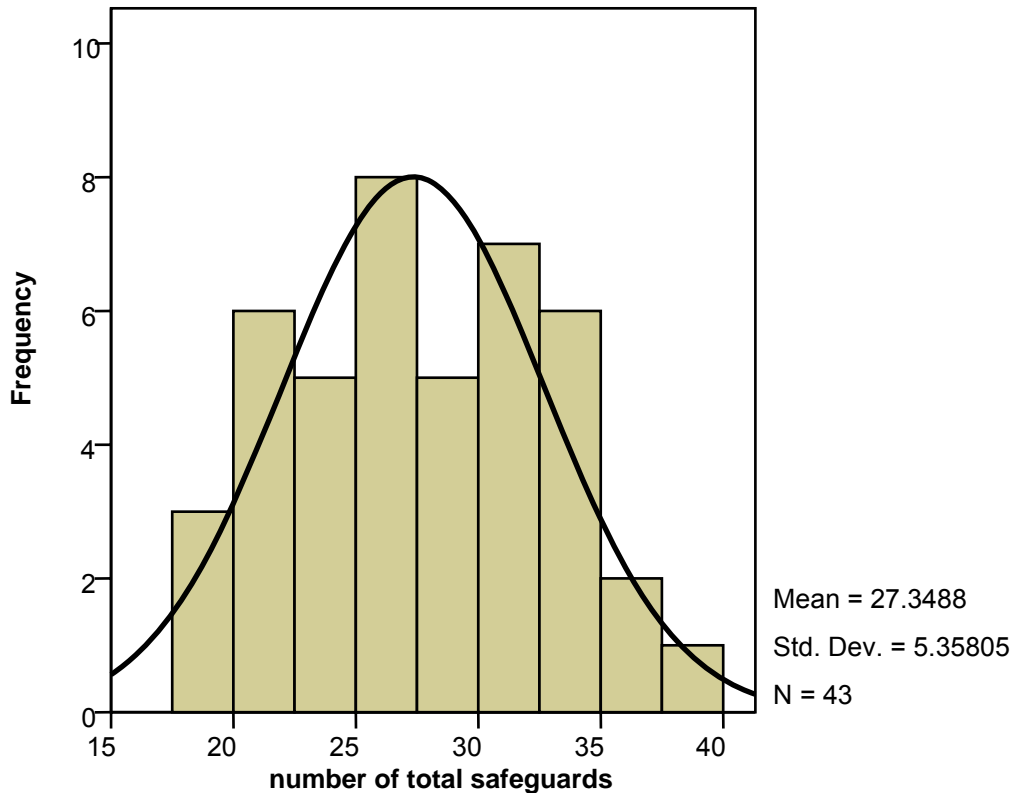
**4.5.3 Total number of safeguards in the LCO-SME relationship (Z3, third moderator variable)**

This variable refers to the total number of safeguards that were put in place in the SME-LCO partnership to manage and control the relationship.

From Table 24 and Figure 14 it is appears that the variable appears to have a bimodal distribution rather than a normal distribution. About 9% of SMEs use 27 safeguards, 12% use 31 safeguards, and 9% use 33 safeguards. Furthermore the distribution is slightly skewed to the right. On average SMEs used 27 safeguards.

**Table 24: Total number of safeguards (formal and informal)**

		<b>Frequency</b>	<b>Percent</b>
Valid	18,00	2	4,7
	19,00	1	2,3
	20,00	4	9,3
	21,00	1	2,3
	22,00	1	2,3
	23,00	2	4,7
	24,00	3	7,0
	25,00	1	2,3
	26,00	3	7,0
	27,00	4	9,3
	28,00	2	4,7
	29,00	3	7,0
	30,00	2	4,7
	31,00	5	11,6
	33,00	4	9,3
	34,00	2	4,7
	35,00	1	2,3
	37,00	1	2,3
	39,00	1	2,3
	Total	43	100,0

**Figure 14: Distribution of total safeguards**

Having examined the frequencies of SMEs that perceived the partnership to be successful (dependent variable), capabilities and competencies (independent variables) and safeguards (moderator variables) we shall next consider the results of the conceptual models, using logistic regression, in order to verify the proposed hypotheses.

#### **4.6 Exploring the hypotheses: Logistic regression models**

This section discusses the findings once the respective models had been fitted to the data. Table 25 lists the results from backward conditional logistic regression when applied to each model respectively. A discussion on the findings of each respective model follows after the table.

**Table 25: Backward conditional logistic regression analyses with partnership success as the dependent variable and the factors influencing partnership success as the independent variables (significance in parenthesis)**

Independent variables	Model 1	Model 2	Model 3	Model 4
<b>Nagelkerke R Square</b>	0.143	0.24	0.189	0.322
% Correct overall	68.8	68.8	65.6	71.9
% Correct unsuccessful	42.9	57.1	64.3	57.1
% Correct successful	88.9	77.8	66.7	83.3
<b>Omnibus test</b>	3.604 (0.058)	6.319 (0.097)	4.859 (0.182)	8.788 (0.032)
<b>Exp B coefficient</b>				
Ability capability	0.639 (0.077)	0.055 (n.s.)	0.001 (n.s.)	0.506 (n.s.)
Awareness capability	0.069 (n.s.)	0.509 (0.066)	0.640 (n.s.)	0.406 (0.025)
Competencies	0.122 (n.s.)	0.316 (n.s.)	0.162 (n.s.)	0.618 (n.s.)
Interaction of total safeguards and ability capabilities (T1)		0.981 (0.062)		
Interaction of total safeguards and awareness capabilities (T2)		1.025 (0.042)		
Interaction effect of total safeguards and competencies (T3)		0.357 (n.s.)		
Interaction of ability capabilities and informal safeguards (IA1)			0.972 (0.066)	0.001 (n.s.)
Interaction of awareness capabilities and informal safeguards (IA2)			1.028 (0.085)	0.008 (n.s.)
Interaction of competencies and informal safeguards (IA3)			0.114 (n.s.)	0.515 (n.s.)
Interaction of ability capabilities and formal safeguards (FA1)				0.947 (0.047)
Interaction of awareness capabilities and formal safeguards (FA2)				1.089 (0.014)
Interaction of competencies and formal safeguards (FA3)				0.763 (n.s.)

#### **4.6.1 Determining the relationship between levels of competencies and capabilities and partnership success (model 1)**

Model 1 examines empirically the relationship between the number of competencies and capabilities and perceived partnership success. The outcome is uncertain and one of the following is expected:



- either that the more competencies and capabilities an SME has, the higher will be the perceived partnership success as the SME presents the LCO with a broader and more varied offering;
- or that the lower will be the perceived partnership success as the LCO cannibalizes the SME's many competences and capabilities.

This is captured in hypotheses 1<sub>a,b and c</sub> representing a positive relationship, and 2<sub>a, b and c</sub> representing a negative relationship:

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

In order to interpret the Naglelkerke's R Square value, we refer to the following definition provided by Field, (2000:181): "The R-statistic is the partial correlation between the outcome variable and each of the predictor variables and it can vary between -1 and 1. A positive value indicates that as the predictor variable increases so does the likelihood of the event occurring. A negative value implies that as the predictor variable increases the likelihood of the outcome occurring decreases. If a variable has a small value of R then it

contributes only a small amount to the model.” In defining  $R^2$ , Field expands on the above definition by stating “ $R^2$  is a measure of how much the badness-of-fit improves as a result of the inclusion of the predictor variables. It can vary between 0 (indicating that the predictors are useless at predicting outcome variable) and 1 (indicating that the model predicts the outcome variable perfectly)”.

Hence, from Table 25 above, the Nagelkerke’s  $R^2$  for Model 1 is 0.143 indicating that Model 1 predicts 14.3% of the variation. For micro or firm-level models, 10% is perceived as being reasonably predictive. This is because of the complexities of doing research in a non-laboratory environment where it is assumed that the other 90% is caused by variations outside the control of the researcher.

As seen from Table 25, the Model 1 classifies 68.8% of the cases correctly which is not a very good result. (This indicates how close the observed are to the predicted values.) The quality of the prediction for successful partnerships is better than that for not successful partnerships (89% versus 43%).

“The Omnibus test is the ratio of the observed points to the predicted number of points. If the omnibus test = 1, the observed and the expected are the same” (Thiart et al, 2004). In Omnibus tests, ideally the significance should be  $\leq 0.05$  – this would indicate a good overall fit of the model. Therefore, a significance of 0.058 (see Table 16), being very close to 0.05, indicates that Model 1 has a good overall fit.

As can be seen from Table 26 below, the variables not included in the equation were the awareness capabilities (cap\_aw) and competencies (comp) as they were not significant (0,79 and 0,73 respectively are not less than 0.1).

**Table 26: Variables not in the equation (Model 1)**

	Score	Sig.
Variables cap_aw	,069	,793
comp	,122	,727

The expB “is an indicator of the change in odds resulting from a one unit change in the predictor ... if the value is greater than 1 then it indicates that as the predictor increases, the odds of the outcome occurring increase. Conversely, a value less than 1 indicates

that as the predictor increases, the odds of the outcome occurring decrease” (Field, 2000:184).

As captured in Table 25, the ability capability is statistically significant in Model 1 (the level of significance being 0.077 which is smaller than  $P < 0.1$ ). The expected B (coefficient) is less than 1 (0.639), which signals a negative relationship between ability capability and perceived success. This means that the more abilities capabilities SMEs have, the lower the perceived partnership success.

This finding would seem to indicate that the more ability capabilities the SME has, the greater opportunity it presents for opportunism by the LCO. The LCO can more easily cannibalize the offerings of the SME which will lead to an unsuccessful partnership (as perceived by the SME).

From the results of Model 1, hypothesis 1<sub>a</sub> is rejected, namely:

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

However, hypothesis 1<sub>d</sub> is accepted, namely:

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

As awareness capabilities and competencies were not included in the equation as they were not significant, subhypotheses H<sub>1b</sub>, H<sub>1c</sub>, H<sub>2b</sub>, and H<sub>2c</sub> could not be verified, namely there is no conclusion for the following subhypotheses:

*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*

*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

This finding is illustrated in the figure below:

**Figure 15: Model 1: The relationship between the number of ability capabilities and perceived successful partnership – a fair fit**

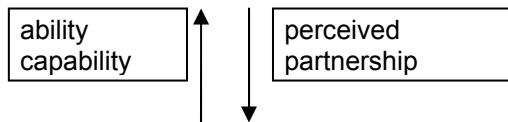


Figure 15 illustrates that as the number of ability capability increases, so the level of perceived partnership success decreases.

#### **4.6.2 Determining the relationship between the numbers of competencies and capabilities and partnership success when total safeguards moderate the relationship (Model 2)**

Model 2 tests whether safeguards in the relationship between LCO and SME (formal and informal) moderate the relationship between the number of core competencies and capabilities on the one hand, and perceived partnership success on the other. Safeguards are designed to manage and control risk in a relationship, hence the expectation is that the more safeguards that are in place in the relationship, the stronger (or the less negative) will be the relationship between competencies and capabilities and perceived partnership success. This is reflected in hypotheses 3<sub>a-f</sub> below:

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.

From Table 25 the following findings are evident:

The Nagelkerke R<sup>2</sup> is 0.24 indicating that Model 2 predicts 24% of the variation of partnership success. A combination of total safeguards and capabilities (awareness and ability) therefore appears to be a better predictor of perceived partnership success than ability capabilities only (which were only 14%).

The total model classifies 68.8% of the cases correctly, and this is not a very good result. Furthermore, the quality of the prediction for successful partnerships is better than that for not successful partnerships (77.8% versus 57.1%).

The Omnibus test indicates a significance of 0.097, which is sufficiently close to  $\leq 0.05$  to indicate that Model 2 is a fair fit, although not as good a fit as model 1.

**Table 27: Variables not in the Equation (Model 2)**

		Score	Sig.
Variables	cap_ab	,055	,814
	comp	,316	,574
	T13	,357	,550
Overall Statistics		,379	,945

From Table 27 we can see that variables that were not included in the equation were: ability capabilities; competencies; and the interaction effect of total safeguards and competencies (TI3). Hence the variable that was included in the equation was the interaction effect of total safeguards and awareness capability (TI2).

From Table 25 it can be seen that awareness capability (0.066); the interaction effect of total safeguards and ability capability (TI1 = 0.062); and the interaction effect of total safeguards and awareness capability (TI2 = 0.042) are statistically significant. Because the awareness capability is less than 1, this means that as the awareness capability increases, the perceived successful partnership diminishes.

The value for the interaction effect of total safeguards and ability capability is 0.981 and as this is close to 1 it can be taken as 1. This means that the interaction effect of total safeguards and ability capability has almost no effect on the perceived partnership success. As the ability capability increased from 0.639 in model 1 where total safeguards did not moderate the relationship, to 1 where total safeguards DID moderate the relationship, it can be concluded that the introduction of total safeguards affects the relationship positively. It would appear, therefore, that whereas the more ability capabilities an SME has, the lower the perceived partnership success, that when total safeguards are introduced the perceived partnership success is no longer affected (either positively or negatively) by increasing numbers of ability capabilities. Total safeguards therefore eliminate the negative effect on partnership success when ability capabilities are increased.

The ExpB for the interaction effect of total safeguards and awareness capability is greater than 1 (1,025), hence, as both total safeguards and awareness capability increase, so does the perceived partnership success. This may be explained as follows. Simply being aware of the LCO's needs, internal politics, motivations for partnering, and technology sourcing strategies does not influence the SME-LCO partnership to be more successful – in fact it influences the partnership negatively. However, with increasing numbers of safeguards together with increasing numbers of awareness capability, the level of perceived partnership success increases. This would imply that if safeguards are put in place as a control mechanism, the effect of awareness capability on partnership success is augmented.

As total safeguards and awareness capability increase, so does the perceived partnership success; and furthermore, as total safeguards and ability capability increase, the less

negative the perceived partnership success, the below mentioned hypotheses are accepted:

*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 increasing numbers of awareness capabilities, 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 increasing numbers of ability capabilities, and the perceived success of the partnership.

From Table 25 it appears that Model 2 predicts 24% of the variation, which is a fair fit. Model 2 is not however, particularly good as only 68.8% of the cases are classified correctly. The Omnibus tests indicate that Model 2 has a fair fit.

These hypotheses are illustrated in the two figures below.

**Figure 16: Model 2: The relationship between the number of awareness capabilities and perceived successful partnership when total safeguards moderate the relationship – a fair fit**

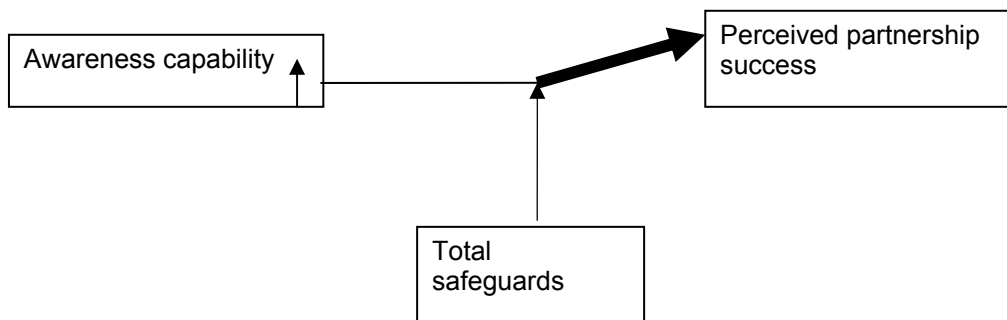


Figure 16 illustrates that as the awareness capability increases together with increased usage of total safeguards, so the perceived partnership success increases.

**Figure 17: Model 2: The relationship between the number of ability capability and perceived successful partnership when total safeguards moderate the relationship – a fair fit**

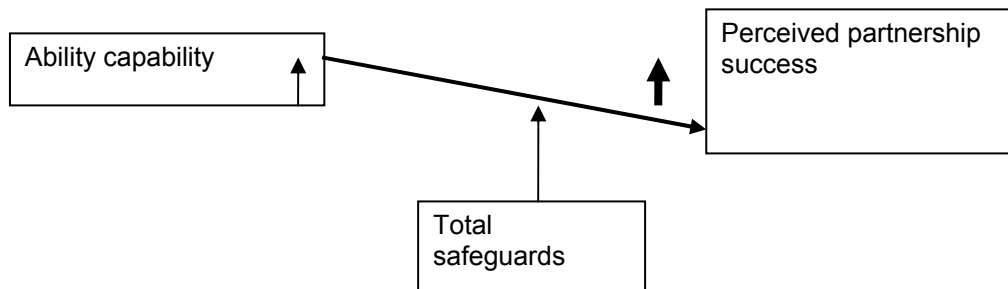


Figure 17 illustrates that as the number of ability capabilities increases, so does the perceived successful partnership decreases. However, as the ability capability and the interaction affect of total safeguards increases, so the relationship between ability capability and perceived partnership success becomes less negative.

The following hypotheses are rejected, namely:

*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>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.*

As competencies were not included in the equation because they were not significant, no conclusions can be derived for hypotheses 2<sub>c</sub> and 2<sub>f</sub> below:

*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>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.*

Next to be considered is the impact of informal safeguards on the perceived partnership success.

#### **4.6.3 Determining the relationship between the number of competencies and capabilities and partnership success when informal safeguards moderate the relationship (Model 3)**

Model 3 examines the effect of informal safeguards on the relationship between competences and capabilities, and perceived successful partnership. The expectation is that the more informal safeguards there are in place, the more positive will be the relationship between competencies and capabilities and perceived partnership success.

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.

From Table 25, the Nagelkerke R<sup>2</sup> is 0.189 indicating that Model 3 predicts 18.9% of the variation of partnership success.

The total model classifies 65.6% of the cases correctly which is not a very good result. Furthermore, the quality of the prediction for successful partnerships is only slightly better than that for not successful partnerships (66.7% versus 64.3%).

As the Omnibus test has a significance of 0.182, which is far greater than 0.05 and hence is not significant, we conclude that Model 3 does NOT have a good overall fit.

**Table 28: Variables not in the equation (Model 3)**

		<b>Score</b>	<b>Sig.</b>
Variables	cap_ab	,001	,977
	comp	,162	,687
	IA3	,114	,736
Overall Statistics		,244	,970

As can be seen from Table 28, the variables not included in the equation were ability capability, competencies, and the interaction effect of competencies and informal safeguards (IA3). The variables included in the equation were awareness capability, the interaction of ability capability and informal safeguards (IA1), and the interaction of awareness capability and informal safeguards (IA2).

The ExpB for awareness capability is not significant. However, the ExpB for the interaction of awareness capability and informal safeguards (IA2) is statistically significant (0.085) and is greater than 1 (1.028), which indicates a positive relationship between awareness capability and perceived partnership success when the relationship is moderated by informal safeguards. This means that higher levels of awareness capability, in combination with higher usage of informal safeguards increases the perceived partnership success.

The ExpB for the interaction effect of ability capability and informal safeguards (IA1) is statistically significant (0.066) and is only slightly less than 1 (0.972) which indicates a

slightly negative relationship between ability capability and perceived partnership success. However, as the value is close to 1 the end result would be almost a “no effect” when informal safeguards moderate ability capability. The considerably higher value resulting when informal safeguards were included (0.972 versus 0.639), indicates that the inclusion of informal safeguards makes the initial effect on the relationship between ability capability and perceived success less negative. Informal safeguards therefore do not change the relationship between ability capability and perceived partnership success from negative to positive, but they do influence this relationship such that it is less negative. Where there is a negative relationship between ability capability and perceived partnership success, the introduction of informal safeguards makes this relationship less negative.

The ExpB for the interaction effect of ability capability and informal safeguards (IA1) is statistically significant (0.066) and is only slightly less than 1 (0.972) which indicates a slightly negative relationship between ability capability and perceived partnership success. However, as the value is close to 1 the end result would be almost a “no effect” when informal safeguards moderate ability capability. The considerably higher value resulting when informal safeguards were included (0.972 versus 0.639), indicates that the inclusion of informal safeguards makes the initial effect on the relationship between ability capability and perceived success less negative. Informal safeguards therefore do not change the relationship between ability capability and perceived partnership success from negative to positive, but they do influence this relationship such that it is less negative. Where there is a negative relationship between ability capability and perceived partnership success, the introduction of informal safeguards makes this relationship less negative.

Higher levels of awareness capability, in combination with high usage of formal safeguards increase. To conclude, the hypotheses below are accepted:

*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>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.*

Model 3 predicts 18.9% of the variation of the perceived successful partnership. This model is not particularly good as only 65.5% of the cases are classified correctly. Furthermore, the Omnibus test indicates that Model 3 does NOT have a good overall fit.

These hypotheses are illustrated in the figures below.

**Figure 18: Model 3: The relationship between the level of awareness capability and perceived successful partnership when informal safeguards moderate the relationship – a poor fit**

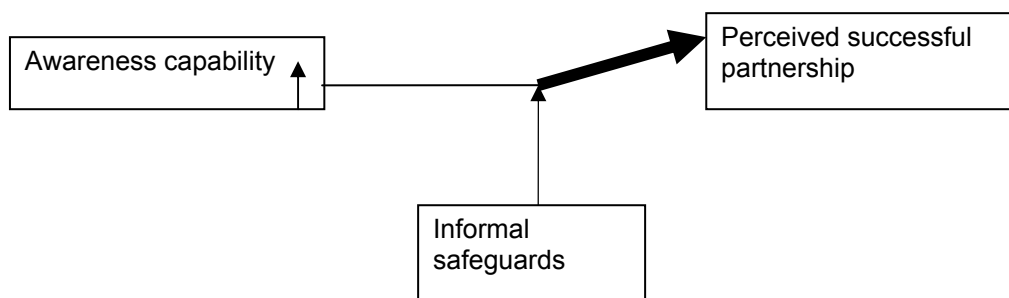


Figure 18 illustrates that higher levels of awareness capabilities, in combination with higher usage of informal safeguards, increases the perceived successful partnership.

**Figure 19: Model 3: The relationship between the number of ability capability and perceived successful partnership when informal safeguards moderate the relationship – a poor fit**

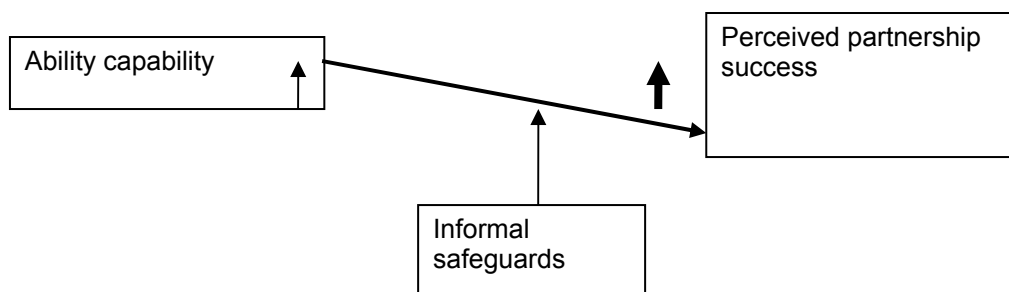


Figure 19 illustrates that as the ability capability increases, so the perceived partnership success decreases. However, with increased use of informal safeguards, the perceived partnership success is less negative.

The below mentioned hypotheses are rejected:

*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>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.*

As competencies were not included in the equation as they were not significant, the following hypotheses could not be verified:

*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.*

*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.*

Next to be examined is the effect of formal safeguards on the relationship between competencies and capabilities and perceived successful partnership.

#### **4.6.4 Determining the relationship between the number of competencies and capabilities and partnership success when formal safeguards moderate the relationship (Model 4)**

Model 4 examines the effect of formal safeguards on the relationship between competencies and capabilities on the one hand and perceived successful partnership on the other hand. The expectation is that the more formal safeguards that are in place in the relationship between the LCO and the SME, the worse will be the relationship between competencies and capabilities and perceived partnership success. This is because too many formal safeguards can signal distrust and the partners may then focus on looking for loopholes via which they can exploit and appropriate (St John, 1996;

Markus 2000; Gallivan and Depledge, 2003). Such opportunistic behaviour would lead to an unsuccessful partnership. The hypotheses are formulated as:

- 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.

The Nagelkerke R<sup>2</sup> is 0.322 indicating that Model 4 predicts 32.2% of the variation on perceived partnership success. This is a very good result and the best of all the models.

The total model classifies 71.9% of the cases correctly – which is a fair result, and the best of all the models. The quality of the prediction for successful partnerships is far better (83.3%) than for not successful partnerships (57.1%).

The Omnibus test is significant (0.032), indicating a good overall fit of the model.

**Table 29: Variables not in the equation (Model 4)**

		<b>Score</b>	<b>Sig.</b>
Variables	cap_ab	,506	,477
	comp	,618	,432
	FA3	,763	,383
	IA1	,001	,974
	IA2	,008	,929
	IA3	,515	,473
Overall Statistics		1,387	,967

From Table 29 it can be seen that the following variables were not included in the equation: Ability capabilities; competencies; interaction of competencies and formal safeguards (FA3); interaction between ability capability and informal safeguards (IA1); interaction between awareness capability and informal safeguards (IA2); and interaction between competencies and informal safeguards (IA3). By implication, therefore, the following variables were included in the equation: awareness capability, the interaction of ability capabilities and formal safeguards (FA2) and the interaction of awareness capability and formal safeguards (FA2).

The ExpB for awareness capability is significant (0.025) and is less than 1 (0.406), indicating a negative relationship between awareness capability and perceived successful partnership. In Model 1 the ExpB for awareness capability was not significant; hence by including the interaction effect of formal safeguards this variable became significant.

The ExpB for the interaction of ability capability and formal safeguards (FA1) is statistically significant (0.047) and is less than 1 (0.947) which indicates a negative relationship between ability capability and perceived success, when moderated by formal safeguards. As with informal safeguards, the higher value resulting when formal safeguards were included (0.947 versus 0.639) indicates that the inclusion of formal safeguards affects the relationship between ability capability and perceived partnership success such that it is less negative. Furthermore, there is little difference between the ExpB of these two variables (IA1 = 0.972; IA2 = 0.947), indicating that there is little difference in whether formal or informal safeguards serve as the moderator.

The ExpB for the interaction of awareness capability and formal safeguards (FA2) is statistically significant (0.014), and is greater than 1 (1.089) which indicates a positive relationship between awareness capability and perceived successful partnership, if it is moderated by formal safeguards. This means that higher levels of awareness capability,

in combination with high usage of formal safeguards increase the rate of perceived partnership success.

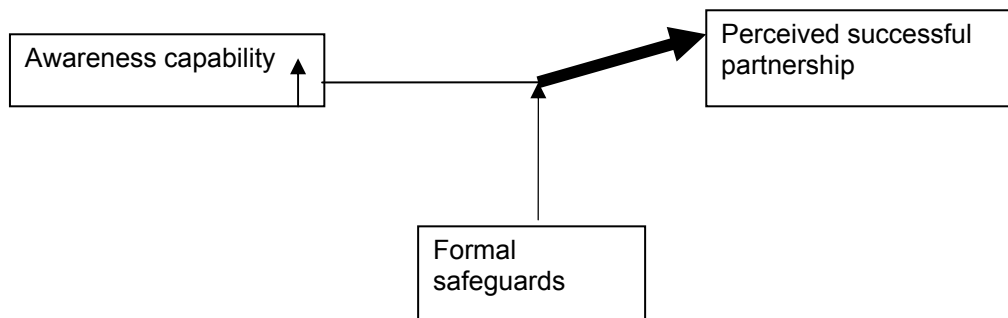
To conclude, therefore, the relationship between awareness capability and perceived success is significant (0.025). It is found that that the higher the awareness capability the lower the perceived success (0.406, being less than 1). However, if the moderator, number of formal safeguards, is combined with awareness capability, a positive relationship results (1.089). This means that if SMEs have awareness capability only, there is a negative effect on perceived success. However, if this is combined with formal safeguards, then the direction of the coefficient changes from negative to positive.

The following hypotheses are accepted:

*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>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.

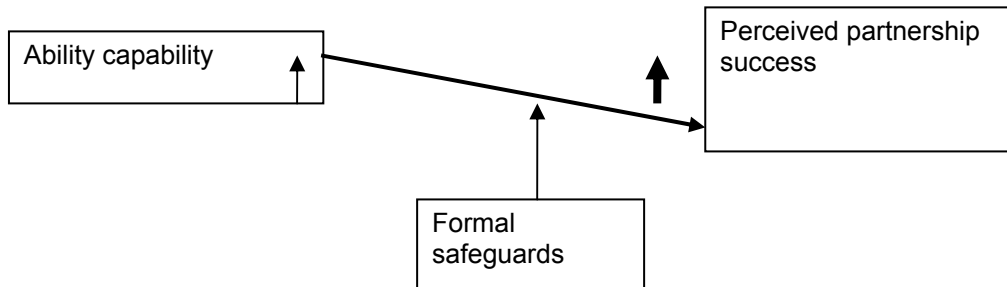
**Figure 20: Model 4: The relationship between the level of awareness capabilities and perceived successful partnership when formal safeguards moderate the relationship – a good fit**



The higher the level of awareness capabilities, if moderated by formal safeguards, results in increased perceived successful partnership.



**Figure 21: Model 4: The relationship between the number of ability capabilities and perceived successful partnership when formal safeguards moderate the relationship – a good fit**



As can be seen from Figure 21, formal safeguards moderate the relationship between ability capabilities and perceived successful partnership, making it less negative. Higher levels of ability capabilities, in combination with high usage of formal safeguards, results in a less negative perceived successful partnership.

The below-mentioned hypotheses are rejected:

*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>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.*

As competencies were not included in the equation as they were not significant, the following hypotheses could not be verified:

*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>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.*

#### **4.6.5 Understanding the relationship between capabilities and partnership success by means of cross tabulations**

In an attempt to understand the negative relationship between ability capabilities and perceived partnership success, as well as positive relationship between awareness capabilities and perceived partnership success, cross tabulations were run on all the individual items to determine the Phi Square<sup>5</sup>. Only four items turned out to be statistically significant, namely: the company developed proprietary information during the period 1995 – 2003; SME segments its potential market using, inter alia, the following categories of potential clients: early innovators, early adopters, early majority, late majority, and laggards; SME has an adequate understanding of the strengths and weaknesses of their LCO partner; preferred technology sourcing strategy of LCO was to enter into a joint venture with another LCO.

In understanding what affected the negative relationship of *ability* capabilities with perceived partnership success, a Phi test was performed on two items included in the ability capability variable, namely: had the SME developed IP; and did the SME segment their potential market using, inter alia, the following categories of potential clients: early innovators, early adopters, early majority, late majority, and laggards?

In understanding what affected the positive relationship of awareness capabilities with perceived partnership success, only two items were statistically significant, namely: the SME had an adequate understanding of the LCO's SWOT; and the SME believed that the preferred strategy of the LCO partner, when sourcing a technology, was to enter into a joint venture with another LCO.

Table 30 captures the Phi results.

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<sup>5</sup> Phi is a measure "of the strength of association between two categorical variables. Phi is used with 2 x 2 contingency tables (tables in which you have two categorical variables and each variable has only two categories)" (Field, 2000:62).

**Table 30: Phi values for cross tabulations of items that were significant with perceived partnership success**

Item	Phi Value	Approx. Significance
The SME developed proprietary information during the period 1995 – 2003	-0.326	0.033
SME segments its potential market using, inter alia, the following categories of potential clients: early innovators, early adopters, early majority, late majority, and laggards	-0.277	0.069
SME has an adequate understanding of the strengths and weaknesses of their LCO partner	0.345	0.024
Preferred technology sourcing strategy of LCO: to enter into a joint venture with another LCO	-0.263	0.084

From Table 30 it can be seen that where SMEs had developed IP there was a negative relationship with perceived partnership success (-0.326). This can be explained as follows. If SMEs were developing IP, they would be very aware of both the value of their intellectual property (patented and unpatented), as well as possibly the difficulty in defending their patent against an LCO. Hence the SME might be reluctant to share extensively with the LCO, being aware of their (SMEs) vulnerability and hence distrustful of the LCO. This distrust would influence the partnership negatively. Similarly, if the SME were reluctant to share its information freely with the LCO, this may have frustrated/damaged the relationship with the LCO, and hence the end result being an unsuccessful partnership. This is illustrated in Figure 22.

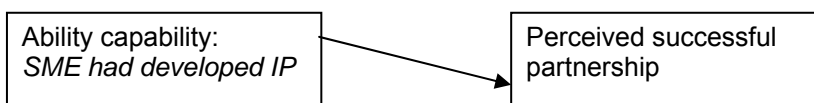
**Figure 22: Negative relationship between Ability capability: SME had developed IP, and perceived successful partnership**

Figure 22 illustrates that one of the influential items resulting in the negative relationship between ability capability and perceived partnership success is *the ability of the SME to develop IP*.

It is seen that where the SME had segmented its potential market using the following categories of potential clients: early innovators, early adopters, early majority, late majority and laggards there was a negative relationship with perceived partnership

success (-0.277). This may be because the SME had expected the LCO to react a certain way, in accordance with the paradigms of these respective market groupings, and possibly the reaction they received was not in accordance with their expectations. There is no confirmation that the SME had correctly identified its target audience according to these groupings, and if this were the case, the SME's marketing pitch may have been inappropriate, which may have created inappropriate expectations, that would ultimately lead to an unsuccessful partnership. Another possible explanation is that although they were of the opinion that they had, most of the SMEs had not yet crossed the chasm. A similar argument prevails here, namely, that if the SME were still marketing to early adopters rather than the early majority (which they believed was their current market), then their marketing pitch and associated expectations would be inappropriate. This would lead to disillusionment and the perception of an unsuccessful partnership. This is illustrated in Figure 23 below.

**Figure 23: Negative relationship between Ability capability: SME had segmented its potential market into early innovators, early adopters, early majority, late majority and laggards, and perceived successful partnership**

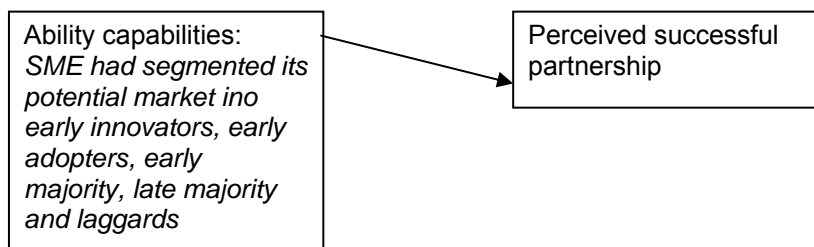


Figure 23 illustrates that the other item resulting in the negative relationship between ability capability and perceived partnership success is *where the SME had segmented its potential market using the following categories of potential clients: early innovators, early adopters, early majority, late majority and laggards.*

Where the SME indicated that it had an adequate understanding of the LCO's SWOT, the Phi Square test indicated that there was indeed a positive relationship between awareness capability and perceived partnership success (0.345). This was expected, as an understanding of the LCO's SWOT should better enable an SME to align itself appropriately. This is illustrated in Figure 24 below.

**Figure 24: Positive relationship between awareness capability: understanding of LCO's SWOT and perceived successful partnership**

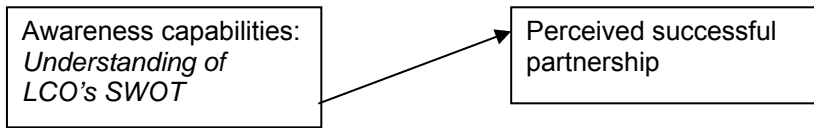
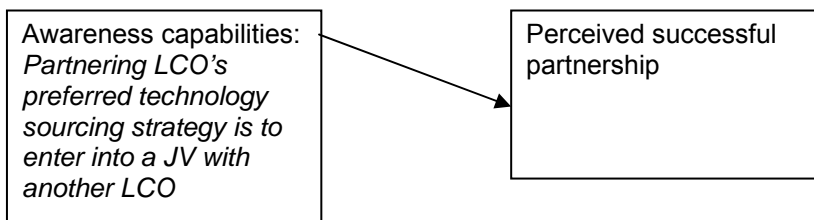


Figure 24 illustrates that the Phi Square test indicated that there was a positive relationship between awareness capabilities and perceived successful partnership when the SME's indicated they had an understanding of the LCO's SWOT.

The Phi value for the SME believing that the preferred strategy of the LCO partner, when sourcing a technology, was to enter into a joint venture with another LCO, and perceived partnership success was negative (-0.263). Such a belief could result in the SME feeling insignificant and that it was not the partner of choice for the LCO. This could result in it engaging less enthusiastically with the LCO in the partnership – resulting in an unsuccessful partnership. This is illustrated in Figure 25 below.

**Figure 25: Negative relationship between awareness capability partnering LCO's preferred technology sourcing strategy is to enter into a JV with another LCO, and perceived successful partnership**



Having discussed the results of the survey in terms of frequencies of the variables, as well as the “best fit model” for the data and an explanation of the results, the next chapter will discuss the case studies. In order to verify the major findings of the quantitative study and gain a deeper understanding of some of the issues raised, a supplementary case study approach was adopted. A comparative study with a select number of SMEs that had participated in the survey was embarked upon to explore the relevance of the major findings. Chapter 5 discusses the reason for the case studies, the methodology employed, the specific cases and their results.

# Chapter 5

## Case studies

### 5.1 Reason for case study approach

In order to increase the validity of the research, it was decided to follow a case study approach to verify/nullify the patterns that became apparent from the quantitative study. The main reasons to take this approach were that the sample number was small for a quantitative study, and that the structured questionnaire did not permit companies to share their insights. Where the quantitative study was useful in that it was an attempt to consider the responses from a wider distribution of companies hence guarding against merely sampling the “outliers” of the normal distribution curve, the case studies would deepen the insights of SMEs in a partnership arrangement with an LCO, and how they protected themselves in this partnership.

Case studies are useful when researching the “how” or “why” questions “when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context” (Yin, 2003:1). Where the survey has answered questions like who, what, how many, how much, the causal case study will attempt to answer the how and why questions (Yin, 200:5). “The essence of a case study....is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result” (Schramm, 1971).

A multiple causal case study approach was decided upon in order to do a comparative study. The unit of analysis was the SME-LCO partnership relationship of a couple of SMEs that had participated in the survey. In line with the RBV theory and understanding the issues that influence a successful partnership between an SME and an LCO, an attempt would be made to validate the main results and hence support (or not) the major findings of the quantitative study.

### 5.2 Methodology

Four companies were selected from the original sample – two were companies that had indicated that they had perceived the partnership with the LCO to be unsuccessful or

partially successful, and two were companies that indicated that they perceived the partnership with the LCO to have been successful. These two groups were selected in order to find out whether there were differences in the responses to the questions between those SMEs that had perceived the partnership to be successful and those that had not. All four companies were based in Gauteng (from which the largest portion of the survey sample had been taken).

Issues that were explored in the case studies were to what extent, according to the respondents involved:

- did the level of the capabilities/competencies of an SME affect the perceived success of the partnership?
- did the level of safeguards influence the relationship between capabilities and competencies and a perceived successful partnership, positively?
- did formal safeguards affect the relationship between capabilities and competencies more positively than informal safeguards?

The interviews were recorded and transcripts captured (see Appendix 2). Six major questions were posed by the investigator to each of the companies, namely:

- 1.1. Do you believe that having capabilities and competencies is important for partnership success?
- 1.2. If yes, which capabilities/competencies did you use in your collaboration with the LCO?
2. Which do you think are more important for a successful partnership: capabilities or competencies, and why?
3. How do you protect your capabilities and competencies when partnering with an LCO?
4. Do you believe that putting safeguards (protection mechanisms against opportunistic behaviour by the large company) in place would improve the relationship between having competencies and capabilities and partnership success?
5. Which safeguards would you use when partnering with an LCO?

In order to ensure an unbiased result in the findings, as well as to verify the initial coding by the researcher, four field experts were approached to give an opinion on the case studies (see Appendix 3 for a description of their fields of expertise and their selection).

They were provided with the transcripts (all references to company and people had been removed to ensure anonymity) and were asked to score each SME as follows:

- On a scale of 1 - 4, where relative to the other companies, 1 is a general capability/competence, and 4 is a specialist capability/competence, please rate the capability/competence of each company
- On a scale of 1 - 4, where 1 indicates that the company's capabilities/competencies are discipline specific and 4 that they are multi-disciplinary, rate the capability/competence of each company relative to the other companies.
- On a scale of 1 - 4, rate your overall impression of the company's capabilities/competencies as 1 (low) – 4 (high) relative to the other companies.
- On a scale of 1 - 4 where 1 indicates (a) weak safeguard(s) relative to the other companies, and 4 indicates (a) strong safeguard(s) relative to the other companies. (Safeguards are mechanisms that are in place to hinder/prevent opportunistic behaviour by the partnering company).

The experts were also informed that in each column, each value could only be allocated once.

What follows are highlights from the company transcripts that serve as the basis for the discussion that will follow.

## **5.3 Case Studies**

### **5.3.1 SME1**

SME1 was founded in January 2000, the original team comprised the CEO (who had a PhD in electronic engineering), the Chief Technical Officer (who had an MSc in electronic engineering) and three technical persons (one had an MSc in electronic engineering, the second had a BEng and was studying towards an honours in electronic engineering, and a third was studying towards a Masters in electronic engineering). As at June 2005 SME1 had grown to 6 full-time employees and a turnover of  $\leq$  R 4 million. SME1 specialises in innovative product development for information and communication security solutions, with a current focus on applications utilising technologies at the convergence between mobile (GSM) and conventional data networks (the Internet). An example of a recent product it developed is "Cell Power". Cell Power is a prepaid electricity vending solution



that uses mobile telephones as Point-of-Sales devices. SME1 developed the Cell Power system to assist Municipalities reduce their lost revenue through the difficult task of managing electricity usage. Another product of theirs is **eXstreamLITE**, which is a robust, secure network device that ensures the optimal use of expensive Internet bandwidth through a unique blend of Internet traffic classification, bandwidth shaping and traffic prioritisation engines.

SME1 wished to achieve two objectives for which they required a partner, namely: to raise cash for growth, and to gain a “big brother”, i.e. protection that would be afforded by having a bigger player as a partner. The expectation was that should a dispute arise with another large company (LCO), then that the “big brother” would enter into high level negotiation to try to resolve the dispute. With this in mind they sought a partner that they believed had a similar culture as their own and were in the same domain as they were namely electronic product development and deployment.

The company with whom they partnered, the LCO1, was a large, reputable South African corporate that specialized in electronics and communications. The LCO1 Ltd had several Divisions that focused on development and implementation – largely for the defense industry. The Division, LCO1Div, although responsible for the lion’s share of LCO1’s turnover of over R1 billion/year, focused on marketing of telecommunications equipment and solutions and did not do its own development – it had no in-house IP. Recognizing their vulnerability in this area, LCO1Div had a strategy of investing in SMEs in order to acquire and gain access to IP. In line with this strategy, LCO1Div, via LCO1, took a third share in SME1 in exchange for a substantial cash injection.

The expectation from SME1’s side was that it would be able to continue with new product development and piggy back off LCODiv’s marketing infrastructure and reputation. Furthermore SME1 expected the LCO1 to offer SME1’s products protection by engaging with any other LCO that exploited SME1’s patents unfairly, and resolve the dispute in a preferably amicable fashion. However, the reality was that LCO1 did not wish to tarnish its own reputation by supporting SME1 against the opportunistic LCOs that were breaching SME1’s patents, as LCO1 already had existing relationships with these opportunistic LCOs that it viewed as important. SME1 was therefore expected to “fight its own battles” without the backing of its LCO partner. SME1 indicated that the relationship was partially successful because only one of the two objectives for partnering, had realized, namely the ability to raise cash. An opportunity was later created for SME1 to buy back its shares from LCO1 when a new CEO was appointed at LCO1Div who, in

focusing the company's resources on its core business, sold off all subsidiaries where LCO1Div investment was R10 million or less. In this way SME1 managed to exit from a less than optimal partnership.

The CEO commented that competencies and capabilities were certainly important for partnership success. He believed that competencies rather than capabilities were more important. His reasoning was that large companies do not partner with SMEs to acquire skills, as they can "buy these in" merely by employing individuals. They are more interested in partnering with an SME such that they gain access to a "total product". In the case of SME1, it was the "existing IP belonging to the company as well as the company's "competence" to develop new IP that attracted the large company into a partnership with SME1" said the CEO. He believed that LCOs were typically after two competencies: IP and market share. In the case of SME1, although they had IP, they did not have market share.

Protecting the SME's capabilities and competencies was important when partnering with an LCO as "LCO's were ruthless and would take everything", commented the CEO. SME1 protected its capabilities and competencies, in an attempt to ensure a successful relationship, by having in place the following:

- patents already secured the first customers to used their service
- a restraint of trade had been built into their employees contracts prohibiting them from working for a competitor within a reasonable period of time
- entered into a formal shareholders agreement with the LCO that
  - excluded re-evaluation of the company against future cash flow projections
  - the LCO had to buy the majority share of SME1 (up to 51%) after a 3 year period (the market value of the shares would be determined by a third party); whereafter at any time thereafter, SME1 could offer to sell the remaining shares at market value and LCO1 Ltd would be obliged to buy them. (This clause was premised on the assumption that LCOs wish to hold the majority of the SMEs shareholding and hence SME1's intention was to build up the value of the company and then exit.)
- the relationship was built on trust where there was a similar culture and the individuals with whom they were dealing had a similar background

### 5.3.2 SME2

SME2 was founded by the CEO in 1999, the core business of the company being network recording. At the time of the partnership with LCO2 AG, SME2 had only one employee (the CEO) and had a turnover of  $\leq$  R4 million. SME2 has subsequently grown to 31 employees and has a turnover of over R 35 million per year, and its core business is developing systems for mass interception and capturing of data and voice. SME2's current skills include being able to develop cutting edge hardware designs; software development based on knowledge of industry and systems engineering (in systems engineering the CEO believes South Africa has a competitive edge as unlike in other countries, South African engineers do not have the luxury of specializing in a niche area but need to address the overall picture); software electronic engineering with computer science. The CEO, having a BCom and BProc degrees, was the sole owner of SME2.

The CEO's prior experience was in financial management – his last position prior to starting SME2 was as a Financial Director of a high-tech engineering company. Because of his interest in technology, in 1994 he had joined a company that supplied voicemail and the system that sends SMS's for one of South Africa's large cellular service providers, as the MD. This gave the CEO an opportunity to familiarize himself with the telecommunications industry. Thereafter he joined Medium Enterprise 2 (ME2) who had an OEM (original equipment manufacturer) agreement with LCO2 to design and manufacture new products. ME2 was keen to sell the company to an American company, and as they did not believe the OEM part of the business (that was worth approximately 25% of the business) would be attractive for the sale, they wished to sell this off. The CEO bought this part of the business from ME2, around which he established his own company, SME2.

The CEO believes that having capabilities and competencies is essential for partnership success, and furthermore, that there should be complementariness, i.e. the SME should have competencies that the LCO does not have and that the LCO requires. SME2 offered a competence in the design and manufacture of products. However, this competence was outsourced to a second company with whom SME2 had a relationship. ME2 (for whom The CEO worked prior to starting SME2) could bring a new product to market at a hugely reduced cost, and much faster, than LCO2, and it was this that had attracted LCO2 to form a partnership with them. When ME2 decided to sell off this section to SME2, a three-way agreement was signed between ME2, LCO2 and SME2 whereby SME2 took over the terms and conditions of the original ME2-LCO2 agreement without any modifications.

Hence, SME2 was still expected to deliver new products to the market cheaper and faster than LCO2 could.

The interest from SME2 in partnering with LCO2 was because of LCO2's strong brand, its reputation, and access to international markets. However, the relationship turned out to be unsuccessful, largely because of a mismatch in size and power, the CEO of SME2 commented. The agreement was very one sided where LCO2 had all the rights and SME2 had all the obligations. An example was where SME2 would have to give them information on new products they were developing and would also have to guarantee availability of spare parts for these products for fifteen years, whereas there was no obligation on LCO2 to buy any of these products. Another example was where LCO2 competed head-on with SME2 selling SME2's own products to SME2's customers. As SME2 was obliged to disclose the names of its customers, LCO2 would then sell the SME2 product at a much higher price than were SME2 to sell its product directly to its customer. It appeared that the philosophy of LCO2 was to conclude the deal at all costs, and do "damage control" thereafter. The CEO commented that for a partnership to be successful both parties must benefit and it should be a win-win situation. The agreement should reflect the same rights and obligations for both parties.

The relationship between ME2 and LCO2 was never good. The CEO described it as LCO2 being "pedantic, nitpicking, demanding, and lopsided". The relationship with LCO2 deteriorated further once SME2 became the OEM. SME2 had tried to end the agreement with LCO2 and wrote a letter to them requesting that their relationship be terminated. However, it was only after a period of approximately nine months that LCO2 in fact responded, and this was after they became aware that SME2 had introduced a new product to the market. Their response was in the form a letter suing SME2. The CEO believes that this was merely a tactic to soften SME2 up for the step that followed. LCO2 then offered to withdraw the charge provided that SME2 would perform a demonstration of their new product to one of LCO2's potential customers to the satisfaction of the customer. This did eventually lead to a sale of the product to LCO2's customer, and LCO2 is again expressing interest in working with SME2 - the CEO believes it is because they are interested in SME2's new product.

The CEO defines a competence as a combination of skills, knowledge and experience that give a company a competitive edge whereas capabilities would be more generic e.g. a technical support capability, a sales capability, a financial capability – on their own these will not necessarily give a company a competitive edge. The CEO believes that

established companies can't innovate that easily as they often have legacy processes and have too much invested in old systems to innovate and change to new systems. Hence he believes that competencies are more important for a successful partnership than capabilities. In the case of LCO2, he re-iterated that it was SME2's ability to develop new products and bring these to the market at a cost and time period attractive to LCO2 that attracted this company to the partnership.

The CEO commented that it is very difficult to protect one's capabilities and competencies when partnering with a large company, but safeguards would certainly help. Firstly, patents are not an effective safeguard unless you have sufficient resources to defend the patent. However, having registered patents does increase the value of the company, the CEO believes. Having "first mover advantage" would be one form of safeguard, as would having a restraint of trade agreement with your employees and preventing the LCO from appointing your employees. Also, including sales targets in the agreement with the LCO could serve as a safeguard. (The current agreement between SME2 and LCO2 lacks sales targets, but lists detailed technical specifications as to norms with which new products must comply, buying and selling prices etc.). Any new agreement to be negotiated would be for a shorter period of time (three, rather than five years), and the arbitration would be moved to an affordable location like South Africa.

The CEO believes that the contractual relationship is more important than a trust-based relationship. Not only is the development of the MOU an important part of the negotiation process, but it is an important reference document for what was originally envisaged and promised – especially for when the originators of the agreement are no longer present. A "fall-back" option is also important, i.e. having a second client (or more) lined up should the relationship with the LCO fail. Relying on a single company is risky.

The CEO concluded by saying that he would more easily trust a South African company than a foreign company – mainly because of a similar culture, as well as proximity and ability to interact on a continual basis. He believes that it is important to interact regularly with the LCO partner and to "keep a finger on the pulse". "LCO's will circumvent agreements. The more you hurt them in the market place, the more negotiable they are" the CEO comments.

### 5.3.3 SME3

SME3 was founded in 1999 by the CEO and his business partner, CTO, who both had a Masters in Electronic Engineering. The CEO and CTO had both left LCO3 (Pty) Ltd, a large player in the South African defense industry having approximately 300 employees, that focused on optoelectronic product development and commercialization for this industry, to found their own business in opto-electronics. This move was partly because they wished to go on their own and partially because LCO3 was short staffed and employees were carrying more than a fair work load. LCO3 had made the CEO a counter-offer when they heard he intended leaving as they were reliant on him, but as he was intent on starting his own company, they agreed that he would continue to assist LCO3 by contracting on an hourly basis with them. Prior to resigning, the CEO had been managing a project and had been working alongside an LCO3-appointed project manager for approximately 4 months. Once he went on his own, his main point of contact within LCO3 for the project contractual work was this project manager. Additional work for the new SME3 came mostly from the LCO3's laser technicians that his partner had worked with whilst still an employee of LCO3.

SME3 has grown over the years and currently has a turnover of  $\leq$  R4 million as well as 7 full-time employees plus 5 – 8 students at any one time. Its core business is electronic engineering solutions and products – and the vision is to become a premier provider of electronic product solutions. SME3, today, has experience in the following industries: telecommunication; military and defense; aviation; agriculture; information technology; security; and mining. The skills set encompass opto-electronics, embedded hardware and software development; PC software; analog design; mechanical draughting; and PCB schematics and layout. Products include: infra-red perimeter beams that provide a cost effective means of detecting when an object passes through an infrared beam; in-circuit serial PIC programmer that programmes a wide range of microchip's 16 and 18 series of PICs; and a smart vehicle harness – an intelligent in-vehicle network that uses the CAN protocol. SME3 is currently participating in an incubation programme.

The CEO believes that it was SME3's capabilities (specialist technical abilities) rather than their competencies that attracted the LCO. It was the CEO and his partner's opto-electronic capabilities and detailed product knowledge of LCO3's products that attracted the LCO to partner with them. At the stage of the partnership, they did not have sufficient processes in place for them to have competencies, but specialist knowledge they did have. The CEO believes that this would still be the case today as LCO3 wants to develop

its own products, hence it wishes to access specialist knowledge rather than, for example, a product development capability. It is difficult to find specialists, and especially locally for defense related work, hence “buying in” the skills was not a realistic option LCO3.

The nature of the partnership was one of contracting SME3’s specialist skills, on an order-based basis, to assist LCO3 with product development and support. Initially this product development related to the LCO3’s core products. However, with time the situation changed as the LCO built up its own in house capabilities in the areas that it had previously subcontracted SME3. Thereafter it would contract SME3 to develop test equipment or supportive products that would enhance the LCO’s product range. Because both the CEO and his business partner had been employees of the LCO they used to interact on a social level and were friends of many of the technical personnel of the LCO. This relationship had been fundamental in securing continued orders from the LCO.

The relationship with LCO3 has changed over time. In the beginning no thought was given to the need for protecting its capabilities. The relationship was based on friendship where the contract work that SME3 performed for LCO3 was based on a verbal agreement, the specifications of which were captured in an order that was placed by LCO3 with SME3. The order would either specify the expected outputs to be delivered against the number of hours of input, or payment for the achievement of certain milestones, or in some instances SME3 would simply develop a complete product, carrying all the costs for product development, and this product would be sold to LCO3.

#### **5.3.4 SME4**

SME4 was established during January 1982 at a South African University. The original group comprised 3 Computer Science professors and 9 Computer Science Honours and Masters students. It became a closed corporation (CC) in March 1989. The CC was converted to SME4 (Pty) Ltd in 1993 and the overseas expansion of the company resulted in SME4 America Inc being established during 1998 as well as SME4 Limited that handled the UK business. During 2000 at least 3 subsidiary companies were created as new “venture capital”-oriented companies and SME4 supplied all the funding. The abovementioned companies now employ approximately 400 people.

SME4 initially supplied “systems programming” solutions to company A and company B. Companies A and B were in computer networking systems and were medium sized companies. The founder of SME4 commented that having capabilities and competencies

was critical for partnership success as it was because of a product that SME4 had developed (a human resource (HR) module) that LCO4 had approached them in the first instance. LCO4 AG and LCO4 South Africa concentrated on ERP (enterprise resource planning), “an industry term for the broad set of activities supported by multi-module application software that helps a manufacturer or other business manage the important parts of its business, including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service, and tracking orders. ERP can also include application modules for the finance and human resources aspects of a business. Typically, an ERP system uses or is integrated with a relational database system. The deployment of an ERP system can involve considerable business process analysis, employee retraining, and new work procedures.” (www.Webopedia). LCO4 recognized that SME4 had certain competencies and asked them to customize the LCO4 HR module for the South African market. SME4 then entered into a Memorandum of Agreement with LCO4. SME4 later became an LCO4 implementation partner after they had been fully trained and gained the required experience. SME4 has grown from 12 full-time employees with a turnover of  $\leq$  R4 million in 1994 to over 400 people having a turnover of in excess of R240 million in 2006. Most of the staff in the earlier days of SME4 were recruited from the University’s Department of Computer Science. It is hence no longer an SME but today qualifies as a LCO. The experience shared below, however, relates to the experience of SME4 when it was still a start-up company (1994), and had a turnover of  $<$  R1,2m.

SME4 had both competencies and capabilities that had attracted LCO4. It had a broad spectrum of knowledge and skills for developing applications and new developments, as well as systems processing skills and an ability for complex programming for example, software protocol development – i.e. capabilities. In addition the company had some knowledge of the domain. The founder clarified that his understanding of capabilities was the ability to bring about new developments, and a competency was an ability to deliver something now. For example, SME4 used its payroll competency to customize the LCO4’s payroll system.

The founder believed that both competencies and capabilities were important for a successful partnership. The SME must demonstrate some competency, although this competency did not need to be specifically in the domain of the LCO. However, a demonstration of the SME’s capabilities and competencies was important for a prospective partnership. The founder further commented that because of domain independence, capabilities were possibly more important than competencies, for example,



an LCO in the financial sector might have seen the SME's capabilities to develop systems in the mining sector, and request them to develop similar systems for the financial sector. This would clearly indicate recognition of certain capabilities that could be used to develop a new competence in a new sector or domain.

When the SME is really small, it appears that the LCO is more interested in the SME's capabilities, but as it grows and develops certain competencies, it appears that the LCO shifts its interest to the SME's competencies. The founder commented that this would be in line with Geoffrey Moore's "chasm"-discussion on how to introduce a technology product to the market as some LCOs tend to be risk averse and would be more interested in accessing a demonstrated competence than merely a capability that would need to be developed into a competence. However, the interest in accessing competencies and capabilities would also be dependent on the situation and the specific need of the LCO, for example, if specialist skills were required for instance to develop cutting edge innovation and radical thinking, then the LCO would be more interested in accessing capabilities to include in its own systems and processes than looking for a competence. Alternatively, and citing examples like Cisco and Microsoft, an LCO may recognize a domain competence in some of the individuals of an SME and acquire the SME, strip it of the people who are not core to the competence, and integrate the competence into its own company. The founder is of the opinion (and talks from SME4's current position as an LCO) that LCOs are looking for complementarity with their own business focus.

The founder believes that integrity (a confidence or trust that the one company will not try to deceive the other and that the company will deliver on what it promised) is critical to a partnership. The founder referred to work done by Fernando Flores, who obtained a PhD in Philosophy from the University of California, Berkeley on *Management and Communication in the Office of the Future*, and who discusses a four stage cycle for coordinating effort, which he refers to as the "atom of work". This is an iterative process of negotiation, commitment, and delivery on expectations. For this process to be effective there must be inherent trust and this trust gets further developed as one follows the process. The founder believes that a contract is mostly about the process of discussing the expectations (including capturing the specifications), and then having an ability to monitor the outputs against the expectations. Where there is a deviation, a contract provides the point of departure for addressing the deviation. He believes that having a contract for punitive measures is less important as if it gets to that stage, then the relationship is already broken and the partnership cannot be successful. He is of the firm opinion that contracts are put in place to avoid misunderstanding, and that they become

increasingly important as the business grows. The founder stressed the importance of a contract and especially for setting the framework for the partnership and clarifying expectations. Also, contracts were important for continuity such that if the negotiator(s) left the company, the terms of the agreement are codified for the successors. He did not believe that a partnership could exist purely on trust.

An important way of protecting the company's capabilities and competencies, the founder commented, was to retain their competent employees. This SME4 did by creating a family culture where people felt they belonged. As the company grew, so the culture changed, but it also became less important to retain critical people as critical mass had been built up by that stage and the company had gained a momentum of its own. Another way of protecting itself against opportunism by the LCO was to ensure that it could offer a better service than the LCO.

To conclude, therefore, the founder believes that good service delivery, trust, contracts and culture are important to improve the relationship between competencies, capabilities and partnership success. Where the contract serves as a safety net, a trusting relationship is critical. If there is no trust, then a contract will not save the relationship.

SME4 had both competencies and capabilities that had attracted LCO4. It had a broad spectrum of knowledge and skills for developing applications and new developments, as well as systems processing skills and an ability for complex programming for example, software protocol development – i.e. capabilities. In addition the company had some knowledge of the domain.

Having described the cases, what follows is a discussion of the main observations and findings.

## **5.4 Analyzing the results**

### **5.4.1 Capabilities and competencies and partnership success**

The two companies that had perceived the partnership with the LCO to be successful were SME3 and SME4, whereas the companies that had perceived the partnership to be not/partially successful were SME1 and SME2. In identifying to what extent capabilities and competencies were important for partnership success and were attractants in

motivating the LCO to partner with the SME, the views of the experts will be considered together with the views of the respective CEOs.

Table 31 lists the average ratings<sup>6</sup> arrived at by the experts for each characteristic of each SME respectively and are in response to the following:

- whether the SME had general or specialist capabilities/competencies, where 1 is a general capability/competence and 4 is a specialist capability/competence
- whether the SME's capabilities/competencies were discipline specific or multidisciplinary, where 1 indicates that the company's capabilities/competencies are discipline specific and 4 that they are multi-disciplinary
- whether the overall impression of the SME's capabilities/competencies were low (1) or high (4), relative to the other companies
- whether the safeguards in place were weak or strong where 1 indicates (a) weak safeguard(s) relative to the other companies, and 4 indicates (a) strong safeguard(s) relative to the other companies.

**Table 31: Experts' ratings on the characteristics of the SMEs**

	<b>General/Specialist capabilities/competencies</b>	<b>Discipline specific/multidisciplinary</b>	<b>Capabilities/competencies</b>	<b>Weak/strong Safeguards</b>
SME1	3.75	1,25	<b>2.5</b>	<b>2.5</b>
SME2	2	3.25	<b>2.25</b>	<b>2</b>
SME3	2.25	2.25	<b>1.75</b>	<b>1.5</b>
SME4	2	3.25	<b>3.5</b>	<b>4</b>

#### **5.4.1.1 SME1**

SME1 cited skills such as project management, programming, software development, and associated product/service support as being the capabilities of their company. Such capabilities lead to SME1's competence in GMS-internet interface systems. However, they believed that it was their competence to develop IP, as well as SME1's portfolio of IP, that had attracted the interest of the LCO. (Although IP had been described as a competence by SME1, in the quantitative study it was defined as an ability capability.) SME1 was of the opinion that LCOs wish to acquire a "total product", rather than simply gain access to capabilities, which they felt could be "bought in" by employing the right

<sup>6</sup> An average rating was derived at for each category by dividing the sum of the values selected by the experts for that category, by 4.

skills set. Hence the CEO believed that it was SME1's IP ability that had served as the attractant and resulted in the partially successful partnership.

From Table 31 it is apparent that the experts were of the opinion that SME1 had very specialist capabilities/competencies (3.75), and that these were discipline specific (1.25). The experts rated the overall impression of SME1's capabilities/competencies as a little above average (2.5), when compared with the other SMEs.

Hence it appears that although SME1 had specialist capabilities/competencies, these were discipline specific. These may therefore have been suitable for a niche market. However, relative to the other SMEs, SME1's capabilities/competencies appeared slightly above average rather than high. As such, SME1's capabilities/competencies although attractive for LCO1, were apparently not critical for LCO1.

#### **5.4.1.2 SME2**

The CEO of SME2 commented that his company offered a competence in the design and manufacture of products (even though this function was outsourced to another company) and could bring a new product to market at a hugely reduced cost and much faster, than LCO2. He believed it was this competence that had attracted LCO2 to form a partnership with them. The CEO defined a competence as a combination of skills, knowledge and experience that give a company a competitive edge whereas capabilities would be more generic e.g. a technical support capability, a sales capability, a financial capability – on their own these will not necessarily give a company a competitive edge. The CEO believes that established companies can't innovate that easily as they often have legacy processes and have too much invested in old systems to innovate and change to new systems. Hence he believes that competencies are more important for a successful partnership than capabilities. In the case of LCO2, he re-iterated that it was SME2's ability to develop new products and bring these to the market at a cost and time period attractive to LCO2 that attracted this company to the partnership.

The experts rated SME2's capabilities/competencies as of a general nature (2), and very multidisciplinary (3.25). Their overall impression of SME2's capabilities/competencies was that they were very slightly above average (2.25) when compared with the other SMEs.

Hence it appears that although the capabilities/competencies of SME2 were very multidisciplinary (indicating a level of complexity), they were general rather than specialist. Furthermore, SME2's capabilities/competencies rated only slightly above average when compared with the other SMEs. This would seem to indicate that SME3's capabilities/competencies, as they were general, could in all likelihood be sourced from other companies. Hence although they may have been an attractant for LCO2 to partner with SME2, LCO2 was not dependent on SME2 for its capabilities/competencies as it could potentially have accessed these from another company.

#### **5.4.1.3 SME3**

The CEO of SME3 mentioned that it was its optoelectronic capabilities and detailed product knowledge of LCO3's products that attracted LCO3 to partner with it. The CEO believed that it was the specialist technical abilities rather than their competencies that had attracted LCO3. At the time of the partnership SME3 did not yet have competencies, only capabilities. However, the sentiment is that even today, LCO3 would be more interested in SME3's capabilities than its competencies as in the defense industry (the domain wherein SME3 operates), LCOs wish to develop their own products rather than buy-in existing products. As specialist skills are not readily available locally, partnering with an SME is one way of gaining access to these skills and capabilities.

The experts rated the capabilities/competencies of SME3 as leaning slightly towards being of a specialist nature (2.25), and being slightly more multidisciplinary than discipline specific (2.25). However, the experts overall impression of SME3's capabilities/competencies rated below average (1.75), i.e. relatively low relative to the other SMEs.

Hence, although SME3 had certain capabilities, these, in the view of the experts, rated low relative to the other SMEs. And yet the relationship with the LCO3 was successful. However, on examining the partnership arrangement with the LCO it can be concluded that this was one of dependence – LCO3 was extremely reliant on the capabilities of SME3 as it had a project running that demanded the skills, knowledge and expertise of SME3's CEO, who had left whilst the project was still running to start his own company. Because there is usually a need for confidentiality and secrecy in product development in the defense industry, skills and expertise are not readily available. It is not always possible merely to hire in the required skills as there are issues of secrecy at stake. Research and development work is therefore usually done internally.

In South Africa during the 1990's, as the era of isolation associated with the demise of apartheid ended, as well as internationally, the end of the cold war which signalled South Africa's withdrawal from military activity in Africa, there was less of a need to focus so heavily on defense for the country. The national focus shifted away from defense and towards poverty alleviation and economic growth for the county. As a direct result the defense industry saw many retrenchments as government spending was directed towards areas that would stimulate economic activity. In addition, many spin-out companies were formed by former employees of these LCOs, who because of the changing and uncertain environment had left their respective companies to start their own companies. In many cases the LCOs were still dependent on the skills, experience and capabilities of the "spin-out" companies and because there existed already a relationship of trust and confidentiality between the LCO and the ex-employee, the LCOs were prepared still to outsource some of their projects to the ex-employees's start-up companies. It was in this context that LCO3 was happy to continue working with SME3 initially, until it had time to build its own in-house capacity again. Hence, although the capabilities/competencies of SME3 may have been relatively low, dependency on these capabilities/competencies and the confidential relationship that existed was what attracted LCO3 to partner with SME3.

#### **5.4.1.4 SME4**

SME4 initially supplied "systems programming" solutions to company A and company B. Companies A and B were in computer networking systems and were medium sized companies. The founder of SME4 commented that having capabilities and competencies was critical for partnership success as it was because of a product that SME4 had developed (a human resource (HR) module) that LCO4 had approached them in the first instance. LCO4 recognized that SME4 had certain competencies and asked them to customize the LCO4 HR module for the South African market.

SME4 had both competencies and capabilities that had attracted LCO4. It had a broad spectrum of knowledge and skills for developing applications and new developments, as well as systems processing skills and an ability for complex programming for example, software protocol development – i.e. capabilities. In addition the company had some knowledge of the domain. The founder clarified that his understanding of capabilities was the ability to bring about new developments, and a competency was an ability to deliver something now. For example, SME4 used its payroll competency to customize the LCO4's payroll system.

The founder believed that both competencies and capabilities were important for a successful partnership. The SME must demonstrate some competency, although this competency did not need to be specifically in the domain of the LCO. However, a demonstration of the SME's capabilities and competencies was important for a prospective partnership. The founder further commented that because of domain independence, capabilities were possibly more important than competencies, for example, an LCO in the financial sector might have seen the SME's capabilities to develop systems in the mining sector, and request them to develop similar systems for the financial sector. This would clearly indicate recognition of certain capabilities that could be used to develop a new competence in a new sector or domain.

When the SME is really small, it appears that the LCO is more interested in the SME's capabilities, but as it grows and develops certain competencies, it appears that the LCO shifts its interest to the SME's competencies. However, he believed that some LCOs tend to be risk averse and would be more interested in accessing a demonstrated competence than merely a capability that would need to be developed into a competence. However, the interest in accessing competencies and capabilities would also be dependent on the situation and the specific need of the LCO, for example, if specialist skills were required for instance to develop cutting edge innovation and radical thinking, then the LCO would be more interested in accessing capabilities to include in its own systems and processes than looking for a competence. Alternatively, and citing examples like Cisco and Microsoft, an LCO may recognize a domain competence in some of the individuals of an SME and acquire the SME, strip it of the people who are not core to the competence, and integrate the competence into its own company.

The experts were of the opinion that SME4 has capabilities/competencies that are of a general nature (2), and that they are very multidisciplinary (3.25). Their overall impression was that SME4's capabilities/competencies were high (3.5) relative to the other SMEs.

Hence it appears that not only did the successful partnership result from SME4's high level of capabilities/competencies, but that it was both competencies and capabilities that had resulted in the successful partnership. The competency was SME4's human resource (HR) module that it had developed and which it was requested to customize such that it became a component of LCO4's system offering. The capabilities that it offered LCO4 were the ability for developing applications and new developments, as well as systems processing skills and an ability for complex programming, for example, software protocol development. Domain knowledge was also listed as a capability. In this

case it was not only a competence, but also the associated strong capabilities that SME4 possessed that appeared to attract LCO4 and influence partnership success.

#### 5.4.1.5 Conclusions on the relationship between capabilities and competencies and partnership success

As in the literature, so also in the practice there is confusion regarding the definitions of competencies and capabilities. There appeared to be a common understanding within the four SMEs that capabilities were a building block for competencies, and that capabilities could be equated with inputs (organizational components being necessary “ingredients” for producing a product or service) and competencies could be equated with outputs (final product or service). However, at what specific point skills became capabilities, and capabilities became competencies was not clear. What is evident was that in all cases the SME had capabilities and/or competencies.

Table 33 summarizes the capabilities/competencies that the SMEs had (classified as per the hierarchical definition used in this research, section 2.3.3) and that the SMEs claim served as attractants for the LCOs.

**Table 32: Capabilities and competencies of SMEs interviewed**

	<b>Ability capability</b>	<b>Awareness capability</b>	<b>Competence</b>
<b>SME1</b>	Intellectual property		
<b>SME2</b>		Complementarity	Design & manufacture of products
<b>SME3</b>	Opto-electronics	Detailed product knowledge	Product development
<b>SME4</b>	Complex programming; domain knowledge	Complementarity	Payroll development

From Table 32 it appears that those SMEs that perceived their partnership to be successful (SME3 and SME4), had at least, an ability capability, an awareness capability and a competency, where SME1 and SME2 had combinations of these, but in no instance one of each.

From the above there does appear to be a link between the level of capabilities and competencies and partnership success. In the cases of SME1 and SME2, the capabilities were slightly above average and were associated with a low level of partnership success. SME3 had a low level of capabilities/competencies and perceived the partnership to be successful. Hence an above average level of capabilities/competencies did not result in a



successful partnership (SME1 and SME2), whereas a low level of capabilities/competencies did result in a successful partnership. In the case of SME4, however, the level of capabilities/competencies was high and yet this also resulted in a successful partnership. Hence it appears that although an above average level of capabilities/competencies appears to be associated with an unsuccessful partnership (SMEs 1, and 2) and a low level of capabilities/competencies is associated with a successful partnership, this is not necessarily true in all cases (SME4). Furthermore, where the capabilities were complemented by a competence, they were related to a high level of partnership success (SMEs 3 and 4).

#### **5.4.2 Effect of safeguards on the relationship between capabilities and competencies, and partnership success**

In discussing safeguards, all four SMEs indicated that they believed safeguards to be important in protecting their capabilities and competencies and ensuring partnership success. “Large companies are ruthless and will take everything” was the comment of one of the SMEs. Safeguards used included the following, and each safeguard has been categorized according to Dekker’s description of formal and informal control mechanisms in inter-organizational relationships:

SME1:

- Having secured the first customers of the new product (informal – social networks)
- Binding own employees to company by means of a restraint of trade agreement (formal: behavioural control – behavioural monitoring)
- A shareholders agreement with the LCO, including an exit clause for the SME and the LCO (formal: behaviour control – behaviour monitoring; outcome control – reward structures)
- Similar cultures (informal - reputation)

SME2:

- Capability trust (informal – capability)
- Contract (specifying technical specifications, buying and selling prices, but not sales targets, and unbalanced in terms of obligations) (formal: behaviour control: structural specifications)

- Restraint of trade with employees

SME3:

- Capability trust (informal – capability)
- Trust building (informal - joint decision making and problem solving)
- Goodwill trust – (informal – goodwill)
- Contract orders specifying deliverables and payment conditions (formal: outcome control – performance monitoring)

SME4:

- Integrity (both that one company will not try to deceive the other, and that the company will deliver on what was promised) (informal – reputation and trust capability)
- Trust (informal - reputation)
- Trust building by means of agreement of the specifications for a contract (informal – joint decision making and problem solving; partner development)
- A contract that describes the parameters of the relationship (formal: behaviour control – rules and regulations)
- A company culture that retains key employees (informal - reputation)
- Delivering a better service than the LCO (formal: outcome control – performance monitoring)

It is evident that a combination of formal and informal safeguards was used in all cases. In the case of SME1, the relationship was guided mainly by a contractual agreement. Much effort was spent on defining the exact nature and expectations of the current and future relationship with LCO1, as well as possible exit strategies for both SME1 and LCO1. In reality not all eventual contingencies could be specified in the contract. An unplanned contingency that arose was when the LCO was willing to invest additional funds in SME1 to improve SME1's liquidity such that it could develop and bring to market new products faster. However, as SME1 could not match the investment this would have meant that additional shares would have to be exchanged for the additional cash investment – and SME1 did not wish to relinquish any more shares. SME1 finally decided to buy its shares back from the LCO when the LCO management changed and with this change came a change in philosophy of working with SMEs. Hence the focus of the relationship was on the contractual arrangements to protect SME1's capabilities and

competencies, rather than on developing and building a trust relationship, hence on formal rather than informal safeguards. Although there was evidence of some informal safeguards, these were largely a “static” demonstration of the capability and goodwill of SME1 (i.e. an ability to develop a customer base; and a similar culture), rather than ever-evolving trust building mechanisms. This “arms length” form of trust did not assist SME1 in achieving its objective of securing the moral support from LCO1 in fending off other opportunistic LCOs. Possibly this was because the relationship with LCO1 was not sufficiently developed (e.g. by trust building) for LCO1 to feel obliged to protect SME1. This finding is supported by the findings of Gill and Butler (1996:86) in their comparisons of two different cases, where “the combination of high expectations and a legalistic approach to the joint-venture, while not necessarily leading to distrust, does, when interacting with other variables, lay open the possibility of later disappointment and litigation”. The experts rated the safeguards in place for SME1 as slightly above average (2.5).

In the case of SME2, LCO2 displayed capability trust in expecting SME2 to bring about rapid and inexpensive product development. However, as with SME1, this can be viewed as rather “static” and not leading to ongoing trust building and hence relationship building. In addition, the relationship with LCO2 had never been good and hence there was no foundation upon which to build trust. Furthermore, the formal control mechanism in place controlled the inputs (product technical specifications for compliance) rather than the outputs (performance monitoring and rewarding). In addition, the contract was skewed in favour of LCO2, and hence would have been ineffective as a safeguard for SME2. The experts rated the safeguards in place for SME2 as average (2).

In the case of SME3 the experts rated the safeguards in place as weak (1.5). Although there were hardly any formal safeguards in place (only contract orders), the trust between SME3 and LCO3 was very strong. The relationship SME3 had with the technical employees of the LCO was very strong and was based on friendships that had evolved when both of the partners had been in the employ of the LCO. The partners interacted socially with the key technical employees of the LCO (e.g. played squash together) and new contracts were discussed in a social environment. There is evidence of capability trust, goodwill trust and trust building. This is demonstrated respectively by LCO3’s trusting relationship and by it being reliant upon SME3’s capabilities; the social interaction with employees of LCO3; and continuous dialogue as SME3 and LCO3 jointly made decisions regarding the project they worked on together. As explained in section 6.4.1.3, the defense industry is reliant on trust relationships in order to enforce secrecy with regard

to product development. Not only are employees of large defense companies screened and carefully selected, but this is a socially embedded system, which in itself is an effective safeguard. The industry in which SME3 operated was therefore unique, having its own social safeguarding mechanisms.

Furthermore, the formal safeguards were in the form of contracts that SME3 signed with LCO3 and that detailed the job specifications in the format of an order. Rather than having general guiding principles governing the relationship, the terms and conditions were very specific, and performance monitoring was tight. Hence SME3 did have both informal and formal safeguards in place, although these appeared to be weak relative to those of the other SMEs.

SME4 had many strong safeguards in place – both formal and informal. A greater emphasis was placed on the informal safeguards, and specifically on trust building and partner development whilst negotiating the contract. The founder commented that the contract was mainly a means of clarifying expectations and obligations, rather than a framework for the implementation of punitive measures. Retaining key employees by creating an attractive culture was also seen to be an important informal safeguard. The founder believed that good service delivery (reputation), culture and contracts were safeguards that should be in place. Hence a mix of formal and informal is proposed where the formal comprise an important safety net, whilst the trusting relationship is vital. Both are necessary for the partnership to be successful.

Based on the discussion above, Table 33 below summarizes the findings.

**Table 33: Level of capabilities, competencies and safeguards, and perceived partnership success for sample companies**

	<b>Successful partnership</b>	<b>Capabilities and competencies</b>	<b>Safeguards</b>
<b>SME1</b>	Low	Average plus	Average plus
<b>SME2</b>	Low	Average plus	Average
<b>SME3</b>	High	Low	Low
<b>SME4</b>	High	High	Strong

From Table 33, it appears that where the SME perceived its relationship with the LCO to be successful, it had both a high level of capabilities/competencies and very strong safeguards in place (SME4). For SME4 both informal and formal appeared to be important – the process of arriving at a contract was seen to be critical, whilst the actual

contract was also seen as very important and without which there could be no basis and definition for a partnership.

In the case of SME3 there did not appear to be an association between capabilities/competencies and partnership success, and strong safeguards. Not only did the safeguards appear to be low in relation to those of the other SMEs, but the informal safeguards appeared to be more critical than the formal safeguards. This result could be explained as a function of the industry in which it operated where secrecy and trust was core to business relationships. The obvious dependency by LCO3 on SME3 might furthermore have influenced the success of the partnership more so than the presence of safeguards.

Where the companies perceived their relationship with the LCO to be unsuccessful, in the case of SME1 more reliance was placed on the formal safeguards (specifically contracts with own staff, and a “static” contract with the LCO), whereas in the case of SME2, reputation trust and a biased formal contract were the safeguards. SME1 ultimately relied on the contract to end its relationship with LCO1, and exited with its capabilities and competencies still in tact. Similarly SME2 is currently in negotiation with LCO2 to exit the existing contract and enter into a new contract.

In conclusion, when the association between capabilities/competencies and partnership success was low, the level of safeguards was average, whereas when the association between capabilities/competencies and partnership success was high, the safeguards were high (in one case), whereas in the other case this pattern was not found.

From this discussion on safeguards, it therefore appears that the level of the safeguards affects the relationship between capabilities and competencies and partnership success. Furthermore, although there can be no relationship without informal safeguards (specifically trust, albeit capability trust), formal safeguards not only capture the intent of the partnership – also important for continuity should the original signatories/negotiators leave the company, but also ensure that should the partnership be unsuccessful, the exiting SME has a good chance of leaving with its capabilities and competencies still in tact.

The next chapter will relate the results to the literature, as well as highlight the new findings. It will conclude by comparing the findings of the survey with those of the case studies and comment on the extent to which the case study findings validate the results of the survey.

## Chapter 6

# Conclusion and Recommendations

What follows is a summary of the results that have been reported in Chapter 4. The discussion focuses on the six hypotheses that were accepted and a possible explanation for the acceptance (and where relevant, for the rejection of the associated hypotheses) is given. The associated four models are discussed and comment is given on which model best fits the data. Conclusions from the accepted hypotheses and best-fit model, and support for the conclusions are then provided. A short discussion on the relevance of the findings and recommendations in terms of future research is given. Finally a comparison is made between the findings from the survey with those of the case studies and a conclusion is reached on whether the case studies' findings validate the survey findings.

### 6.1 Main findings from the survey

The first hypothesis to be accepted is associated with Model 1, namely:

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

It appears that having many competencies and capabilities does not lead to partnership success. In fact the findings show that the more ability capabilities an SME has, the lower is the perceived partnership success. The reason for this negative relationship can be explained as follows.

In the absence of safeguards, LCOs can behave opportunistically as they will, in all likelihood, suffer no penalties from displaying such behaviour. An SME making known its competencies and capabilities would therefore be very vulnerable and open to exploitation by the LCO. Furthermore, because of its limited resources, the SME is not well positioned to litigate against the LCO should the LCO behave opportunistically. Such an exploitative relationship would be perceived by the SME as not successful. Hence, the more ability capabilities the SME has, the more attractive it is for the LCO, and in the absence of

safeguards, the SME runs the risk of being taken advantage of by the LCO. This would result in an unsuccessful relationship.

With the introduction of safeguards, the situation changed and the partnership appeared to be perceived as being successful. It appears that safeguards do, indeed, moderate the relationship between competencies and capabilities and partnership success. The second and third hypotheses which are accepted are associated with Model 2, namely:

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 increasing numbers of awareness capabilities, 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 increasing numbers of ability capabilities, and the perceived success of the partnership.

Hence introducing both formal and informal safeguards results in both a positive relationship between awareness capabilities and partnership success, and a less negative relationship between ability capabilities and partnership success. Where awareness capabilities on their own had no effect on partnership success, when safeguards moderate awareness capabilities, awareness capabilities have a positive relationship on partnership success. Where ability capabilities on their own had a negative relationship with partnership success, when moderated by safeguards they had almost no effect on partnership success. This can be explained as follows: safeguards in the relationship deter the LCO from acting opportunistically, and the absence of opportunism creates the perception (in the eyes of the SME) of a successful partnership.

Similarly, from the hypotheses below (Models 3 and 4 respectively) it can be concluded that both informal safeguards and formal safeguards, when applied on their own, moderated the relationship between capabilities (awareness and ability) and perceived partnership success:

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>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>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>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.

However, from the Nagelkerke R<sup>2</sup> results as well as the percentage of data points that were classified correctly, it appears that Model 4, (formal safeguards) was the best fitting model. It can therefore be concluded that increasing numbers of awareness capabilities, when moderated by *formal* safeguards, result in greater partnership success. Similarly, increasing numbers of ability capabilities, when moderated by formal safeguards, have a less negative (and almost no) effect on perceived partnership success.

Hence, SMEs that are aware of the LCO's internal and external environment (internal politics and SWOT), how they can play a complementary role, the opportunities they present to the LCO, and also the organizational type and partnering form that the LCO prefers; and where formal safeguards are present in the SME-LCO relationship, are highly likely to perceive their partnership with the LCO as being successful. Ability capabilities, however, do not appear to have a positive effect on the partnership, even in the presence of formal safeguards.

It is interesting that competencies were not significant in any of the models. This can be interpreted as LCOs source certain capabilities rather than competencies. As seen from Figure 3 in Chapter 2, competencies comprise capabilities plus processes. However, LCOs have their own internal processes and hence would be more inclined to absorb new capabilities and fit them into their existing processes than take on new capabilities plus new processes, i.e. competencies. This may account for competencies not being significant – competencies are probably not generally “in-sourced” by LCOs. Rather, capabilities are “in-sourced”. This finding would support the argument that LCOs, in order to offer variety, must innovate, and for innovation they require knowledge. As has been summarized in Figure 3, knowledge forms the basis for skills and technologies, which

together with facilities/infrastructure and organization, form capabilities. LCOs are therefore after knowledge (Hamel et al, 1989), either in its raw form, or developed into capabilities. As knowledge can be packaged into capabilities, it is the capabilities that the LCO seeks.

The negative relationship between ability capabilities and partnership success was influenced by two items, namely, where the SME had developed IP; and where the SME had segmented its potential market in accordance with Moore's (1999) market segmentation strategy for hi-tech products. This can be explained as below.

An SME developing its own IP would also be aware of its vulnerability in dealing with an LCO. It would not be aware that, should the LCO act opportunistically that it would be able to restrain it, nor have the resources to litigate against the LCO. Hence, the SME would be distrustful and possibly not very open in the relationship. This would frustrate the LCO who would not be able to benefit to the degree it had intended, from the ability capabilities of the SME, leading to an unsuccessful partnership.

Although the SMEs had claimed to have segmented their market in accordance with that for hi-tech products, this may not have been the reality as this claim could not be verified. It could be that SMEs had, in fact, NOT segmented the hi-tech market accurately and hence did not package their product offering appropriately. They may, in fact, not have been able to deliver on the expectations that had been created, resulting in the partnership being unsuccessful.

The positive relationship between awareness capability and partnership success was influenced by the SME having an understanding of the LCO's SWOT. This is an expected result as the more the SME understands of the LCO, the better positioned it is to align its offering appropriately such that it presents an attractive opportunity for the LCO.

However, a negative relationship was found to exist between the awareness capability of LCO's preferring to enter into a JV with another LCO when sourcing technology. This can be explained as the SME feeling excluded as the partner of choice, and hence not being that open to the relationship in the first instance, leading to an unsuccessful partnership. The introduction of safeguards, which included items like the LCO having a technology strategy, quantitative measures for determining partnership success, expansionistic opportunities SME presented for the LCO, similar cultures, SME being project champion, joint-decision making, SME's reputation, and being seen as important in the industrial

cluster, resulted in a positive relationship between awareness capability and partnership success. Such safeguards may have dispelled the SME's fear of exclusion as the LCO's commitment to the partnership became evident.

Having summarized the findings above, below is discussed how they relate to the literature.

## **6.2 Relationship between survey findings and the literature**

The literature (Siriram and Snaddon, 2004; Porter, 1998; Kogut, 1988; Hagedoorn, 1993) emphasizes that among the major reasons for companies to form partnerships is to access technologies, skills and resources – i.e. capabilities. There is, however, no evidence in the literature to suggest that either a higher number or a lower number of capabilities is what is sought by LCOs wishing to partner. The findings of this research are that the number of ability capabilities should be low as the more ability capabilities; the less successful the partnership is perceived to be. This could be explained as the more abilities, the more opportunity of opportunistic behaviour by the LCO, and hence the less successful the perceived partnership.

Furthermore, the use of safeguards to moderate the relationship between capabilities and perceived partnership success appears to affect the relationship positively. The use of total safeguards (formal and informal) as well as both formal and informal safeguards respectively positively affects the relationship between capabilities and perceived partnership success. In the case of awareness capabilities, the interaction of safeguards results in a positive relationship between capabilities and partnership success, whereas in the case of ability capabilities, the relationship between capabilities and partnership success is less negative than when ability capabilities were tested on their own with partnership success. This would imply that SMEs wishing to partner with LCOs should ensure that appropriate safeguards are in place. Furthermore, if safeguards are in place, then the more awareness capabilities the SME has, the more successful will be the partnership. Furthermore, the more ability capabilities an SME has, in the absence of safeguards, the less likely is the relationship to be successful. However, unlike in the case of awareness capabilities, if safeguards are in place, increasing numbers of ability capabilities does not make the partnership more successful. This can be because if an SME has too many abilities, it may be defocused and not have sufficient depth in any one

ability. As the LCO partners to access an ability, should the ability not materialize in line with the expectations of the LCO, the partnership may not be successful.

These findings are in line with Ouchi (1979), Das and Teng (1998), and Dekker's (2004) framework for control in inter-organizational relationships and control mechanisms, whereby both formal and informal control mechanisms or safeguards, can be used to control the behaviour of collaborating firms. However, the findings also suggest that formal rather than informal safeguards are the most influential in moderating the relationship between competencies and capabilities.

The research indicated that where SMEs had developed proprietary information, including patents, software, new products and/or new processes (IP) (an ability capability), there was a negative relationship with perceived successful partnership. The question relating to whether this IP had been patented had an insignificant result. This could indicate that where SMEs had developed IP and had not patented it, they were aware that their IP was unprotected. The SMEs were therefore probably feeling vulnerable and exposed to possible opportunistic behaviour by the LCO. In attempting to safeguard their IP, the SMEs may not have disclosed sufficient information or sufficiently engaged with the LCO, to ensure a successful partnership. These findings are in support of the findings of Teece, (1990) and Arundel (2001) who comment that a disincentive to patent is because of the requirement for full disclosure, and that creates an opportunity for mimicking. An SME that has elected not to patent, therefore, would still be aware of the dangers associated with disclosure, and would hence be reluctant to make all the required information readily available. This would explain the negative relationship with partnership success.

A positive relationship was found between the SME having an understanding of the LCO's SWOT (awareness capability), and perceived successful partnership. This is in line with the literature (Bakker, 1994; Klofsten and Schaerberg, 2000; Hlavacec et al, 1977) whereby companies need to understand where they can add value to their potential partners for the partnership to be successful.

The research indicated a negative relationship between the preferred partnering form of the LCO when sourcing technology to be *to enter into a joint venture with another LCO*, and perceived partnership success. Freeman and Soete (1997) comment that transnational companies (which because of their size would qualify as LCOs) are well positioned to cooperate with rivals and organize international joint ventures. Klein Woolthuis and Groen (2000) found that LCOs preferred to cooperate with other LCOs

rather than with SMEs. O'Dwyer and O'Flynn (2005) believe that joint ventures offer a good form of governance when the absorptive capacity of the recipient is low and more interaction with the knowledge supplier is required. Therefore a joint venture, they believe, is appropriate for transferring complex capabilities. These arguments would tend to support the abovementioned finding, arguing that entering into a joint venture with another LCO would be an appropriate form for a technology sourcing strategy in an uncertain (hi-tech) environment. LCO-LCO joint ventures appear to be preferable in uncertain environments. However, an LCO-LCO partnership would in all likelihood exclude or be to the detriment of an LCO-SME partnership, hence resulting in a negative perception by the SME of partnership success.

The comments by Hadegorn and Sadowski (1999) would offer further support for this research finding, namely that contractual agreements are preferable and tend to prevail in technology intensive sectors, whereas joint ventures are preferable in medium and low-tech industries. As the sample surveyed comprised SMEs from the technology intensive sectors, an assumption can be made that their LCO partners would also be from the technology intensive sector. A joint venture arrangement with an SME would therefore not be the LCO's preferred technology sourcing strategy – but rather a contractual agreement. Furthermore, there is much literature commenting on the high failure rate of joint ventures (Park and Russo, 1996; Kogut 1989; Porter, 1987; Frick and Torres, 2002; Das et al, 1998). This might also explain the negative relationship between the sourcing strategy of the partnering LCO to be *to enter into a joint venture with another LCO*, and perceived successful partnership as not only would the preferred form of partnership be a contractual agreement rather than a JV, but because of the high failure rate of JV's entering into a JV with an SME would not be the preferred form of partnership.

### **6.3 Unexpected findings from the survey**

The first surprising result is that competencies appear not to play a role in determining partnership success. Rather, it is the abilities that have a relationship with partnership success. However, as described in the section above, knowledge, packaged as abilities (without associated processes) rather than competencies (abilities PLUS processes) are probably what are sought by LCOs.

This finding would support the argument that LCOs, in order to offer variety, must innovate, and for innovation they require knowledge. As has been summarized in Figure

3, knowledge forms the basis for skills and technologies, which together with facilities/infrastructure and organization, form capabilities. LCOs are therefore after knowledge (Hamel et al, 1989), either in its raw form, or developed into capabilities.

A second unexpected result was that the more ability capabilities an SME has, the less successful the partnership is perceived to be. As discussed above, this can be due both to opportunistic behaviour by the LCO, as well as a lack of focus by the SME.

A third surprising result is that one would have expected to find a positive relationship between informal safeguards (that largely comprise trust) and perceived partnership success as this is largely what is described in the literature. However, the findings of this research indicate that formal safeguards were more effective in moderating the relationship between capabilities and partnership success than informal safeguards. This finding is contrary to what was expected, as discussed below.

There is much in the literature describing how trust and formal control appear to be juxtaposed to each other. Dekker (2004:34) and Das and Teng (1998) claim that there is an inverse relationship between trust (informal control) and formal control, and that extensive use of formal control signals a lack of belief in the partner's goodwill or competence. Gulati (1998) comments that trust replaces the need for hierarchical structures to control opportunistic behaviour. Pyka (2002) 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. Gulati and Singh (1998) maintain that where there is trust, there are likely to be fewer hierarchical controls. Hence one would have expected to find a positive relationship between capabilities and partnership success when moderated by informal controls as this would indicate that the partnership had matured to the level where fewer hierarchical controls were needed, and at this stage the relationship would be stable and perceived to be successful. However, the findings suggest that informal safeguards have less of a moderating effect on the relationship between competencies and capabilities and perceived successful partnership than formal safeguards. There is support in the literature for this finding, for example Klein Woolthuis (1999) comments that contracts (formal safeguards) are often a means to an end, and i.e. they are used to make the commitment of the partners clear and tangible. But perhaps this result can better be explained by considering the historical impact on South African companies.

In order to explain this phenomenon we consider the political and economic history of South Africa. Prior to 1994, South Africa implemented a political policy of *apartheid* or “separate development” of its people. This policy removed most of the constitutional rights of non-white residents in South Africa. *Apartheid* resulted in the development of a polarized society, and was found unacceptable not only to many South Africans, but also to the Western World (US, Scandinavia and Europe). As the Western world comprised South Africa’s largest trading partners, they applied pressure to the South African government to change its racist policies by imposing trade embargoes on South African goods. As a result of the trade embargoes, the South African economy was to a great extent marginalized. Two major effects resulted: a very competitive domestic market developed where local businesses competed for local market share; and a culture of distrust rather than trust in the export business environment arose, explained as follows. Those companies that wished to retain their export market share had to use devious means to continue selling into foreign markets, for example by setting up “front” companies and exporting goods via Middle East ports. The net effect was that trust was no longer the basis for doing business, local or international, and formal contracts were used to guard against opportunism. It therefore appears that South African business relationships have not yet matured to the degree where they are built on trust. Furthermore, unlike the US or Europe, there is not yet a culture in South Africa of LCOs collaborating with SMEs. This could be because of South Africa typically being viewed as a technology colony, where R&D of the large foreign-based companies was performed in the respective home country and South Africa was merely treated as a supplier of inexpensive resources – LCO’s therefore had no need to develop relationships with South African SMEs.

A third argument in support of the use of formal safeguards is that formal safeguards are easier to implement. They generally have clearly defined outputs which makes monitoring and corrective intervention relatively simple. Informal safeguards, however, are far less tangible and it is much more difficult to monitor and control the partner’s behaviour against informal safeguards. It follows, therefore, that formal safeguards can be seen as more important and more easily implementable than informal safeguards in moderating the relationship between capabilities and perceived partnership success.

However, although formal safeguards appear to be more important in controlling opportunism, a fourth unexpected finding is that equity did not appear to be a common formal safeguard mechanism. Equity can be viewed as a form of hierarchical control, and hence if a substantial equity stake in the SME is held by another company, this second

company would be able to exert some degree of control on the SME. Similarly, were the SME to enter into a partnership with a third company, the SME's equity partner would be able to exert influence on the new partner. If the equity partner were an LCO, then the presence and engagement of this LCO might discourage opportunistic behaviour by a third party. On the other hand, where little or no equity is held, the SME, as a stand-alone entity, is vulnerable to opportunism by an LCO. Equity not appearing to be a common formal safeguard might be as a result of an apparent lack of trust in South African business relationships, such that SMEs are not willing to share equity with LCOs. It could also be as a result of the size of the SMEs in the sample population – because they were largely still very small companies, most of them may not yet have reached the stage where they were an attractive investment opportunity for another company.

A fifth unexpected finding is the negative relationship between the SME having segmented their potential market, *inter alia*, into early innovators, early adopters, early majority, late majority and laggards, and perceived successful partnership. This means that the more the SMEs segmented their market according to these categories, the less successful was the perceived success of the partnership. This finding is somewhat surprising as Moore (1999) elaborates extensively on the difficulties encountered in “crossing the chasm” from early adopters to the early majority. He emphasizes that the process for a successful crossing is in identifying the market categories (early innovators, early adopters etc), understanding the paradigms and needs of each category, and following a strategy to address the paradigms and needs of the early majority. Companies would need to have the capability to understand this market segmentation strategy and implement it successfully. A possible explanation for the findings of this research could be as follows. Many of the companies interviewed were still very small – the highest percentage (32%) had fewer than 5 employees – and they had therefore most probably not yet crossed the chasm. Although they had indicated that they had segmented their market into the abovementioned categories, the fact that they had not yet grown substantially would indicate that they had not yet implemented successfully a strategy to attract the “early majority” – and they had not yet, in fact, crossed the chasm. Hence, either they did not adequately understand these market segmentation categories, or they had not successfully applied tactics to influence the paradigms/address the needs of the early majority. Because their expectations for capturing a share of the early majority had not yet realized, they perceived the partnership to be unsuccessful. An additional explanation could be that the companies interviewed were NOT familiar with the theory of Moore's market segmentation strategy – in fact they may neither have read this theory, nor had an understanding of it. If their “yes” answers were taken to be “no”



answers, then the result would have been expected, i.e. a lack of understanding of Moore's theory would result in a less successful partnership.

## 6.4 Comparison of survey findings with case study findings

Table 34 below compares the major findings of the survey with those of the case studies.

**Table 34: Comparison of survey and case study findings**

Survey Findings	Case Study Findings
1. <i>Higher numbers of ability capabilities are associated with lower levels of perceived partnership success</i>	<ul style="list-style-type: none"> <li>• <i>average levels of capabilities/competencies are associated with a low level of perceived partnership success (in two cases);</i></li> <li>• <i>low levels of capabilities/competencies are associated with high levels of perceived partnership success in one case</i></li> <li>• <i>high levels of capabilities/competencies are associated with a high level of perceived partnership success (in one case);</i></li> </ul>
2. Numbers of competencies are not significant in determining partnership success	<ul style="list-style-type: none"> <li>• SMEs having ability capabilities, awareness capabilities and competencies were associated with <i>high levels of perceived partnership success</i>, whereas those with either an ability capability or an awareness capability plus a competence (i.e. not all 3) were associated with low levels of perceived partnership success</li> </ul>
3.1 The greater the number of safeguards (formal and informal) that are in place, the more positive the relationship between increasing numbers of awareness capabilities and the perceived success of the partnership 3.2 The greater the number of safeguards (formal and informal) that are put in place, the less negative will be the relationship between increasing numbers of ability capabilities, and the perceived success of the partnership	<ul style="list-style-type: none"> <li>• when the level of safeguards was <i>strong</i> (in one case) then the association between capabilities/competencies and <i>partnership success was high</i></li> <li>• when the level of safeguards was only <i>above average or average</i> (in two cases), then the association between capabilities/competencies and <i>partnership success was low</i></li> <li>• when the level of safeguards was <i>weak</i> (in one case) then the association between capabilities/competencies and partnership success was <i>high</i></li> </ul>
4.1 Increasing numbers of awareness capabilities, when moderated by formal safeguards, result in greater partnership success 4.2 Increasing numbers of ability capabilities, when moderated by formal safeguards, have a less negative effect on perceived partnership success	<ul style="list-style-type: none"> <li>• Both formal and informal safeguards appeared to influence the association between capabilities/competencies and partnership success.</li> </ul>

From the table the following is evident.

6.4.1 Slightly above average levels of capabilities/competencies were associated with low levels of partnership success, and in one case a low level of capabilities/competencies was associated with a high level of partnership success. This would seem to support the findings that *higher numbers* of ability capabilities are associated with *lower levels* of perceived partnership success. However, this finding is challenged by one SME that had *high levels* of capabilities/competencies and these were associated with a *high level* of perceived partnership success. However, this SME also had strong safeguards that could have moderated the relationship between capabilities/competencies and partnership success. Hence the findings from the case studies would appear to support the first finding of the survey, namely that high levels of capabilities/competencies are associated with low levels of partnership success.

6.4.2 The case studies reflected that SMEs having ability capabilities, awareness capabilities and competencies were associated with *high levels* of perceived partnership success, whereas those with either an ability capability or an awareness capability plus a competence were associated with low levels of partnership success. Hence it appears that competencies do play a role in influencing a successful partnership. This finding would seem to nullify the finding from the survey that indicated that the number of competencies is not significant in determining partnership success. Furthermore the case studies reflected that it was not necessarily the number, but rather the level of competencies that influenced the partnership.

6.4.3 In one case the level of safeguards was *strong* and the association between capabilities/competencies and *partnership success was high*. In two cases the level of safeguards was only slightly above average or average, and the association between capabilities/competencies and *partnership success was low*. This would seem to verify the survey findings that the greater the number of safeguards (formal and informal) that are in place, the more positive the relationship between increasing numbers of awareness capabilities and the perceived success of the partnership as well as the less negative will be the relationship between increasing numbers of ability capabilities, and the perceived success of the partnership. Hence the findings would seem to indicate a positive association between the level of safeguards and the association between capabilities/competencies and partnership success. However, one SME reflected that although the level of safeguards was weak, the association between capabilities/competencies and partnership success was high. The explanation that has

been offered in section 6.4.1.3 is that there may have been a different reason for the partnership success that was not necessarily related to safeguards, i.e. dependency by the LCO on the SME for critical capabilities.

6.4.4 No concluding evidence was found in support of formal safeguards being more important than informal safeguards. In all cases the importance of both was mentioned.

## **6.5 Relevance of the findings and recommendations**

The research set out to determine how SMEs could influence the successfulness of a partnership with an LCO. An objective was to open the “black box” that many SMEs experience when negotiating with LCOs, by identifying key components that the SME can control. Armed with this knowledge, the end result would be to restore the balance on the seesaw such that in a partnership with an LCO, the SME would be able to achieve the outcomes it had planned. This objective has been achieved to some degree.

The survey findings have confirmed that having competencies does not influence the successfulness of a partnership. Furthermore, having capabilities does not influence the successfulness of a partnership positively – in fact, the more ability capabilities (attractants) an SME has, the less successful will be the partnership. However, when safeguards (weights) are in place, and more specifically formal safeguards, then awareness capabilities affect partnership success, i.e. an increase in awareness capabilities results in improved partnership success. The awareness capabilities identified were:

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

The formal safeguards that influenced the relationship positively between capabilities and partnership success were:

- partnership between LCO and SME was formalized
- use of quantitative measures for determining partnership success

- LCO has a technology strategy
- expansionist opportunities SME presents for the LCO
- means by which LCO gathered information on SME
- documented process for monitoring quality control, delivery and support of products
- substantial equity stake in SME held by another entity

The case studies, in turn, highlighted that safeguards are perceived to be important to protect the company's capabilities and competencies, as confirmed by each of the companies interviewed. Furthermore, support was found in favor of the hypothesis that the stronger the safeguards, the more positive will be the relationship between capabilities/competencies and the perceived success of the partnership. Although trust (informal safeguard) was seen to be important for partnership success, formal safeguards appeared critical – both in developing a common understanding (informal: trust-building safeguard) as well as arriving at a framework for specifying the rights and obligations of the parties (formal safeguard). Furthermore the existence of formal safeguards appeared to lead to a successful exit strategy. Even in the case of the companies that had experienced an unsuccessful partnership, they had managed to exit from the partnerships with their competencies intact due to the fact that they had formal safeguards in place.

This would support the findings from the survey that safeguards are important to ensure a positive relationship between capabilities and competencies and partnership success, but that both informal and formal are essential. Furthermore, that the quality rather than the number of safeguards is important, for example LCO3 was reliant on SME3's critical capabilities and hence capability-based trust was critical. Assuming that there are indeed capabilities and competencies to protect, and then safeguards positively moderate the relationship between capabilities and competencies and a successful partnership.

These are important findings for SMEs wishing to partner with LCOs, as firstly it cautions SMEs against having many capabilities/competencies in the absence of safeguards. This is because not only could the SME be defocused, but it would be more vulnerable to exploitation by an LCO. Secondly it highlights the importance of an SME having ability capabilities, awareness capabilities and competencies as jointly these appear to influence the successfulness of the partnership. Thirdly and SME should ensure that both formal and informal safeguards are in place as these are very influential in determining the success of a partnership. SMEs may therefore be able to influence the outcome of a

partnership positively, if they ensure that certain formal and informal safeguards are in place.

These findings should be brought to the attention of professionals who assist South African SMEs in establishing their businesses – and specifically those SMEs in the hi-tech sector where partnering with an LCO is often an essential component of growing the business. In this way SMEs can be guided such that their partnership with the LCO is successful and achieves the desired outcomes.

## **6.6 Shortcomings and possible sources of error**

As has been discussed in Chapter 3, because of the poor response rate the research design had to be changed mid-way into the project. This not only wasted valuable time, but resulted in an “adapted” questionnaire which was not sufficiently focused regarding the expected outcomes of the research, and was very lengthy – 44 questions translating to 13 pages capturing 283 variables. The reason for the many questions was an attempt to cover as many contingencies and perceptions as possible, and to allow for the compounding of variables in order to improve the variation of an envisaged small sample. Furthermore, the final method of analyzing the variables was decided upon only once the responses had been gathered and the small sample size needed to be taken into account. Should it have been possible for the method to have been decided up front, the questions could have been tailored to meet the desired outcome.

The interviewing process, if strictly controlled and not allowing much discussion from the interviewee, took approximately 75 minutes. However, companies were often keen to share their insights rather than merely respond to quantitative questions, and the structured questionnaire was not sufficiently flexible to capture many of their comments. Hence, an empirical study to arrive at the main findings, followed by multiple case studies that focussed on specific findings in attempt to gain a deeper understanding of these findings, was adopted to enhance the study. However, as only four SMEs were selected for the case studies, these SMEs may not necessarily have been the most representative SMEs of their respective categories (perceiving successful versus not successful partnerships). Hence using a larger number of case studies for the comparative study may have reduced this possible risk of unrepresentative findings.

Much time was spent trying to solicit responses from targeted companies. By far the most effective method for achieving an acceptable response rate was to target companies referred “by word of mouth”. Such companies generally understood the importance of the research and were very willing to cooperate. Emphasis, from the start, could therefore have been placed on building the “word-of-mouth” referral database rather than cold canvassing and trying to cajole potential respondents to participate.

The awareness and ability capabilities were compiled from the literature and from anecdotal evidence. However, this is not an exhaustive list and there may be other items that should have been included that would have influenced the relationship between competencies and capabilities, and perceived partnership success. Furthermore the existence of a competitor intelligence activity within the SME was not tested. Although certain awareness capabilities were identified and tested, the vigour with which information on competitors was gathered by the SME was not identified as a variable, nor tested.

What the research also did not answer, were which formal/informal safeguards are the most important to put in place, and whether the formal/informal safeguards that were tested in the research, are necessarily the most effective safeguards to include. For example, anecdotal evidence indicates that an SME can be so taken in by the attention that an LCO shows in its capabilities, that in its eagerness to impress, the SME divulges more information than it should. Hence, putting in place a guiding document that explains what information may be shared and with whom, could be an effective formal control mechanism. Similarly, informal safeguards could have been expanded to include ensuring that the SME’s negotiation team included a lawyer who is highly respected in the community (and specifically by the LCO). The reputation of such an individual could significantly reduce the tendency of the LCO to act opportunistically.

Furthermore, although the composition of the variables was agreed upon by a group of experts, it could be argued that a different group of experts may have decided upon a different composition – which could have resulted in different outcomes. However, the factors mitigating against this would be that the experts consulted were well versed in the field, they were familiar with the scientific literature in the field, and “collective” wisdom was applied – more than one expert was used. In addition, the researcher herself had identified and categorized the variables using the scientific literature as a point of departure. Hence, the categorization of the variables was by no means accidental, but was a consultative process based on scientific literature.

The research also did not test how strong the existing relationship was between key individuals of the LCO and the SME prior to entering into a partnership, and whether such relationships were with the appropriate decision-makers (i.e. having economical rather than technical status). It could be that should the SME have a well established relationship with appropriate key individuals within the LCO that the informal safeguard, level of trust, would be very high and could outweigh the importance of the use of formal safeguards. This relationship may, furthermore, depend on the age of a company, i.e. the more mature the SME, the greater the possibility of having established relationships with key individuals in the LCO, and the higher the level of trust. Assuming that trust therefore becomes a more important safeguard, it would be interesting to determine whether the age of a company determines the appropriateness of formal or informal safeguards, namely, whether formal safeguards are more important for very small or start-up companies, and when they reach a certain age (and/or size associated with growth), that informal safeguards become more important.

Similarly, the research did not test whether the SME had established the reputation of the LCO in its dealings with other SMEs – was it opportunistic or not. Reputation is an informal control mechanism, and if it was a key factor in identifying an LCO partner, it would weigh in favour of informal control mechanisms being important.

With the new political dispensation in South Africa (after 1994), there may be an ever changing culture, namely from a strongly individualistic culture, to a more socialistic culture where consensual behaviour rather than individualistic behaviour is encouraged. Consensual behaviour may encourage companies to collaborate for the common good, rather than act opportunistically for their own benefit. Furthermore, as legislation in South Africa drives black economic empowerment (BEE), LCOs are being challenged to partner with BEE owned companies, and many of these may be emerging companies, hence LCO-SME partnerships are being promoted. It would therefore be useful to repeat the research in a few years time to see whether there has been an explicit change in the South African culture and whether this, in turn, has resulted in a change of importance from formal to informal safeguards.

The research only tested the perceptions of SMEs, and not the perceptions of LCOs. The research therefore captures the views of one partner rather than both. Hence, if it were possible to interview both parties in the relationship, capturing the LCOs perspective would have presented an opportunity to confirm/reject the main findings. In addition, new findings may have been arrived at.

Lastly, because of the convenience sample, and the fact that the sample was small, one cannot conclude that the results presented are representative of a population. A more representative sample from different economic and geographical sectors would need to be surveyed to make conclusive statements and ensure external validity.

Future research could therefore include the following:

1. testing which of the individual items comprising the compounded variables are the most influential
2. determining whether the items selected as competences and capabilities are the most appropriate, or whether there are others that should be tested
3. revisiting the composition of formal, as well as informal safeguards and testing the appropriateness and effect of the items selected on partnership success
4. testing the research findings with a representative sample of SMEs to establish the congruence of the findings with the considered opinion of the affected population – a case study approach
5. repeating the research using a sample of companies that are slightly more established ( $\geq 5$  years old)
6. repeating the research in a couple of years time to determine the effect of a changing South African culture
7. testing the perceptions from both an SME and an LCO perspective
8. improving the external validity of the research by testing a larger, more representative sample, both geographically and from different hi-tech sectors.



## Bibliography

Abernathy, W. 1978. The productivity dilemma. Baltimore, MD: The Johns Hopkins University Press.

Abrahamson, E. and Fombrun, C.K. 1992. Forging the iron cage: interorganizational networks and the production of macro-culture. Journal of Management Studies. 29: 175-194.

Abrahamson, E. and Fombrun, C.J. 1994. Macrocultures: determinants and consequences. Academy of Management Review. 19: 728-755.

Acs, Z. and Audretsch, D. 1989. Entrepreneurial strategy and the presence of small firms. Small Business Economics. 1: 193-213.

Akguen, A.E., Lynn, G.S. and Byrne, J.C. 2004. Taking the guesswork out of new product development. Journal of Business Strategy. 25(4): 41-46

Albaladejo, M., Romijn, H. 2000. Determinants of innovation capability in small UK firms: an empirical analysis. WP 00. 13. ECIS. Technische Universiteit Eindhoven, Eindhoven.

Alchian, A.A. and Demsetz, H. 1972. Production, information costs and economic organization. American Economic Review. 62: 777-795.

Amit, R., and Schoemaker, P.J.H. 1993. Strategic assets and organizational rent. Strategic Management Journal. 14: 33-46.

Anand, B. and Khanna. T. 1997. Intellectual property rights and contract structure. Harvard Business School Working Paper. 97-016.

Anderson, E. and Gatignon, H.A. 1986. Modes of foreign entry. A transaction cost analysis and propositions. Journal of International Business Studies. 17(3):1-25.

Anderson, J.C. and Narus, J.A. 1990. A model of distributor firm and manufacturer firm working partnerships. Journal of Marketing. 54(1): 42-58.

Anderson, P. and Tushman, M. 1990. Technological discontinuities and dominant designs: a cyclical model of technological change. Administrative Science Quarterly. 35: 604-633.

Arrow, K. 1974. The Limits of Organization. New York. Norton.

Arundel, A. 2001. The relative effectiveness of patents and secrecy for appropriation. Research Policy. 30: 611-624.

Auster, E. 1987. International corporate linkages: dynamic forms in changing environments. Columbia Journal of World Business. 22(2): 306.

Axelrod, R. 1984. The evolution of cooperation. New York: Basic Books

Bahra, N. 2001. Competitive knowledge management. New York, NY: Palgrave.

Bakker, H. and Wexler, K. 1986. New business development. Paper presented at the Eighth Annual Strategic Management Society Conference in Amsterdam (October 17-20).

Bakker, H. Jones, W. and Nichols, M. 1994. Using core competences to develop new business. Long Range Planning. 27(6): 13-27.

Balakrishnan, Srinivisan, and Mitchell P. Koza. 1993. Information asymmetry, adverse selection and joint ventures: theory and evidence. Journal of Economic Behavior and Organization. 20: 99-117.

Barber, B.M., Palmer, D. & Wallace, J. 1995. Determinants of conglomerate and predatory acquisitions: evidence from the 1960s. Journal of Corporate Finance. 1: 283-318.

Barley, S.R., Freeman, J. and Hybels, R. 1991. Strategic alliances in commercial biotechnology. Working paper, Cornell University.

Barnard, C.I. 1938. The functions of the executive. Cambridge, MA: Harvard University Press.

Barney, J.B. 1986. Strategic factor markets: expectations, luck and business strategy. Management Science. 32: 1231-1241.

Barney, J. 1991. Firm resources and sustained competitive advantage. Journal of Management. 17: 99-120.

Barney, J.B. 2001. Is the resource-based “view” a useful perspective for strategic management research? Yes.”. Academy of Management Review. 26: 41-56.

Bathelt, H. 2001. The rise of a new cultural products industry cluster in Germany: The case of the Leipzig media industry. Department of Economic and Social Geography Working Paper (06-2001). Johann Wolfgang Goethe-Universitat, Frankfurt.

Beamish, P. 1988. Multinational joint ventures in developing countries. London: Routledge.

Bell, M. and Albu, M. 1999. Knowledge systems and technological dynamism in industrial clusters in developing countries. World Development. 27(9): 1715-1734.

Beneito, P. 2003. Choosing among alternative technological strategies: an empirical analysis of formal sources of innovation. Research Policy. 32: 693-713.

Birchall, W.W., Chanaron, J.J., and Soderquist, K. 1996. Managing innovation in SMEs: a comparison of companies in the UK, France and Portugal. International Journal of Technology Management. 12 (3): 291-304.

Blau, P.M. 1964. Exchange and power in social life. New York: Wiley.

Blau, P.M. 1972. Interdependence and hierarchy in organizations. Social Science Research. 1: 1-24.

Boer, H. and During, W.E. undated. Innovation. What innovation? - A comparison between product, process and organisational innovation. International Journal of Technology Management.

Boon, S.D. and Holmes, J.G. 1991. The dynamics of interpersonal trust: resolving uncertainty in the face of risk. In: Hinde, R.A. and Groebel, J. (eds.), Cooperation and prosocial behaviour. Cambridge, England: Cambridge University Press. 190-211.

Bound, J., Cummins, C., Griliches, Z., Hall, B.H. and Jaffe, A. 1984. Who does R&D and who patents? In: Griliches, Z. (eds), R&D, patents and productivity. University of Chicago Press, Chicago, IL. 21-54.

Bowles, S. and Gintis, H. 2002. Social capital and community governance. Economic Journal. 112. F419-36.

Bradach, J.L. and Eccles, R.G. 1989. Markets versus hierarchies: from ideal types to plural forms. In: Scott, W.R. (ed.), Annual Review of Sociology. Palo Alto, CA: Annual Review. 97-118.

Brain Business Brief. May 2005. Small business owner's battle against giant continues. Business Referral and Information Network, Department of Trade and Industry, South Africa.

Breizman, A. and Thomas, P. December 2002. Using patent citation analysis to target/value M&A candidates. Research-Technology Management. Industrial Research Institute, Inc.: 28-36.

Breschi, S. and Lissoni, F. 2001. Knowledge spillovers and local innovation systems: a critical survey. Industrial and Corporate Change. 10(4): 975-1005.

Brush, G.G., Greene, P.G. and Hart, M.H. 2001. From initial idea to unique advantage: The entrepreneurial challenge of constructing a resource base. Academy of Management Executive. 15(1): 64-81.

Büchel, B. 2001. Creating joint value: key to successful joint ventures. IMD Perspectives for Managers, February 2001, 79.

Buckley, P.J. and Casson, M. 1988. A theory of cooperation in international business. in Contractor, F. and Lorange, P. (eds), Cooperative Strategies in International Business. Lexington Books, Lexington, MA.

Burgelman, R.A. 1983. A model of the interaction of strategic behaviour, corporate context, and the concept of strategy. Academy of Management Review. 8:61-70.

Burgelman, R.A., Maidique, M.A., and Wheelwright, S.C. 1996. Strategic management of technology and innovation. Second edition. Chicago: Irwin.

Calvet, A.L. 1981. A synthesis of foreign direct investment theories and theories of the multinational firm. Journal of International Business Studies. 12(1): 4-59.

Camerer, C. and Vepsalainen, A. 1988. The economic efficiency of corporate culture. Strategic Management Journal. 9: 115-126.

Candalino, A.W. and Knowlton, M. Spring 1994. Small companies as business laboratories. (Special Report: A new look at small business.) Canadian Business Review, 21(1): 25-28.

Carayannis, E.GI, Kassicieh, S.K., Radosevich, R. 2000. Strategic alliances as a source of early-stage seed capital in new technology based firms. Technovation 20: 603-615.

Chandler (Jr), A.A. 1977. The visible hand: the managerial revolution in American business. Cambridge, MA: Belknap Press.

Chiles, T.H. and McMackin, J.F. 1996. Integrating variable risk preferences, trust, and transaction cost economics. Academy of Management Review. 21:73-99.

Christensen, C.M., Johnson, M.W. and Rigby, D.K. 2002. Foundations for growth. How to identify and build disruptive new businesses. MIT Sloan Management Review. Spring 2002: 22 – 31.

Coates, D. 1996. Putting core competency thinking into practice. International Journal of Technology Management, Special Issue on the 5<sup>th</sup> International Forum on Technology Management. 11 (nos 3/4): 441-450.

Cohen, W.M. and Levinthal, D. 1989. Innovation and learning: the two faces of R&D. The Economic Journal. 99:569-596.

Cohen, W.M. and Levinthal, D.A. 1990. Absorptive capacity: a new perspective on learning. Admin. Sci. Quarterly. (35): 128-152.

Cohen, W.M., Nelson, R.N. and Walsh, J.P. 2000. Protecting their intellectual assets: appropriability conditions and why US manufacturing firms patent (or not)". Working Paper no 7552. National Bureau of Economic Research, Cambridge, MA.

Collis, D. 1994. How valuable are organizational capabilities? Strategic Management Journal. 15: 143-52.

Commons, J.R. 1934, reprint 1990. Institutional Economics. New Brunswick, N.J.: Transaction Publishers.

Contractor, F. 1986. International business: an alternative view. International Marketing Review. 3(1): 74-85.

Contractor, F.K. and Ra, W. 2002. How knowledge attributes influence alliance governance choices: a theory development note. Journal of International Management. 8:11-27.

Cooper, A.C. and Schendel, D. 1976. Strategic response to technological threats. Business Horizons. 19: 61-69.

Coopers and Lybrand. 1986. Collaborative Ventures: an emerging phenomenon in information technology. Coopers and Lybrand, New York.

Da Silva, M. Fourth quarter 1995. Big fish and small fry. Subcontracting between large and small businesses. Update. 45-50.

Das, T.K. and Teng, B. 1998. Between trust and control: developing confidence in partner cooperation in alliances. Academy of Management Review. 23 (3): 491-512.

Dasgupta, P. 1988. Trust as a commodity. In: Gambetta, D. (ed.), Trust: making and breaking of cooperative relations. Oxford: Blackwell. 49-72.

Dasgupta, P. August 2005. Economics of social capital. The Economic Record. 81: S2-S21.

Dekker, H.C. 2004. Control of inter-organizational relationships: evidence on appropriation concerns and coordination requirements. Accounting, Organizations and Society. 29: 27-49.

Dess, G.I.G. and Beard, D. 1984. Dimensions of organizational task environments. Administrative Science Quarterly. 29: 52-73.

Detienne, D.R., Koberg, C.S. and Heppard, K.A. 2001. A fresh look at incremental and radical innovation in the entrepreneurial firm. USASBE/SBIDA 2001 National Conference in Orlando, Florida.

De Wet, P. 26 September 2002. Software patents: patently obvious or preposterous? ITWeb. 1-5. www.itweb.co.za.

Dickson, P.H. and Weaver, K.M. 1997. Environmental determinants and individual-level moderators of alliance use. Academy of Management Journal. 40 (2): 404-425.

Dierickx, I, and Cool, K. Dec. 1989. Asset sock accumulation and sustainability of competitive advantage. Management Science (35) 12:1504-1513.

Dosi, G. 1988. Sources, procedures, and microeconomic effects of innovation. Journal of Economic Literature. 24:1120-1171.

Doz, Y.L. 1988. Technology partnerships between larger and smaller firms: some critical issues. In: Contractor, F.J. and Lorange, P. (eds.), Cooperative strategies in international business. Lexington, MA. Lexington Books: 3-30.

Doz, Y.L. 1996. The evolution of cooperation in strategic alliances: initial conditions or learning processes? Strategic Management Journal. 17 (Summer Special Issue): 55-83.

Doz, Y. 1997. Managing core competency for corporate renewal: towards a managerial theory of core competencies, in: Campbell, Luchs (eds.), Core competency-based strategy. International Thomson Business Press, London. 53-81.

Dussauge P. and Garrette, B. 1999. Cooperative strategy: competing successfully through strategic alliances. John Wiley.

Eisenhardt, I.K.M. 1985. Control: organizational and economic approaches. Management Science. 31: 134-149.

Escher, S. Oct. 2002. Moderator effect of cognitive ability on the relationship between planning strategies and business success of small scale business owners in South Africa: a longitudinal study. Journal of Developmental Entrepreneurship. 1-8.  
ww.looksmart.com

Farr, C. and Fischer, W. 1992. Managing international high technology cooperative projects. R & D Management. 22(1): 55-67.

Faulkner, D. 1995. International strategic alliances: co-operating to compete. McGraw-Hill, UK.

Faulkner, R.R. and Anderson, A.B. 1987. Short-term projects and emergent careers: evidence from Hollywood. American Journal of Sociology. 92: 879-909.

Festinger, L. 1950. Informal social communication. Psychological Review. 57: 271-282

Festinger, L, 1954. A theory of social comparison processes. Human Relations. 7: 117-140.

Field, A. 2000. Discovering statistics using SPSS for Windows. Sage Publications Ltd, London.

Fluck, Z, B. Malkiel and R.E. Quandt. 1997. Predictability of Stock Returns: A Cross-Sectional Simulation. Review of Economics and Statistics. 79(2): 1-18.

Fluck, Z. 1998. Optimal Financial Contracting: Debt versus Outside Equity. Review of Financial Studies. 11 (2): 383-419.

Fluck, Z. and Lynch, A.W. 1999. Why do firms merge and then divest? A theory of financial synergy. Journal of Business, 72(3): 319-346

Forrest, J.E. July 1990. Strategic alliances and the small technology-based firm. Journal of Small Business Management. 37-45.



- Forrest, J.E. 1991. Models of the process of technological innovation. Technological Analysis and Strategic Management. 3:439-453.
- Freel, M.S. 2003. Sectoral patterns of small firm innovation, networking and proximity. Research Policy, 32: 751-770.
- Freel, M.S. 2005. Patterns of innovation and skills in small firms. Technovation. 25: 123-134.
- Freeman, C. 1986. The economics of industrial innovation. Second edition. MIT Press.
- Freeman, C. 1991. Networks of innovators, a synthesis of research issues. Research Policy. 20:499-514.
- Freeman, C. and Hagedoorn, J. 1994. Catching up or falling behind: patterns in international interfirm technology partnering. World Development. 22: 771-780.
- Freeman, C. and Soete, L. 1997. The Economics of industrial innovation. Third edition. Pinter Publishers.
- Frick, A. and Torres, A. 2002. Learning from high-tech deals. The McKinsey Quarterly: 1-8. Retrieved February 11, 2002 from the World Wide Web: <http://www.mckinseyquarterly.com>.
- Gadiesh, O., Haas, D. & Cullinan, G. 2001. Getting the price right. Strategy & Leadership, 29(4): 27-31.
- Galbraith, J.R. 1977. Organization design. Reading, MA: Addison-Wesley.
- Gallivan, M.J. and Depledge, G. 2003. Trust, control and the role of interorganizational systems in electronic partnerships. Info Systems Journal. 13: 159-190.
- Gallon, M.R., Stillman, H.M., and Coates, D. May-June 1995. Putting core competency thinking into practice. Research Technology Management. 20-28.
- Gambetta, D. 1988. Trust: making and breaking co-operative relation. Basil Blackwell: Oxford.

- Gambetta, D. 1993. The Mafia: a ruinous rationality. Harvard University Press. Cambridge, MA.
- Garnsey, E.W. 1998. A theory of the early growth of the firm. Industrial and Corporate Change. 7(3): 523-556.
- Garud, R, and Kumaraswamy, A. 1993. Changing competitive dynamics in network industries: an exploration of Sun Microsystems' open systems strategy. Strategic Management Journal. 14: 351-369.
- Gerlach, M.L. 1992. The Japanese corporate network: a blockmodel analysis. Administrative Science Quarterly. 37: 105-139.
- Geroski, P.A. 1995. What do we know about entry?" International Journal of Industrial Organization. 13: 412-40.
- Ghoshal, S. and Moran, P. 1996. Bad for practice: a critique of the transaction cost theory. Academy of Management Review. 21: 13-48.
- Gill, J, and Butler, R. 1996. Cycles of trust and distrust in joint-ventures. European Management Journal. 14(1): 81-89.
- Gonzalez-Alvarez, N, and Nieto-Antolin, M. 2005. Protection and internal transfer of technological competencies. The role of causal ambiguity. Industrial Management & Data Systems. 105(7): 841-856.
- Gouldner, A. 1959. Reciprocity and autonomy in functional theory. In: Gross, L. (ed.), Symposium on Sociological Theory. Harper and Row, New York.
- Gordon, G.C. 1991. Industry determinants of organizational culture. Academy of Management Review.
- Granovetter, M.S. 1973. The strength of weak ties: a network theory revisited. American Journal of Sociology. 78: 1360-1380.

Granovetter, M. 1985. Economic action and economic structure: a theory of embeddedness. American Journal of Sociology. 91: 481-510.

Grant, R. 1991. The resource-based theory of competitive advantage: implications for strategy. California Management Review. 33: 114-35

Grant, R.M. 1996a. Toward a knowledge-based theory of the firm. Strategic Management Journal. 17: 109-22.

Grant, R.M. 1996b. Prospering in dynamically-competitive environments: organizational capability as knowledge integration. Organizational Science. 7:375-87.

Grant, R.M. and Baden-Fuller, C. 1995. A knowledge-based theory of inter-firm collaboration. Academy of Management Best Paper Proceedings: 17-21.

Groen, A.J. Nov 2002. Stimulating high tech entrepreneurship in a region: many visible hands creating heterogeneous entrepreneurial networks. Paper presented at Conference in Barcelona.

Groen, A.J., de Weerd Nederhof, P.C. and Kerssens-van Drongelen, I. 2002. Creating and justifying research and development value: scope, scale, skill and social networking of R & D. Creativity and Innovation management, 11(1), March 2002.

Gulati, R. 1993. The dynamics of alliance formation. Unpublished doctoral dissertation, Harvard University.

Gulati, R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. Academy of Management Journal. 38: 85-112.

Gulati, R. 1997. Which firms enter into alliances? An empirical assessment of financial and social capital explanations. Working paper, J.L. Kellogg Graduate School of Management, Northwestern University.

Gulati, R. 1998. Alliances and networks. Strategic Management Journal. 19:293-317.

Gulati, R. and Gargiulo, M. 1999. Where do interorganizational networks come from? American Journal of Sociology (in press).

Gulati, R., and Singh, H. 1998. The architecture of cooperation: managing coordination costs and appropriation concerns in strategic alliances. Administrative Science Quarterly. 43:78-814.

Hafeez, K, Zhang, Y, Malak, N. 2002a. Determining key capabilities of a firm using analytic hierarchy process. International Journal of Production Economics. 76: 39-51.

Hafeez, K., Yhang, Y, and Malak, N. February 2002b. Core competence for sustainable competitive advantage: a structured methodology for identifying core competence. IEEE transactions on Engineering Management. 49(1): 28-35.

Hagedoorn, J. 1993. Understanding the rationale of strategic technology partnering: interorganizational modes of cooperation and sectoral differences. Strategic Management Journal. 14: 371-385.

Hagedoorn, J. and Narula, R. 1996. Choosing modes of governance for strategic technology partnering: international and sectoral differences. Journal of International Business Studies. 27: 265-284.

Hagedoorn, J. and Sadowski, B., January 1999. The transition from strategic technology alliances to mergers and acquisitions: an exploratory study. Journal of Management Studies, 36(1): 87-107.

Hagedoorn, J. and Schakenraad, J. 1989. Strategic partnering and technological cooperation. In: Dankbaar, B., Groenewegen, J. and Schenk, H. (eds.), Perspectives in Industrial Economics, Kluwer, Dordrecht.

Hagedoorn, J. and Schakenraad, J. 1992. Leading companies and networks of strategic alliances in information technology. Research Policy. 21:163-191.

Hakansson, H. 1989. Corporate technological behaviour: cooperation and networks. London: Routledge.

Hakansson, H. 1993. Networks as a mechanisms to develop resources. In: P. Beije, J. Groenewegen and O. Nuys, (eds.), Networking in Dutch Industries. Leuven/Apeldoorn: Garant/Siswo. 207-223.

Hamel, G. 1991. Competition for competence and inter-partner learning within international strategic alliances. Strategic Management Journal. Summer Special Issue. 12: 83-103.

Hamel, G. 1994. The concept of core competence in: Hamel, G, and Heene, A. (eds.), Competence-based competition. Wiley, New York. 11-33.

Hamel, G. 2000. Leading the revolution. First edition. Harvard Business School Press.

Hamel, G. May 2004. Revolution, renewal and resilience: building organisations that thrive in turbulent times. The Gibs Review (5): 1-4.

Hamel, G., Doz, Y. and Prahalad, C.K. 1989. Collaborate with your competitors and win. Harvard Business Review. 67 (1): 133-139

Hamel, G. and Prahalad, C.K. 1990. The core competence of the corporation. Harvard Business Review.

Hamel, G. and Prahalad, C.K., 1992. Competitiveness. On-line strategy workshop facilitator's guide. Boston: Nathan/Tyler.

Hamel, G. and Prahalad, C.K. Summer 1995. Thinking differently. Business Quarterly. 23-35.

Harrigan, K.R. 1986. Managing for joint ventures success. Lexington, MA: Lexington Books.

Harris, L. August 2005. Weaving webs of relationships. ITWeb Brainstorm: 58-63.

Harrison, J.S. and St John, C.H. 1996. Managing and partnering with external stakeholders. Academy of Management Executive. 10(2): 46-61.

Hart, P. and Saunders, C. 1997. Power and trust: critical factors in the adoption and use of electronic data interchange. Organization Science. 8: 23-42.

Hayhow, S. and Ressler, T. 1996. Strategic partnerships: how to make them work. In S. Hayhow (Ed), A comprehensive guide to business incubation (277-281). Athens, Ohio: National Business Incubation Association.

Henderson, R.M. and Clark, K.B. 1996. Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. in (eds) *Burgelman, R.A., Maidique, M.A., and Wheelwright, S.C.* 1996. Strategic management of technology and innovation. 2<sup>nd</sup> edition. Chicago: Irwin.

Hennart, J.-F. and Reddy, S. 1997. The choice between mergers/acquisitions and joint ventures: the case of Japanese investors in the United States. Strategic Management Journal. 18: 1-12.

Herbig, P.A. 1994. The innovation matrix: culture and structure prerequisites to innovation. Westport, C.T. Quorum Books.

Higgins, J.M. March-April 1996. Achieving the core competence – it's as easy as 1,2,3, ... 47,48,49. Business Horizons: 27-32.

Hirschman, A. 1882. Rival interpretations of market society: civilizing destructive or feeble? Journal of Economic Literature. 20 (4):1463-1483.

Hitt, M., Harrison, J., Ireland, R.D. and Best, A. June 1998. Attributes of successful and unsuccessful acquisitions of US firms. British Journal of Management, 9(2): 91-115.

Hlavacek, J.D., Dovey, B.H., Biondo, J.J. Jan/Feb 1977. Tie small business technology to marketing power. Harvard Business Review. 55 (1): 106-117.

Hoffman, K., Perejo, M., and Bessand, J. 1998. Small firms, R&D, technology and innovation in the UK: a literature review. Technovation. 18: 39-56.

Hofstede, G. 1991. Cultures and organizations. Software of the mind. Intercultural cooperation and its importance for survival. McGraw-Hill Book Company Europe, Berkshire, England.

Hollander, S. 1965. The sources of increased efficiency: a study of Du Pont Rayon plants. Cambridge, MA: MIT Press.

Hoopes, D.G., Madsen, T.L. and Walker, G. 2003. Why is there a resource-based view? Toward a theory of competitive heterogeneity. Strategic Management Journal. 24: 8890-902.

Hotz-Hart. B. 2000. Innovation networks, regions and globalization. In: Clark, G.L., Feldman, M.P. and Gertler, M.S. (eds.),The Oxford Handbook of Economic Geography. Gertler. Oxford: OUP.

Huff, A.S. April 2000. Presidential address: Changes in organizational knowledge production. Academy of Management Review. 25(2): 288-294.

Igou, E. 11 June 1999. Moderator variable. <http://www.sfb504.uni-mannheim.de/glossary/moderat.htm>.

Ittner, C.D., Larcker, D.F., Nagar, V., and Rajan, M.V. 1999. Supplier selection, monitoring practices, and firm performance. Journal of Accounting and Public Policy. 18: 253-281.

Inkpen, A.C. and Beamish, P.W. 1997. Knowledge, bargaining power, and the instability of international joint ventures. Academy of Management Review. 22: 177-202.

Jarillo, J.C. 1988. On strategic networks. Strategic Management Journal. (9): 31-41.

Javidan, M. 1998. Core competence: what does it mean in practice? Long Range Planning. 31(1): 60-71.

Jones, G. 1987. Organization-client transactions and organizational governance structures. Academy of Management Journal. 20: 197-218.

Johnson, J.L., Cullen, J.B., Sakano, T. and Takenouchi, H. 1996. Setting the stage for trust and strategic integration in Japanese-U.S. cooperative alliances. Journal of International Business Studies. 27(5): 981-1004.

Jones, C., Hesterly, W.S., and Borgatti, S.P. October 1997. A general theory of network governance and social mechanisms. Academy of Management. The Academy of Management Review. 22 (4) 911-945.

Kale, P., Singh, H., and Perlmutter, H. 2000. Learning and protection of proprietary assets in strategic alliances: building relational capital. Strategic Management Journal. 21: 217-237.

Kash, E. 1989. Perpetual Innovation. Basic Books.

Keel, R. 1998. The McDonaldization of society. Notes for introduction to Sociology 010. University of Missouri, St Louis. [www document]. URL <http://www.umsl.edu/~rkeel/010/mcdonsoc.html>.

Kemp, T. March 2006. Of transactions and transaction costs: uncertainty, policy, and the process of law in the thought of Commons and Williamson. Journal of Economic Issues. 15 (1): 45 – 58.

Kenney, M. (ed.) 2000. Understanding Silicon Valley: the anatomy of an entrepreneurial region. Stanford University Press: Stanford, CA.

Kesper, A. 18-20 September 2000. Failing or not aiming to grow? Manufacturing SMMEs and their contribution to employment growth in South Africa. Trade and Industrial Policy Secretariat 2000 Annual Forum, Glenburn Lodge, Muldersdrift.

Killing, J.P. 1988. Understanding alliances. The role of task and organizational complexity in: Contractor, F.L. and Lorange, P. (eds). Cooperative strategies in international business. Lexington, Mass: Lexington Books: 55-67.

Killing, P. February 2001. Strategic alliances with competitors: how deep a relationship do you want? IMD Perspectives for Managers, 77.

Kimzey, C.H. and Kurokawa, S. 2002. Technology outsourcing in the U.S. and Japan. Research – Technology Management: 36-42.

Klein, J., Gee, D., and Jones, H. 1998. Analysing clusters of skills in R&D core competencies, metaphors, visualisation, and the role of IT. R&D Management. 28(1): 37-42.

Klein Woolthuis, R. 1999. Sleeping with the Enemy. Trust, dependence and contract in interorganisational relationships. Febodruk.



Klein Woolthuis, R., Hillebrand, B. and Nooteboom, B. December 2003. Trust, contract and relationship development. Rotterdam School of Management, Erasmus University Rotterdam, the Netherlands.

Klein Woolthuis, R.J.A. and Groen, A.J. 2000. High technology partnerships – what makes them succeed. In The 8<sup>th</sup> Annual International Conference on high-technology small firms: Vol. 1. Enschede: Grafisch Centrum Twente. 157-176

Kline, S.J. July-August 1985. Innovation is not a linear process. Research Management. 36-45.

Klofsten, M. and Schaerberg, C. 2000. Barriers in co-operation between small and large technology-based firms: a Swedish case study. In: The 8<sup>th</sup> Annual International Conference on high-technology small firms: Vol. 1. (140 – 156). Enschede: Grafisch Centrum Twente.

Koepfler, E. 1989. Strategic options for global market players. Journal of Business Strategy. 10(4): 46-50.

Kogut, B. 1988. Joint ventures: theoretical and empirical perspectives. Strategic Management Journal. 9(4): 319-332.

Kogut, B. 1989. The stability of joint ventures: reciprocity and competitive rivalry. Journal of Industrial Economics. 38: 183-198.

Kogut, B. and Kim, D-J. 1991. Strategic alliances of semiconductor firms. Working paper, Department of Management, Wharton School, University of Pennsylvania.

Kogut, B., Shan, W. and Walker, G. 1992. The make-or-cooperate decision in the context of an industry network. In: Nohia, N. and Eccles, R. (eds.), Networks and Organizations. Harvard Business School Press. Cambridge, MA. 348-365.

Koh, F.C.C., Koh, W.T.H., Tschang, F.T. September 2003. An analytical framework for science parks and technology districts with an application to Singapore. Singapore Management University Economics & Statistics working paper series: Paper No 18-2003:1-31.

- Kwak, M. 2002. What's the best commercialisation strategy for startups? MIT Sloan Management Review: 43(3): 10.
- Lam, A. 1997. Embedded firms, embedded knowledge: problems of collaboration and knowledge transfer in global cooperative ventures. Organization Studies (18) 6: 973-996.
- Lane, P.J. and Lubatkin, M. May 1998. Relative absorptive capacity and interorganizational learning. Strategic Management Journal. 19: 461-477.
- Lang, J.W. 1996. Strategic alliances between large and small high-tech firms (The small firm licensing option). 796-806.
- Lapin, D. September 2004. Culture: from inhibitor of growth to driver of competitive advantage. Management Today. 12 – 14.
- Larson, A. 1992. Network dyads in entrepreneurial settings: a study of the governance of exchange relationships. Administrative "Science Quarterly. 37: 76-104.
- Laurie, D.L. 2001. Venture catalyst. First edition. Cambridge, Massachusetts: Perseus Publishing Services.
- Leonard-Barton, D. 1995. Wellsprings of knowledge: building and sustaining the sources of innovation. Harvard Business School Press, Boston. MA.
- Lee, C.-M., Miller, W.F., Hancock, M.G. and Rowen, H.S. (eds.). 2000. The Silicon Valley Edge: a habitat for innovation and entrepreneurship. Stanford University Press: Stanford, C.A.
- Leedy, P.D. 1997. Practical research planning and design. 6<sup>th</sup> edition. Columbus, Ohio: Prentice Hall.
- Lei, D., and Slocum, J.W.Jnr. Fall 1992. Global strategy, competence-building and strategic alliances. California Management Review: 81-97.
- Leifer, R. and Mills, P.K. 1996. An information processing approach for deciding upon control strategies and reducing control loss in emerging organizations. Journal of Management. 22: 113-137.

Leifer, R. et al. 2000. Radical innovation. How mature companies can outsmart upstarts. Boston, Massachusetts: Harvard Business School Press.

Levin, R., Klevorick, A., Nelson, R. and Winter, S. 1987. Appropriating the returns from industrial research and development. Brookings papers on Economic Activity. 3: 783-820.

Lin, B.W. 2003. Technology transfer as technological learning: a source of competitive advantage for firms with limited R&D resources. R&D Management. 33:327-41.

Linder, J.C., Jarvenpaa, S.L. and Davenport, T.H. 2003. A little help from their friends. Accenture Outlook 2.

Lippman, S. and Rumelt, R. 1982. Uncertain immitability: an analysis of interfirm differences in efficiency under competition. Bell Journal of Economics. 13: 418-38.

Little, A.D. 2001. How your company can sustain growth and innovation while avoiding change fatigue. (2001). Prism (1): 5 – 14.

Littler, D., Leverick, F. and Bruce, M. 1995. Factors affecting the process of collaborative product development: a study of UK manufacturers of information and communications technology products. Journal of Prod. Innovation Management. 12:16-32.

Luhmann, N. 1988. Familiarity, confidence, trust: problems and alternatives. In: Gambetta, D. (ed.), Trust: making and breaking of cooperative relations. Third edition. Oxford: Blackwell. 94-107.

Lynch, R.P. 1990. Building alliances to penetrate European markets. Journal of Business Strategy. 11(2): 4-8.

Lyons, M.P. 1991. Joint ventures as strategic choice: a literature review. Long Range Planning. 24(4): 130-144.

Madhok, A. 1995. Revisiting multinational firms' tolerance for joint ventures: a trust-based approach. Journal of International Business Studies. 26: 117-137.

- Madhok, A. and Tallman, S.B. May/June 1998. Resources, transactions and rents: managing value through interfirm collaborative relationships. *Organization Science*. 9(3): 326-350.
- Malmberg, A. and Maskell, P. 1997. Towards an explanation of industry agglomeration and regional specialization. *European Planning Studies*. 5: 25-41.
- March, J. G. and Simon, H.A. 1958. Organizations. New York: Wiley.
- Markus, M.L. 2000. Towards a theory of IT-integrated risk control. In: Baskerville, R., Stage, J. and De Gross, J. (eds.), *Organizational and Social Perspectives on Information Technology*, Kluwer Academic Publishers, Amsterdam. 167-178.
- Marino, K.E. 1996. Developing consensus on firm competencies and capabilities. *Academy of Management Executive*. 10(3): 40-51.
- Mayer, R.C., Davis, H.H. and Schoorman, D.F. 1995. An integrative model of organisational trust. *Academy of Management Review*. 20(3): 709-734.
- Mauzy, J. 1993. Succeeding at Innovation. Cambridge, MA: Syntectics Corporation.
- McAllister, D.J. 1995. Affect- and cognition-based trust as foundations for interpersonal cooperation in organisations. *Academy of Management Journal*. 38(1): 24-59.
- McKelvey, B. and Aldrich, H.E. 1993. Populations, organizations, and applied organizational science. *Administrative Science Quarterly*. 28: 101-128.
- Menard, S. 1995. Applied logistic regression analysis. Sage university paper series on quantitative applications in the social sciences. Thousand Oaks, CA: Sage: 07-106.
- Miles, R.E., and Snow, C.C. 1986. Organizations: new concepts for new forms. *California Management Review*. 28(3): 62-73.
- Milliken, R.J. 1987. Three types of perceived uncertainty about the environment: state, effect, and response uncertainty. *Academy of Management Review*. 12: 133-143.

Minshall, T. Fraser, P. Valli, R. Probert, D. 2005. Resource-based view of partnerships between technology-based start-ups and established firms: a case study of Cambridge Display Technology (DCT). University of Cambridge Centre for Technology Management, Institute for Manufacturing, Cambridge, CB2 1R, UK.

Moon, J.L. and Khanna, T. 1995. Product market considerations in private equity sales. Working paper, Harvard Business School.

Moore, G.A. 1995. Inside the tornado. New York: HarperCollins.

Moore, G.A. 1999. Crossing the chasm. Revised edition. New York: HarperCollins.

Morgan, G. 1997. Images of organization. Thousand Oaks CA: Sage.

Morgan, J. and Cruz, C. 14 August 1997. When the giants downsize, small suppliers can get hurt. *Purchasing*. 123(2): 68-70.

Moss Kanter, R. and Corn, R.I. 1994. Do cultural differences make a business difference? Contextual factors affecting cross-cultural relationship success. *The Journal of Management Development*. 13: 5-23.

Mouton, J. 2001. How to succeed in your master's and doctoral studies. Pretoria: Van Schaik.

Mowery, D.C., Oxley, J.E., Silverman, B.S. 1996. Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal* 17:77-91.

Murray, A., and Siehl, C. 1989. Joint ventures and other alliances. Morristown, NJ: Financial Executive Research Foundation.

Nanda, A. 1996. Resources, capabilities and competencies, in: Edmondson, Moingeon (eds.), Organisational learning and competitive advantage. SAGE Publications Ltd., London. 93-120.

Nardeosingh, R. 2000. The role of small firms in the development of innovations: technological systems as intermediaries between markets and hierarchies. In *The 8<sup>th</sup>*

Annual International Conference on high-technology small firms: Vol. 1. (25 - 38). Enschede: Grafisch Centrum Twente.

Narula, R and Sadowski, B.M. 2002. Technological catch-up and strategic technology partnering in developing countries. International Journal of Technology Management, 23(6): 599-617.

National Small Business Act, 1996. Government Gazette, 27 November 1996, Act No. 102 (17612):20.

Nelson, R. and Winter, S. 1982. An evolutionary theory of economic change. Cambridge, MA: Harvard University Press.

Niosi, J. 2003. Alliances are not enough explaining rapid growth in biotechnology firms. Research Policy, 32: 737-750.

Nonaka, I. 1994. A dynamic theory of organization knowledge creation. Organization Science. (5): 14-37.

Nooteboom, B. 1996. Trust, opportunism and governance: a process and control model. Organization Studies. 17(6): 985-1010

Nooteboom, B. 1999. Inter-firm alliances, analysis and design. London: Routledge.

O'Dwyer, M. and O'Flynn, E. February 2005. MNC-SME strategic alliances – a model framing knowledge value as the primary predictor of governance modal choice. Journal of International Management. 1-20.

Oerlemans, L.A.G., Meeus, M.T.H., Boekema, F.W.M. March 2000. On the spatial embeddedness of innovation networks: an exploration of the proximity effect. Tijdschrift voor Economische en Sociale Geografie – 2001. 92 (1): 60 – 75.

Oerlemans, L., Meeus, M., and Boekema, F. 1998. Do networks matter for innovation? The usefulness of the economic network approach in analyzing innovation. Tijdschrift voor Economische en Sociale Geografie. 89: 298-309.

Oerlemans, L., Meeus, M., and Boekema, F. 2001. Firm clustering and innovation: determinants and effects. Papers in Regional Science 80. 337-356.

Oerlemans, LAG, Pretorius, MW, Buys, AJ and Rooks, G. 2003. SAIS 2001: industrial innovation in South Africa, 1998-2000, report on the South African Innovation Survey in the period 1998-2000.

Ohmae, K. 1989. The global logic of strategic alliances. Harvard Business Review. 67 (2): 143-154.

Okun, A. 1981. Prices and quantities. Washington, D.C.: Brookings.

Oliver, C. 1990. Determinants of interorganizational relationships: integration and future directions. Academy of Management Review, 15(2): 241-265.

O'Reilly, C.A. and Chatman, J.A. 1996. Culture as social control: corporations, cults and commitment. Research in Organizational behaviour. 18: 157:200

Osborn, R.N. and Baughn, C.C. 1990. Forms of interorganizational governance for multinational alliances. Academy of Management Journal. 33 (3): 503-519.

Oster, S.M. 1992. Modern competitive analysis. Second edition. New York: Oxford University Press.

Ouchi, W.G. Sept. 1979. A conceptual framework for the design of organizational control mechanism. Management Science. 25 (9): 833-848.

Oxley, J.E. 1997. Appropriability hazards and governance in strategic alliances: a transaction cost approach. Journal of Law, Economics and Organization. 13 (2): 387-409.

Park, S.H. and Russo, M.V. June 1996. When competition eclipses cooperation: an event history analysis of joint venture failure. Management Science. 42(6): 875-890.

Parker, H. 2000. Interfirm collaboration and the new product development process. Industrial Management and Data Systems. Wembley. 100(6): 255.

Parkhe, V. 1993. Strategic alliance structuring: a game theoretic and transaction cost examination of interfirm cooperation. Academy of Management Journal. 36: 794-829.

Pedersen, P.O. and McCormick, D.I. 1996. Small enterprises: flexibility and networking in an African Context. London: Longham.

Penrose, E.T. 1959. The theory of the growth of the firm. 3<sup>rd</sup> ed. 1995. New York: Oxford University Press.

Perry, L.T., Hansen, M.H. Reese, C.S., and Pesci, G. October 2005. Diversification and focus: a Bayesian application of the resource-based view. Schmalenbach Business Review. 57: 304-310.

Peteraf, M. 1993. The cornerstones of competitive advantage: a resource-based view. Strategic Management Journal. 14: 179-91.

Phillips, M.E. 1994. Industry mindsets: exploring the cultures of two macro-organizational settings. Organization Science. 5: 384-402.

Piore, M.J. and Sabel, C.F. 1984. The second industrial divide. New York: Basic Books.

Pisano, G.P. 1989. Using equity participation to support exchange: evidence from the biotechnology industry. Journal of Law, Economics and Organization. 5: 109-126.

Pisano, G. 1990. The governance of innovation: vertical integration and collaborative arrangements in the biotechnology industry. Research Policy. 20: 237-250.

Pisano, G.P., Russo, M.V. and Teece, D. 1988. Joint ventures and collaborative agreements in the telecommunications equipment industry. in Mowery, D. (ed.), International collaborative ventures in U.S. manufacturing. Cambridge, MA: Ballinger. 23-70.

Pistorius, C. 11-13 May 1998. Technological innovation: managing the dynamics of technological change. A short course presented by the Institute for Technological Innovation in the Faculty of Engineering at the University of Pretoria in co-operation with the laboratory for Advanced Engineering (Pty) Ltd.



Pfeffer, J., Salancik, G.R. & Leblebici, H. June 1976. The effect of uncertainty on the use of social influence in organizational decision making. Administrative Science Quarterly, 21:227-245.

Potter, D. July 2001. Growing a technology business. Physics World: 17-18.

Polanyi, M. 1966. The Tacit Dimension. London: Routledge & Kegan Paul.

Pondy, L.R. 1977. The other hand clapping: an information-processing approach to organizational power. in Hammer, T.H. and Bacharach, S.B. (eds.), Reward systems and power distribution in organizations: Ithaca, NY: Cornell University Press. 56-91.

Porter, M.E. 1987. From competitive advantage to corporate strategy. Harvard Business Rev. (65): 43-59.

Porter, M. 1998. The competitive advantage of nations. Hampshire: Macmillan Press Ltd.

Porter, M. August 2003. Global competitive strategy: affecting developing markets. Management Today: 14 – 16.

Porter, M.E. and Fuller, M. 1985. Competition in global industries. Boston, MA: HBS Press.

Porter, L.W. Lawler, E.E. and Hackman, J.R. 1975. Behaviour in organisations. New York: McGraw-Hill.

Powell, W.W. 1990. Neither market nor hierarchy: network forms of organization. in Staw, B.M. and Cummings, L.L. (eds.). Research in organizational behaviour. Greenwich, CT: JAI Press. 12: 295-336.

Powell, W.W. and Brantley, P. 1992. Competitive cooperation in biotechnology: learning through networks? In Nohria, N. and Eccles, R.G. (eds.), Networks and organizations: structure, form and action. Boston: Harvard Business School Press. 366-394.

Prahalad, C.K. and Hamel, G. May-June 1990. The core competence of the corporation. Harvard Business Review: 79-91.

Putnam, R.D., Leonardi, R. and Nanetti, R.Y. 1993. Making democracy work: civic traditions in modern Italy. Princeton University Press, Princeton, NJ.

Pyka, A. 2002. Innovation networks in economics: from the incentive-based to the knowledge-based approaches. European Journal of Innovation Management. 5(3): 152-163.

Radtke, M.L. 1987. The development in the United States of strategic partnering between large and small firms. Science parks and the growth of technology-based enterprises. United Kingdom Science Park Association: (95-100). Cardiff: CSP Economic Publications Ltd.

Rahman, N. September 2006. Duality of Alliance Performance. Journal of American Academy of Business, Cambridge. 10(1): 305-311.

Rech, L. October 2002. Legal due diligence. www.deneysreitz.co.za.

Reed, R. and DeFillipini, R.J. 1990. Causal ambiguity, barriers to imitation and sustainable competitive advantage. Academy of Management Review. 15: 88-102.

Ressler, T. 1996. Helping companies sell up or sell out. In S. Hayhow (Ed), A comprehensive guide to business incubation (271-276). Athens, Ohio: National Business Incubation Association.

Riedle, K. 1989. Demand for R&D activities and the trade-off between in-house and external research: a viewpoint from industry with reference to large companies and small and medium-sized enterprises. Technovation. 9: 213-225.

Ring, P.S. and Van de Ven, A.H. 1992. Structuring cooperative relationships between organizations. Strategic Management Journal. 13: 483-498.

Ring, P.S. and Van de Ven, A.H. 1994. Developmental processes of cooperative interorganizational relationships. Academy of Management Review. 19: 90-118.

Rip, A. and Groen, A.J. 2001. Many visible hands. In Coombs, R., Green, K. Walsh, V. and Richards, A. (eds.), Demands, Markets, Users and Innovation. Elgar, E.

Ritzer, G. 1996. The McDonaldization of Society. 2nd edition, CA: Pine Forge Press, Thousand Oaks.

Roberts EB. 1988. What we've learned, managing invention and innovation. Research/Technology Management. 31 (1):11-21.

Robertson, P.L. and Langlois, R.N. 1995. Innovation, networks, and vertical integration. Research Policy. 24: 543-562.

Romanowska, E. April 2001. Relationships between core competence, skills and capabilities: a consistent hierarchical framework to clarify terminology. (Unpublished)

Rothwell, R. 1991. External networking and innovation in small and medium-sized manufacturing firms in Europe. Technovation. 11(2): 93-112.

Rothwell, R. and Zegveld, W. 1982. Innovation and the small and medium-sized firm. London: Pinter Publications.

Rothwell, R. 1994. Industrial innovation: success, strategy, trends. in Dodgson, M. and Rothwell, R. (eds.), The Handbook of Industrial Innovation. Edward Elgar, Cheltenham.

Sahal, D. 1977. The Multidimensional Diffusion of Technology. Technological Forecasting and Social Change (10): 277 – 298.

Santarelli, E., Sterlacchini, AI, 1990. Innovation, formal vs informal R&D, and firm size: some evidence from Italian manufacturing firms. Small Business Economics 2: 223-228.

Saxenian, A. 1994. Regional advantage: culture and competition in Silicon Valley and Route 128. Cambridge, MA: Harvard University Press.

Saxton, T. 1997. The effects of partner and relationship characteristics on alliance outcomes. Academy of Management Journal. 40: 443-461

Scarborough, H., Swan, J. and Preston, J. 1999. Knowledge management – a literature review. Institute of Personnel and Development, London.

Schramm, W. Dec 1971. Notes on case studies of instructional media projects. Working paper for the Academy for Educational Development. Washington, DC.

Schramm, C.F. July/August 2004. Building entrepreneurial economies. Foreign Affairs (83) 4:104-115.

Schumpeter, J.A. 1934. The theory of economic development. Cambridge, MA: Harvard University Press.

Schumpeter, J.A. 1943. Capitalism, socialism and democracy. London. George Allen & Unwin Ltd.

Selznick, P.I. 1957. Leadership in administration. New York: Harper and Row.

Shimshoni, D. 1970. The mobile scientist in the American instrument industry. Minera (8) 1: 59-89.

Shan, W., Walker, G., and Kogut, B. 1994. Interfirm cooperation and startup innovation in the biotechnology industry. Strategic Management Journal. 15: 387-394.

Simonin, B.L. 1999. Ambiguity and the process of knowledge transfer in strategic alliances. Strategic Management Journal. 20: 595-623.

Simons, R. 1996. Levers of control: how managers use innovative control systems to drive strategic renewal. Boston, MA: Harvard Business School Press.

Sriram, R., Snaddon, D.R., 2004. Linking technology management, transaction processes and governance structures. Technovation 24:779-791.

Sitkin, S.B. and Stickel, D. 1996. The road to hell: the dynamics of distrust in an era of quality. In, Kramer, R.M. and Tyler, T.R. (eds.), Trust in organizations: frontiers of theory and research. CA: Thousand Oaks, Sage. 196-215.

Slowinski, G. Seelig, G. Hull, F. Spring 1996. Managing technology-based strategic alliances between large and small firms. S.A.M. Advanced Management Journal. 61(2):42-47.

Snow, C.C., Miles, R.E. and Coleman, H.J. Jr. 1992. Managing 21<sup>st</sup> century network organizations. Organizational Dynamics. 20(3): 5-20.

Sohn, J.H.D. 1994. Social knowledge as a control system: a proposition and evidence from the Japanese FDI behaviour. Journal of International Business Studies. 25: 295-324.

South Africa's National Research and Development Strategy. August 2002. Department of Science and Technology. The Government of the Republic of South Africa.

Stalk, G., Evans, P., and Shulman, L.E. March-April 1992. Competing on capabilities: the new rules of corporate strategy. Harvard Business Review. 70: 57-89.

Stein, T. May 2002. Titanic failures. Red Herring: 59-61.

Sternberg, R. and Tamasy, C. 1999. Munich as Germany's no. 1 high technology region: empirical evidence, theoretical explanations and the role of small firm/large firm relationships. Regional Studies. 33 (4) 367-377.

Szulanski, G. 1996. Exploring internal stickiness: impediments to the transfer of best practice within the firm. Strategic Management Journal. 17: 27-43.

Takeuchi, H., and Nonaka, I. 2004. Hitotsubashi on Knowledge Management. Singapore: John Wiley & Sons (Asia) Pty Ltd.

Teece, D.J. 1980. Economies of scope and the scope of the enterprise. Journal of Economic Behavior and Organization. 1: 223-247.

Teece, D. 1986. Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. Research Policy. 15:285-305.

Teece, D. 1987. Profiting from technological innovation: implications for integration, collaboration, licensing and public policy”, in Teece, D. (ed.), The competitive challenge, Ballinger Publishing, Cambridge, MA. 185-219.

Teece, D.J. May 1990. Competition, cooperation, and innovation. Organizational arrangements for regimes of rapid technological progress. Journal of Economic Behavior and Organization. 18: 1-25.

Teece, D.J. 1992. Competition, cooperation, and innovation. Journal of Economic Behavior and organization. 18: 1-25.

Teece, D.J., Pisano, G. and Shuen, A. 1990. Firm capabilities, resources, and the concept of strategy. Working Paper 90-99. Center for Research in Management, University of California at Berkeley.

Thiart, C., Bonham-Carter, G.F., Agterberg F.P., Cheng, Q. and Panahi A. 2004. An Application of the New Omnibus Test for Conditional Independence in Weights-of-evidence Modeling. In, Harris, J. (ed.), Special Volume on GIS Applications in the Earth Sciences, Geological Association of Canada. 131-141

Timm, S. and Terblanche, B. November 2005. David and Goliath battle proves too much, as Foot bails out. BigNews. Pietermaritzburg: The Natal Witness Printing and Publishing Company (Pty) Ltd.

Tidd, J., Bessant, J., and Pavitt, K. 2001. Managing Innovation. Integrating technological, market and organizational change. 2<sup>nd</sup> ed. New York: John Wiley & Sons, Ltd.

Timmons, J.A. 1998. America's entrepreneurial revolution: the demise of Brontosaurus capitalism. Babson College, F.W. Olin Graduate School of Business.

Toffler, A. 1981. The Third Wave. First edition. Pan Books Ltd. London SW10 9PG: Cavaye Place.

Tracey, P. and Clark, G.L. Winter 2003. Alliances, networks and competitive strategy: rethinking clusters of innovation. Growth and Change. 34(1): 1-16.

Utterback, J.M. 1993. Mastering the dynamics of innovation. Boston: Harvard Business School Press.

Uzzi, B. 1996. The sources and consequences of embeddedness for the economic performance of organizations: the network effect. American Sociological Review. 61: 674-698.

Uzzi, B. 1997. Social structure and competition in interfirm networks: the paradox of embeddedness. Administrative Science Quarterly. 42: 35-67.

Van de Ven, A.H. 1976. On the nature, formation and maintenance of relations among organizations. Academy of Management Review. 1: 24-36.

Van de Ven, A.H. May 1986. Central problems in the management of innovation. Management Science: 590-601.

Van de Ven, A.H., Polley, D.E., Garud, R. and Venkataraman, S. 1999. The innovation journey. New York, NY: Oxford University Press.

Van Maanen, J. and Schein, E.H. 1979. Towards a theory of organizational socialization. Research in Organizational Behavior. 1: 209-264.

Wernerfelt, B. 1984. A resource-based view of the firm. Strategic Management Journal. 5: 171-180.

Whitley, R. 2002. Developing innovative competences: the role of institutional frameworks. Industrial and Corporate Change. 11(3): 497-528.

Williamson, O. 1975. Markets and hierarchies: antitrust analysis and implications. New York, NY: The Free Press.

Williamson, O. 1985. The economic institutions of capitalism. New York, NY: The Free Press.

Williamson, E.E. 1991. Comparative economic organization: the analysis of discrete structural alternatives. Administrative Science Quarterly. 36:269-296.

Williamson, O.E. 1994. Transaction cost economics and organization theory. In, Smelser, N.J. and Swedberg, R. (eds.), The handbook of economic sociology: Princeton, NJ: Princeton University Press. 77 – 107.

Winter, S. 1964. Economic “natural selection” and the theory of the firm. Yale Economic Essays. 4: 225-272.

Yin, R.K. 2003. Case study research design and methods. Applied Social Research Methods Series Volume 5. Third edition. London: Sage Publications

Zaheer, A. and Venkatraman, N. 1995. Relational governance as an interorganisational strategy. An empirical test of the role of trust in economic exchange. Strategic Management Journal. 16: 373-392.

Zajac, E.J. and Olsen, C.P. Jan 1993. From transaction cost to transactional value analysis: implications for the study of interorganizational strategies. The Journal of Management Studies. Oxford. 30, Iss. 1: 131-146.

Zucker, L.G.I., Darby, M.R., and Armstrong, J. 1998a. Geographically localised knowledge: spillovers or markets? Economic Inquiry. 36: 65-86.

Zucker, L.G., Darby, M.R., and Brewer, M. 1998b. Intellectual human capital and the birth of US biotechnology enterprises. American Economic Review. 88: 290-306.



**APPENDIX 1**  
**SURVEY FOR SMALL AND MEDIUM SIZED**  
**ENTERPRISES (SMEs)**

## Tactics for small or medium sized enterprises (SMEs) in the technologically innovative sector, that will constrain opportunistic behaviour by large companies in a merger/sell-out

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**This information will be treated as confidential.**

### SURVEY FOR SMALL AND MEDIUM SIZED ENTERPRISES (SMEs)

#### PERSONAL PARTICULARS

1) Title, Name and Surname:				
2) Name of company:				
3) Your job title or position (e.g., Managing Director, Financial Director, Technical Manager, etc.)				
4) Office Telephone: (including area code)				
5) Approximate number of full time employees in your firm on 31 March 2003 (please select only one answer):				
1 ≤5	2 ≤20	3 ≤40	4 ≤200	5 > 200
6) Annual turnover of your firm on 31 March 2003 (please select only one answer):				
1 ≤R0,15 million	2 ≤R4 million	3 ≤R10 million	4 ≤R40 million	5 >R40 million

For Office Use
Respondent no:
V1 <input type="text"/> <input type="text"/> <input type="text"/> 1-3
V2 <input type="text"/> <input type="text"/> <input type="text"/> 4-6
V3 <input type="text"/> <input type="text"/> 7-8
V4 <input type="text"/> 9
V5 <input type="text"/> 10

7) Total gross asset value (excluding fixed property) (please select only one answer):					<b>For Office Use</b>  V6 <input type="checkbox"/> 11  V7 <input type="checkbox"/> 12
1 ≤R0,10 million	2 ≤R1,5 million	3 ≤R3,75 million	4 ≤R15 million	5 >R15 million	
8) Are you a local subsidiary of a foreign company?				<b>Yes</b> (1)	

**CHECK POINT 1:** Should your company comply with at least two of the below-mentioned criteria (i.e. you are a large company), please do not fill in any further details, but return this questionnaire to us

1. more than 200 employees
2. an annual turnover of more than R40 million
3. total gross asset value of more than R15 million

**Definitions:-**

(a) **Industrial Cluster:** groups of companies (eg. multiple suppliers and institutions) from a specific industrial sector

(b) **Intellectual Property (IP):** IP entails ownership of at least one of the following:

- Patents
- Software
- New products
- New processes

(c) **Innovation:** a new or greatly improved product/service/process introduced to the market, or the introduction within your organisation of a new or greatly improved product/service/process. The innovation is a result of new technological developments, new combinations of existing technology or utilisation of knowledge acquired by your company.

(d) **Joint Venture (JV):** A partnership between two or more companies where there is shared ownership of the new entity, substantial sharing of resources and long term commitment.

(e) **Large Company (LCO):** As per the National Small Business Act, 1996, a LCO is defined as having more than 200 full-time employees, an annual turnover in excess of R40 million, and total gross assets – excluding fixed property, of over R15 million (see definition below).

(f) **Small and medium size enterprise (SME):** As per the National Small Business Act, 1996, an SME is defined as having 200 or fewer full-time employees, an annual turnover of R40 million or less, and total gross assets – excluding fixed property, of R15 million or less (see definition below).

Size	Full-time employees	Annual Turnover	Total gross asset value (fixed property excluded)
Medium	200	R40 million	R 15 million
Small	40	R10 million	R 3,75 million
Very small	20	R 4 million	R 1,5 million
Micro	5	R150 000	R100 000

All the questions below require a yes (1) or no (2) response:-

	Yes (1)	No (2)
A. Has your company developed proprietary information during the period 1995 – 2003? (This intellectual property may include patents, software, new products and/or new processes.)	1	2
B. If yes, has this intellectual property (IP) been patented?	1	2
If you did register at least one patent, please indicate for each year, the number of patents that were registered:		
1995: number of patents.....		
1996: number of patents.....		
1997: number of patents.....		
1998: number of patents.....		
1999: number of patents.....		
2000: number of patents.....		
2001: number of patents.....		
2002: number of patents.....		
2003: number of patents.....		
	Yes (1)	No (2)
C. If you did register at least one patent, your reasons for patenting are because you (more than one answer possible):		:
1) Wish to commercialise the patent	1	2
2) Wish to retain your option to commercialise the patent	1	2
3) Wish to extend the coverage of a particular patent	1	2
4) Wish to prevent a competitor from developing this technology	1	2
5) Wish to sell the patent	1	2
6) Other reasons (specify)		

For Office Use

V8   13

V9   14

V10   15-16

V11   17-18

V12   19-20

V13   21-22

V14   23-24

V15   25-26

V16   27-28

V17   29-30

V18   31-32

V19   33

V20   34

V21   35

V22   36

V23   37

V24   38-39

V25   40-41

V26   42-43

V27   44-45

V28   46-47

	Yes (1)	No (2)	
<b>D. If you did NOT register a patent, WHY not (more than one answer possible) ?</b>			
1) Desire to keep the intellectual property confidential	1	2	
2) Patenting is not worth the investment / time spent	1	2	
3) Indecision by company to patent or not	1	2	
4) Patenting was unaffordable	1	2	
5) Insufficient resources to defend the patent	1	2	
6) Other reasons (please specify)			
	Yes (1)	No (2)	
<b>E. Have you during the period 1990 – 2003 cooperated and/or partnered with a large company (LCO)?</b>			
<b>If yes, on what basis? (If no, go to question F)</b>			
1) Joint venture (A partnership between two or more companies where there is shared ownership of the new entity, substantial sharing of resources and long term commitment)	1	2	
2) Technology development sub-contract	1	2	
3) Licensing	1	2	
4) Beta test site	1	2	
5) Distribution agreement	1	2	
6) Assembly agreement	1	2	
7) A joint project	1	2	
8) Other type of cooperation (please specify)			
<b>F. Have you, during the period 1990 – 2003, been acquired or been partially acquired by a large company (LCO)?</b>			
Specify the shareholding percentage the LCO acquired (where 0% will indicate that you have <i>not</i> sold any shares to a LCO):			
1) 0%	1	2	
2) 1-25%	1	2	
3) 26-50%	1	2	
4) 51-99%	1	2	
5) 100%	1	2	
	Yes (1)	No (2)	Number of LCOs acquiring this percentage of shareholding

**For Office Use**

V29  48

V30  49

V31  50

V32  51

V33  52

V34   53-54

V35   55-56

V36   57-58

V37   59-60

V38  61

V39  62

V40  63

V41  64

V42  65

V43  66

V44  67

V45  68

V46   69-70

V47   71-72

V48   73-74

V49   75-76

V50  V51   77-79

V52  V53   80-82

V54  V55   83-85

V56  V57   86-88

V58  V59   89-91

**Check point 2: Should you not have been in a partnership with a large company as per questions E and/or F above, please do not complete the remaining questions.**

**For the remaining questions, if you have been in more than one partnership arrangement, please relate the remaining questions to the MOST IMPORTANT partnership, and please indicate below which type it was (i.e. your selection in E):**

.....

	Successful (1)	Not successful (2)	Partially Successful (3)
G. Did your company perceive the partnership/acquisition to be a success?	1	2	3
H. What were the main reasons for the partnership being successful/unsuccessful/partially successful? (please specify)			
I. Did you use quantitative measures to determine whether the partnership was successful/unsuccessful/partially successful? If yes, please specify the type of measure used (e.g. increased profitability).			
J. Was your technological offering complementary to the LCO's core business?	(Yes) 1	(No) 2	
K. What was your level of trust in the large company prior to the partnership?	(1) High	(2) Low	(3) Medium
L. What was your level of trust in the large company with whom you partnered after the partnership?	(1) High	(2) Low	(3) Medium
M. Would you consider partnering with this large company again?	(Yes) 1	(No) 2	
Why? (please specify)			

**For Office Use**

- V60   92
- V61   93-94
- V62   95-96
- V63   97-98
- V64   99-100
- V65   101-102
- V66   103-104
- V67   105-106
- V68   107-108
- V69   109-110
- V70   111-112
- V71   113
- V72   114
- V73   115
- V74   116
- V75   117-118
- V76   119-120
- V77   121-122
- V78   123-124
- V79   125-126

N. What do you believe were the MAIN REASONS FOR THE LARGE COMPANY TO PARTNER WITH YOU (consider list of reasons below, please mark yes (1) / no (2))?  Please also indicate whether their initial expectations later proved to be correct (1) or incorrect (2)	Reason		Expectation			For Office Use
	Yes (1)	No (2)	Correct (1)	Incorrect (2)	Do not know (0)	
1) To acquire the brand	1	2	1	2	0	V80 <input type="checkbox"/> V81 <input type="checkbox"/> 127-128
2) To acquire the expertise	1	2	1	2	0	V82 <input type="checkbox"/> V83 <input type="checkbox"/> 129-130
3) To acquire the patent	1	2	1	2	0	V84 <input type="checkbox"/> V85 <input type="checkbox"/> 131-132
4) To access a source of innovation	1	1	1	1	0	V86 <input type="checkbox"/> V87 <input type="checkbox"/> 133-134
4) To acquire the technology	1	2	1	2	0	V88 <input type="checkbox"/> V89 <input type="checkbox"/> 135-136
5) To acquire the product	1	2	1	2	0	V90 <input type="checkbox"/> V91 <input type="checkbox"/> 137-138
6) To access new market segments	1	2	1	2	0	V92 <input type="checkbox"/> V93 <input type="checkbox"/> 139-140
7) To access your network and relationships	1	2	1	2	0	V94 <input type="checkbox"/> V95 <input type="checkbox"/> 141-142
8) To acquire your assets	1	2	1	2	0	V96 <input type="checkbox"/> V97 <input type="checkbox"/> 143-144
9) To take advantage of financial synergies e.g. high growth potential of the SME, but cash strapped	1	2	1	2	0	V98 <input type="checkbox"/> V99 <input type="checkbox"/> 145-146
10) To downsize the company by outsourcing	1	2	1	2	0	V100 <input type="checkbox"/> V101 <input type="checkbox"/> 147-148
11) To challenge and change the dominant logic of the large company	1	2	1	2	0	V102 <input type="checkbox"/> V103 <input type="checkbox"/> 149-150
12) To increase sales	1	2	1	2	0	V104 <input type="checkbox"/> V105 <input type="checkbox"/> 151-152
13) To pursue market dominance	1	2	1	2	0	V106 <input type="checkbox"/> V107 <input type="checkbox"/> 153-154
14) To acquire a competitor	1	2	1	2	0	V108 <input type="checkbox"/> V109 <input type="checkbox"/> 155-156
15) To create a barrier to entry	1	2	1	2	0	V110 <input type="checkbox"/> V111 <input type="checkbox"/> 157-158
16) Not to miss a trend, which could result in falling behind other competitors	1	2	1	2	0	V112 <input type="checkbox"/> V113 <input type="checkbox"/> 159-160
17) To benefit from your company's black economic empowerment initiatives	1	2	1	2	0	V114 <input type="checkbox"/> V115 <input type="checkbox"/> 161-162
18) To form a technological alliance with a view to an eventual acquisition	1	2	1	2	0	V116 <input type="checkbox"/> V117 <input type="checkbox"/> 163-164
19) To protect own brand	1	2	1	2	0	V118 <input type="checkbox"/> V119 <input type="checkbox"/> 165-166
20) To develop a <u>shallow</u> relationship (i.e. buy a non-controllable share and/or get a seat on the Board, and/or create an option to buy remainder of equity)	1	2	1	2	0	V120 <input type="checkbox"/> V121 <input type="checkbox"/> 167-168
21) To develop a <u>deep</u> relationship with many co-operative activities (viz: cross ownership with reciprocal positions on the Boards of Directors, equally balanced joint ventures, multiple smaller projects that do not involve equity positions)	1	2	1	2	0	V122 <input type="checkbox"/> V123 <input type="checkbox"/> 169-170

	Yes (1)	No (2)	Correct (1)	Incorrect (2)	Do not know (0)
22) To develop a 'quick win' that has a high probability of success and will probably produce an immediate pay-off	1	2	1	2	0
23) To satisfy managerial motives such as:					
(1) Marketing economies of scale	1	2	1	2	0
(2) Increasing profitability	1	2	1	2	0
(3) Spreading of risk factors	1	2	1	2	0
(4) Reducing costs	1	2	1	2	0
(5) Technical economies of scale	1	2	1	2	0
(6) Recognition of management expertise for proposing cooperation	1	2	1	2	0
24. Other reasons (specify)					
	Yes (1)	No (2)	Do not know (0)		
O. Did the large company (LCO) have a technology strategy?	1	2	0		
P. If "yes", did it's technology strategy:	1	2	0		
1) explain or specify how each technology should be used for competitive advantage?					
2) specify whether certain technology should be developed in-house?	1	2	0		
3) specify whether a given technology should preferably be procured from a foreign (i.e. non-South African) country?	1	2	0		
4) specify who, in the company, was responsible for technology management decisions?	1	2	0		
Q. Does your large company partner source innovative technologies from:					
1) SMEs specifically?	1	2	0		
2) LCOs specifically?	1	2	0		
3) Research institutions specifically?	1	2	0		
4) A combination of the above	1	2	0		

For Office Use

V124  V125  171-172

V126  V127  173-174

V128  V129  175-176

V130  V131  177-178

V132  V133  179-180

V134  V135  181-182

V136  V137  183-184

V138   185-186

V139   187-188

V140   189-190

V141   191-192

V142   193-194

V143  195

V144  196

V145  197

V146  198

V147  199

V148  200

V149  201

V150  202

V151  203



5) Other sources (please specify)				<b>For office use</b>			
				V152	<input type="checkbox"/>	<input type="checkbox"/>	204-205
				V153	<input type="checkbox"/>	<input type="checkbox"/>	206-207
				V154	<input type="checkbox"/>	<input type="checkbox"/>	208-209
				V155	<input type="checkbox"/>	<input type="checkbox"/>	210-211
				V156	<input type="checkbox"/>	<input type="checkbox"/>	212-213
6) If yes to one of the above, why? (please specify)				V157	<input type="checkbox"/>	<input type="checkbox"/>	214-215
				V158	<input type="checkbox"/>	<input type="checkbox"/>	216-217
				V159	<input type="checkbox"/>	<input type="checkbox"/>	218-219
				V160	<input type="checkbox"/>	<input type="checkbox"/>	220-221
				V161	<input type="checkbox"/>	<input type="checkbox"/>	222-223
					<b>Yes</b>	<b>No</b>	
					<b>(1)</b>	<b>(2)</b>	
R. Did your large company partner task one of its employees to be the interface/champion between them and your company?				1	1	2	V162 <input type="checkbox"/> 224
1. Was a representative from the LCO the project champion?				1	1	2	V163 <input type="checkbox"/> 225
2. Was a representative from your company the project champion?				1	1	2	V164 <input type="checkbox"/> 226
S. Were you aware of the internal politics of your large company partner?				1	1	2	V165 <input type="checkbox"/> 227
T. Did you have an adequate understanding of the strengths and weaknesses of your large company partner?				1	1	2	V166 <input type="checkbox"/> 228
1. Was your offering complementary to the LCOs SWOT?				1	1	2	V167 <input type="checkbox"/> 229
U. When sourcing innovative technologies, your large company partner sources:				<b>Yes</b>	<b>No</b>	<b>Do Not Know</b>	
				<b>(1)</b>	<b>(2)</b>	<b>(0)</b>	
1) disruptive technology i.e. technology that will radically change the way you do business				1	2	0	V168 <input type="checkbox"/> 230
2) incremental technology i.e. technology that will result in improved processes and/or products				1	2	0	V169 <input type="checkbox"/> 231
V. Is the sectoral environment in which your company operates one of:							
1) occasional changes which the company manages (incremental innovation)				1	2	0	V170 <input type="checkbox"/> 232
2) occasionally dealing with a once-off change (spasmodic innovation)				1	2	0	V171 <input type="checkbox"/> 233
3) frequent change of a recurring nature (repetitive innovation)				1	2	0	V172 <input type="checkbox"/> 234
4) fast & furious changes coming from all directions (incessant innovation)				1	2	0	V173 <input type="checkbox"/> 235

	Yes (1)	No (2)	Do Not Know (0)	For Office Use
<b>W. When sourcing a technology, the preferred strategy of your large company partner is:</b>				
1) To wholly acquire the technology	1	2	0	V174 <input type="checkbox"/> 236
2) To enter into one of the following partnership arrangements with an SME:				
2.1) A joint venture (A partnership between two or more companies where there is shared ownership of the new entity, substantial sharing of resources and long term commitment)	1	2	0	V175 <input type="checkbox"/> 237
2.2) A license	1	2	0	V176 <input type="checkbox"/> 238
2.3) Becoming a "reseller of the technology"	1	2	0	V177 <input type="checkbox"/> 239
3) To enter into one of the following partnership arrangements with a large company:				
3.1) A joint venture	1	2	0	V178 <input type="checkbox"/> 240
3.2) A license	1	2	0	V179 <input type="checkbox"/> 241
3.3) Becoming a "reseller of the technology"	1	2	0	V180 <input type="checkbox"/> 242
3.4) Other methods of sourcing (please specify)				V181 <input type="checkbox"/> <input type="checkbox"/> 243-244 V182 <input type="checkbox"/> <input type="checkbox"/> 245-246 V183 <input type="checkbox"/> <input type="checkbox"/> 247-248 V184 <input type="checkbox"/> <input type="checkbox"/> 249-250 V185 <input type="checkbox"/> <input type="checkbox"/> 251-252
	Yes (1)	No (2)		
<b>X. Do you have a documented process for monitoring:</b>				
1) Quality control of your products?	1	2		V186 <input type="checkbox"/> 253
2) Reliable delivery?	1	2		V187 <input type="checkbox"/> 254
3) Reliable product support ?	1	2		V188 <input type="checkbox"/> 255
<b>Y. Do you segment your potential market using, inter alia, the following categories of potential clients: early innovators, early adopters, early majority, late majority, and laggards?</b>	1	2		V189 <input type="checkbox"/> 256
<b>Z. Is the worth of your company based on:</b>				
1) your sales turnover?	1	2		V190 <input type="checkbox"/> 257
2) your number of customers?	1	2		V191 <input type="checkbox"/> 258
3) an analysis of your financial statements (ratios, profitability, etc)?	1	2		V192 <input type="checkbox"/> 259

	Yes (1)	No (2)	For Office Use	
4) a high customer:sales ratio	1	2	V193	<input type="text"/> <input type="text"/> 260
5) the longevity of your average customer account?	1	2	V194	<input type="text"/> <input type="text"/> 261
6) your reputation in the market place?	1	2	V195	<input type="text"/> <input type="text"/> 262
7) projected growth of profits?	1	2	V196	<input type="text"/> <input type="text"/> 263
5) Other (please specify)			V197	<input type="text"/> <input type="text"/> 264-265
			V198	<input type="text"/> <input type="text"/> 266-267
			V199	<input type="text"/> <input type="text"/> 268-269
			V200	<input type="text"/> <input type="text"/> 270-271
			V201	<input type="text"/> <input type="text"/> 272-273
<b>ZA. Do you think that the large company gathered information on your company by:</b>				
1) Scanning relevant technological magazines?	1	2	V202	<input type="text"/> <input type="text"/> 274
2) Formal business appointment(s) with the owner(s) and/or staff of your company?	1	2	V203	<input type="text"/> <input type="text"/> 275
3) Informal meetings/lunches with the owner(s) and/or staff of your company?	1	2	V204	<input type="text"/> <input type="text"/> 276
4) Word of mouth?	1	2	V205	<input type="text"/> <input type="text"/> 277
5) Relationship building at networking event(s)?	1	2	V206	<input type="text"/> <input type="text"/> 278
5) Other methods (please specify)			V207	<input type="text"/> <input type="text"/> 279-280
			V208	<input type="text"/> <input type="text"/> 281-282
			V209	<input type="text"/> <input type="text"/> 283-284
			V210	<input type="text"/> <input type="text"/> 285-286
			V211	<input type="text"/> <input type="text"/> 287-288
<b>ZB. What was the main motivation for your company to partner with the large company?</b>				
<b>Did this prove to be correct (1) or incorrect (2)</b>	<b>Yes (1)</b>	<b>No (2)</b>	<b>Correct (1)</b>	<b>Incorrect (2)</b>
1) Gaining access to new markets or larger share of current market	1	2	2	2
2) Improving/adding to your management skills	1	2	1	2
3) Easing pressure from investors	1	2	1	2
4) Obtaining financial support	1	2	1	2
5) Optimising entrepreneurship value ("cashing in")	1	2	1	2
6) "Piggy backing" on the LCO's technical infrastructure and expertise	1	2	1	2
			V212	<input type="text"/> <input type="text"/> 289-290
			V213	<input type="text"/> <input type="text"/> 291-292
			V214	<input type="text"/> <input type="text"/> 293-294
			V215	<input type="text"/> <input type="text"/> 295-296
			V216	<input type="text"/> <input type="text"/> 297-298
			V217	<input type="text"/> <input type="text"/> 299-300
			V218	<input type="text"/> <input type="text"/> 301-302

	Yes (1)	No (2)	Correct (1)	(1)Correct (2)
8) Your company had moved into a mature phase and no longer provided challenges for management	1	2	1	2
9) Other reasons (please specify)				
			Yes (1)	No (2)
ZD. Can you quantify the approximate cost for the large company to switch to/acquire your technology?	1	2		
ZE. Is the cost influenced by?				
1) Equipment being made obsolete	1	2		
2) Acquisition and/or development of new equipment and/or systems	1	2		
3) Staff retrenchment	1	2		
4) Cost of employing new staff and new competencies	1	2		
5) The loss of customers	1	2		
ZF. As part of the negotiation process, did you, with your partnering large company:				
1) Establish a long-term strategic intent?	1	2		
2) Develop a short-term joint intent?	1	2		
3) Identify and create project teams?	1	2		
4) Widely communicate the joint intent?	1	2		
5) Obtain stakeholder support?	1	2		
6) Establish an implementation plan?	1	2		
7) Develop an exit strategy for the SME?	1	2		
ZG. During negotiations with the large company, was a substantial equity stake in your company held by:				
1) A venture capital company	1	2		
2) Another company viz: a) Another SME	1	2		
b) A large company (more than 200 employees, with a turnover exceeding R40 million)	1	2		
3) An angel investor (a high net worth individual who takes equity in exchange for investing in the company)	1	2		

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V219  303

V220   304-305

V221   306-307

V222   308-309

V223   310-311

V224   312-313

V225  314

V226  315

V227  316

V228  317

V229  318

V230  319

V231  320

V232  321

V233  322

V234  323

V235  324

V236  325

V237  326

V238  327

V239  328

V240  329

V241  330

	Yes (1)	No (2)
4) An incubator (a facility offering shared facilities and mentorship to start-up companies)	1	2
5) A bank	1	2
Other (please specify)		
ZH. Are you recognized as an important player in your industrial cluster?	1	2
ZI. Did any key strategic individuals in your company leave within a 12 month period of the partnership with the large company?	1	2
1) If "yes", did they leave because of cultural differences?	1	2
2) If they left, did this create a problematic capacity gap?	1	2
ZJ. Is your company dependant on complementary assets of the large company partner (such as new product development, branding, expertise, etc)?	1	2
ZK. Is the large company partner dependent on the complementary assets of your company?	1	2
ZL. Did (or would) one of the below-mentioned factors <b>strengthen (1) or weaken (2)</b> your position when negotiating with the LCO?		
1) a substantial equity stake in your company was held by another company/investor	1	2
2) you are an important player in your industrial cluster	1	2
3) your company is dependent on the complementary assets of the large company	1	2
If yes, why? (please specify)		
ZM. Please list the main core values to which your large company partner ascribes:		

For Office Use	
V242	<input type="checkbox"/> 331
V243	<input type="checkbox"/> 332
V244	<input type="checkbox"/> 333
V245	<input type="checkbox"/> 334
V246	<input type="checkbox"/> 335
V247	<input type="checkbox"/> 336
V248	<input type="checkbox"/> 337
V249	<input type="checkbox"/> 338
V250	<input type="checkbox"/> 339
V251	<input type="checkbox"/> 340
V252	<input type="checkbox"/> 341
V253	<input type="checkbox"/> 342
V254	<input type="checkbox"/> 343
V255	<input type="checkbox"/> 344
V256	<input type="checkbox"/> 345
V257	<input type="checkbox"/> <input type="checkbox"/> 346-347
V258	<input type="checkbox"/> <input type="checkbox"/> 348-349
V259	<input type="checkbox"/> <input type="checkbox"/> 350-351
V260	<input type="checkbox"/> <input type="checkbox"/> 352-353
V261	<input type="checkbox"/> <input type="checkbox"/> 354-355
V262	<input type="checkbox"/> <input type="checkbox"/> 356-357
V263	<input type="checkbox"/> <input type="checkbox"/> 358-359
V264	<input type="checkbox"/> <input type="checkbox"/> 360-361
V265	<input type="checkbox"/> <input type="checkbox"/> 362-363
V266	<input type="checkbox"/> <input type="checkbox"/> 364-365

	Yes (1)	No (2)
ZN. Would you describe your large company partner as being an opportunistic company viz: seeking self-interest with guile?	1	2
ZO. What evidence would you look for to conclude whether the LCO was an opportunistic company?		
ZP. Was your large company partner a South African company?	1	2
ZQ. In your opinion, which tactics should be avoided by large companies to ensure a successful partnership?		
ZR. Please list the main core values to which your company ascribes.		

For Office Use
V267 <input type="checkbox"/> 366
V268 <input type="checkbox"/> <input type="checkbox"/> 367-368
V269 <input type="checkbox"/> <input type="checkbox"/> 369-370
V270 <input type="checkbox"/> <input type="checkbox"/> 371-372
V271 <input type="checkbox"/> <input type="checkbox"/> 373-374
V272 <input type="checkbox"/> <input type="checkbox"/> 375-376
V273 <input type="checkbox"/> 377
V274 <input type="checkbox"/> <input type="checkbox"/> 378-379
V275 <input type="checkbox"/> <input type="checkbox"/> 380-381
V276 <input type="checkbox"/> <input type="checkbox"/> 382-383
V277 <input type="checkbox"/> <input type="checkbox"/> 384-385
V278 <input type="checkbox"/> <input type="checkbox"/> 386-387
V279 <input type="checkbox"/> <input type="checkbox"/> 388-389
V280 <input type="checkbox"/> <input type="checkbox"/> 390-391
V281 <input type="checkbox"/> <input type="checkbox"/> 392-393
V282 <input type="checkbox"/> <input type="checkbox"/> 394-395
V283 <input type="checkbox"/> <input type="checkbox"/> 396-397

**Thank you for your assistance in completing this questionnaire.**

## Appendix 2

### Transcripts from the case study interviews

SME1 was founded in January 2000, the original team comprised the CEO (who had a PhD in electronic engineering), the Chief Technical Officer (who had an MSc in electronic engineering) and three technical persons (one had an MSc in electronic engineering, the second had a BEng and was studying towards an honours in electronic engineering, and a third was studying towards a Masters in electronic engineering). As at June 2005 SME1 had grown to 6 full-time employees and a turnover of  $\leq$  R 4 million. SME1 specialises in innovative product development for information and communication security solutions, with a current focus on applications utilising technologies at the convergence between mobile (GSM) and conventional data networks (the Internet). An example of a recent product it developed is “Cell Power”. Cell Power is a prepaid electricity vending solution that uses mobile telephones as Point-of-Sales devices. SME1 developed the Cell Power system to assist Municipalities reduce their lost revenue through the difficult task of managing electricity usage. Another product of theirs is **eXstreamLITE**, which is a robust, secure network device that ensures the optimal use of expensive Internet bandwidth through a unique blend of Internet traffic classification, bandwidth shaping and traffic prioritisation engines.

SME1 wished to achieve two objectives for which they required a partner, namely: to raise cash for growth, and to gain a “big brother”, i.e. protection that would be afforded by having a bigger player as a partner. The expectation was that should a dispute arise with another large company (LCO), then that the “big brother” would enter into high level negotiation to try to resolve the dispute. With this in mind they sought a partner that they believed had a similar culture as their own and were in the same domain as they were namely electronic product development and deployment.

The company with whom they partnered, the LCO1, was a large, reputable South African corporate that specialized in electronics and communications. The LCO1 Ltd had several Divisions that focused on development and implementation – largely for the defense industry. The Division, LCO1Div, although responsible for the lion’s share of LCO1’s turnover of over R1 billion/year, focused on marketing of telecommunications equipment and solutions and did not do its own development – it had no in-house IP. Recognizing their vulnerability in this area, LCO1Div had a strategy of investing in SMEs in order to

acquire and gain access to IP. In line with this strategy, LCO1Div, via LCO1, took a third share in SME1 in exchange for a substantial cash injection.

The expectation from SME1's side was that it would be able to continue with new product development and piggy back off LCO1Div's marketing infrastructure and reputation. Furthermore SME1 expected the LCO1 to offer SME1's products protection by engaging with any other LCO that exploited SME1's patents unfairly, and resolve the dispute in a preferably amicable fashion. However, the reality was that LCO1 did not wish to tarnish its own reputation by supporting SME1 against the opportunistic LCOs that were breaching SME1's patents, as LCO1 already had existing relationships with these opportunistic LCOs that it viewed as important. SME1 was therefore expected to "fight its own battles" without the backing of its LCO partner. SME1 indicated that the relationship was partially successful because only one of the two objectives for partnering, had realized, namely the ability to raise cash. An opportunity was later created for SME1 to buy back its shares from LCO1 when a new CEO was appointed at LCO1Div who, in focussing the company's resources on its core business, sold off all subsidiaries where LCO1Div investment was R10 million or less. In this way SME1 managed to exit from a less than optimal partnership.

In discussing the difference between capabilities and competencies, The CEO clarified his understanding of capabilities as being "skills", and cited project management, programming, software development and the associated support, as capabilities that he believed were captured in the employees of SME1. Such skills were necessary in order to produce a business output such as intellectual property (IP) – which he defined as a competency. He believed that SME1 had a competency in developing GMS-internet interface systems, and that this competency was dependent on the skills set of the employees. The CEO drew an analogy of capabilities being like gears and competencies being like a gearbox, where the individual gears were all components of a gearbox, and where the gears on their own could not perform work, as part of a gearbox, they could. An LCO, he believed, therefore either had the option either to grow organically by hiring in "gears" and over a period of time assembling them into a "gearbox", or alternatively, partnering with an SME and rapidly acquiring the entire gearbox. (In the case of SME1, they had, in fact, been approached by a second LCO who was merely interested in the skills of one of their employees and wished to partner with the company merely to access this set of skills. As they feared that this partnership would lead to the demise of SME1, they declined the partnership offer.) However, the CEO believed that a fully functional



gearbox, including market share, customers etc, was of greater value to an LCO than the individual skills of the SMEs employees.

The CEO commented that competencies and capabilities were certainly important for partnership success. He believed that competencies rather than capabilities were more important. His reasoning was that large companies do not partner with SMEs to acquire skills, as they can “buy these in” merely by employing individuals. They are more interested in partnering with an SME such that they gain access to a “total product”. In the case of SME1, it was the “existing IP belonging to the company as well as the company’s “competence” to develop new IP that attracted the large company into a partnership with SME1” said the CEO. He believed that LCOs were typically after two competencies: IP and market share. In the case of SME1, although they had IP, they did not have market share.

Protecting the SME’s capabilities and competencies was important when partnering with an LCO as “LCO’s were ruthless and would take everything”, commented the CEO. SME1 protected its capabilities and competencies, in an attempt to ensure a successful relationship, by having in place the following:

- patents already secured the first customers to use their service
- a restraint of trade had been built into their employees contracts prohibiting them from working for a competitor within a reasonable period of time
- entered into a formal shareholders agreement with the LCO that
  - excluded re-evaluation of the company against future cash flow projections
  - \*
    - the LCO had to buy the majority share of SME1 (up to 51%) after a 3 year period (the market value of the shares would be determined by a third party); whereafter at any time thereafter, SME1 could offer to sell the remaining shares at market value and LCO1 Ltd would be obliged to buy them. (This clause was premised on the assumption that LCOs wish to hold the majority of the SMEs shareholding and hence SME1’s intention was to build up the value of the company and then exit.)
- the relationship was built on trust where there was a similar culture and the individuals with whom they were dealing had a similar background

\* The CEO mentioned that a common oversight SMEs make when entering into a shareholder’s agreement with an LCO is that they fail to take note of a clause that is

usually inserted by the LCOs linking the value of the SME to its cash flow projections. The strategy is that because the SMEs typically make very optimistic cash flow projections in order to entice LCOs to invest, that when, after a certain period of time (e.g. 2 years) the SME's worth is reassessed, should it not have achieved the originally projected cash flow, then the LCO can demand additional shares in exchange for the value that had not realized. In this way an SME seriously compromises itself as the LCO can dramatically increase its shareholding without the need for further investment. In this way an LCO can gain the majority share from an unsuspecting SME.

## **2. SME2**

SME2 was founded by the CEO in 1999, the core business of the company being network recording. At the time of the partnership with LCO2 AG, SME2 had only one employee (the CEO) and had a turnover of  $\leq$  R4 million. SME2 has subsequently grown to 31 number of employees and has a turnover of over R 35 million per year, and its core business is developing systems for mass interception and capturing of data and voice. Their current skills include being able to develop cutting edge hardware designs; software development based on knowledge of industry and systems engineering (in systems engineering the CEO believes South Africa has a competitive edge as unlike in other countries, South African engineers do not have the luxury of specializing in a niche area but need to address the overall picture); software electronic engineering with computer science. The CEO, having a BCom and BProc degrees, was the sole owner of SME2. The CEO's prior experience was in financial management – his last position prior to starting SME2 was as a Financial Director of a high-tech engineering company. Because of his interest in technology, in 1994 he had joined a company that supplied voicemail and the system that sends SMS's for one of South Africa's large cellular service providers, as the MD. This gave The CEO an opportunity to familiarize himself with the telecommunications industry. Thereafter he joined ME2 who had an OEM (original equipment manufacturer) agreement with LCO2 to design and manufacture new products. ME2 was keen to sell the company to an American company, and as they did not believe the OEM part of the business (that was worth approximately 25% of the business) would be attractive for the sale, they wished to sell this off. The CEO bought this part of the business from ME2, around which he established his own company, SME2.

The CEO believes that having capabilities and competencies is essential for partnership success, and furthermore, that there should be complementarity, i.e. the SME should

have competencies that the LCO does not have and requires. SME2 offered a competence in the design and manufacture of products. However, this competence was outsourced to a second company with whom SME2 had a relationship. ME2 (for whom The CEO worked prior to starting SME2) could bring a new product to market at a hugely reduced cost, and much faster, than LCO2, and it was this that had attracted LCO2 to form a partnership with them. When ME2 decided to sell off this section to SME2, a three-way agreement was signed between ME2, LCO2 and SME2 whereby SME2 took over the terms and conditions of the original ME2-LCO2 agreement without any modifications. Hence, SME2 was still expected to deliver new products to the market cheaper and faster than LCO2 could.

The interest from SME2 in partnering with LCO2 was because of LCO2's strong brand, its reputation, and access to international markets. However, the relationship turned out to be unsuccessful, largely because of a mismatch in size and power, the CEO commented. The agreement was very one sided where LCO2 had all the rights and SME2 had all the obligations. An example was where SME2 would have to give them information on new products they were developing and would also have to guarantee availability of spare parts for these products for fifteen years, whereas there was no obligation on LCO2 to buy any of these products. Another example was where LCO2 competed head-on with SME2 selling SME2's own products to SME2's customers. As SME2 was obliged to disclose the names of its customers, LCO2 would then sell the SME2 product at a much higher price than were SME2 to sell its product directly to its customer. It appeared that the philosophy of LCO2 was to conclude the deal at all costs, and do "damage control" thereafter. The CEO commented that for a partnership to be successful both parties must benefit and it should be a win-win situation. The agreement should reflect the same rights and obligations for both parties.

The relationship between ME2 and LCO2 was never good. The CEO described it as LCO2 being "pedantic, nitpicking, demanding, and lopsided". The relationship with LCO2 deteriorated further once SME2 became the OEM. SME2 had tried to end the agreement with LCO2 and wrote a letter to them requesting that their relationship be terminated. However, it was only after a period of approximately nine months that LCO2 in fact responded, and this was after they became aware that SME2 had introduced a new product to the market. Their response was in the form a letter suing SME2. The CEO believes that this was merely a tactic to soften SME2 up for the step that followed. LCO2 then offered to withdraw the charge provided that SME2 would perform a demonstration of their new product to one of LCO2's potential customers to the satisfaction of the customer.

This did eventually lead to a sale of the product to LCO2's customer, and LCO2 is again expressing interest in working with SME2 - the CEO believes it is because they are interested in SME2's new product. The CEO concludes that were he to enter into an agreement with LCO2 once the old agreement has expired, he would structure the contract around the rights and obligations of the generic seller and the generic buyer respectively, rather than the rights and obligations of each specific company. In this way he believes that balance can be obtained.

The CEO defines a competence as a combination of skills, knowledge and experience that give a company a competitive edge whereas capabilities would be more generic e.g. a technical support capability, a sales capability, a financial capability – on their own these will not necessarily give a company a competitive edge. The CEO believes that established companies can't innovate that easily as they often have legacy processes and have too much invested in old systems to innovate and change to new systems. Hence he believes that competencies are more important for a successful partnership than capabilities. In the case of LCO2, he re-iterated that it was SME2's ability to develop new products and bring these to the market at a cost and time period attractive to LCO2 that attracted this company to the partnership.

The CEO commented that it is very difficult to protect one's capabilities and competencies when partnering with a large company, but safeguards would certainly help. Firstly, patents are not an effective safeguard unless you have sufficient resources to defend the patent. However, having registered patents does increase the value of the company, the CEO believes. Having "first mover advantage" would be one form of safeguard, as would having a restraint of trade agreement with your employees and preventing the LCO from appointing your employees. Also, including sales targets in the agreement with the LCO could serve as a safeguard. (The current agreement between SME2 and LCO2 lacks sales targets, but lists detailed technical specifications as to norms with which new products must comply, buying and selling prices etc.). Any new agreement to be negotiated would be for a shorter period of time (three, rather than five years), and the arbitration would be moved to an affordable location like South Africa.

The CEO believes that the contractual relationship is more important than a trust-based relationship. Not only is the development of the MOU an important part of the negotiation process, but it is an important reference document for what was originally envisaged and promised – especially for when the originators of the agreement are no longer present. A

“fall-back” option is also important, i.e. having a second client (or more) lined up should the relationship with the LCO fail. Relying on a single company is risky.

The CEO concluded by saying that he would more easily trust a South African company than a foreign company – mainly because of a similar culture, as well as proximity and ability to interact on a continual basis. He believes that it is important to interact regularly with the LCO partner and to “keep a finger on the pulse”. “LCO’s will circumvent agreements. The more you hurt them in the market place, the more negotiable they are” the CEO comments.

### **3. SME3**

SME3 was founded in 1999 by the CEO and his business partner, CTO, who both had a Masters in Electronic Engineering. The CEO and CTO had both left LCO3 (Pty) Ltd, a large player in the South African defence industry having approximately 300 employees, that focused on optoelectronic product development and commercialization for this industry, to found their own business in opto-electronics. This move was partly because they wished to go on their own and partially because LCO3 was short staffed and employees were carrying more than a fair work load. LCO3 had made the CEO a counter-offer when they heard he intended leaving, but as he was intent on starting his own company, they agreed that he would continue to assist LCO3 by contracting on an hourly basis with them. Prior to resigning, the CEO had been managing a project and had been working alongside an LCO3-appointed project manager for approximately 4 months. Once he went on his own, his main point of contact within LCO3 for the project contractual work was this project manager. Additional work for the new SME3 came mostly from the LCO3’s laser technicians that his partner had worked with whilst still an employee of LCO3.

SME3 has grown over the years and currently has a turnover of  $\leq$  R4 million as well as 7 full-time employees plus 5 – 8 students at any one time. Its core business is electronic engineering solutions and products – and the vision is to become a premier provider of electronic product solutions. SME3, today, has experience in the following industries: telecommunication; military and defense; aviation; agriculture; information technology; security; and mining. The skills set encompass opto-electronics, embedded hardware and software development; PC software; analog design; mechanical draughting; and PCB schematics and layout. Products include: infra-red perimeter beams that provide a cost effective means of detecting when an object passes through an infrared beam; in-circuit

serial PIC programmer that programmes a wide range of microchip's 16 and 18 series of PICs; and a smart vehicle harness – an intelligent in-vehicle network that uses the CAN protocol. SME3 is currently participating in an incubation programme.

The CEO commented that he believed that having capabilities and competencies was important for partnership success. It was the CEO and his partner's opto-electronic capabilities and detailed product knowledge of LCO3's products that attracted the LCO to partner with them. The nature of the partnership was one of contracting SME3's specialist skills, on an order-based basis, to assist LCO3 with product development and support. Initially this product development related to the LCO3's core products. However, with time the situation changed as the LCO built up its own in house capabilities in the areas that it had previously subcontracted SME3. Thereafter it would contract SME3 to develop test equipment or supportive products that would enhance the LCO's product range. Because both the CEO and his business partner had been employees of the LCO they used to interact on a social level and were friends of many of the technical personnel of the LCO. This relationship had been fundamental in securing continued orders from the LCO.

The CEO believes that it was SME3's capabilities (specialist technical abilities) rather than their competencies that attracted the LCO. At the stage of the partnership, they did not have sufficient processes in place for them to have competencies, but specialist knowledge they did have. The CEO believes that this would still be the case today as LCO3 wants to develop its own products, hence it wishes to access specialist knowledge rather than, for example, a product development capability. It is difficult to find specialists, and especially locally for defence related work, hence "buying in" the skills was not a realistic option LCO3.

The relationship with LCO3 has changed over time. In the beginning no thought was given to the need of protecting its competencies. The relationship was based on friendship where the contract work that SME3 performed for LCO3 was based on a verbal agreement, the specifications of which were captured in an order that was placed by LCO3 with SME3. The order would either specify the expected outputs to be delivered against the number of hours of input, or payment for the achievement of certain milestones, or in some instances SME3 would simply develop a complete product, carrying all the costs for product development, and this product would be sold to LCO3.

However, associated with the departure of key contacts from LCO3, as well as SME3's own growth, the preference of SME3 is to have a company-company agreement in place

as a framework within which to subcontract work to the LCO. Such a contract could specify means of monitoring the partnership e.g. having the books of the partner audited to ensure the correct reflection of payment to the partner. The CEO believes that not only is it important to have a contract in place, but as it is not always easy to monitor whether there is compliance with the contract (e.g. where disclosure on sales is required for royalty payments), retaining and not handing over a crucial part of the product (e.g. the software component) would further protect SME3's capabilities in its dealings with a LCO. Formal safeguards (e.g. contracts; deposits) he believes are critical to prevent a situation for a breach in trust to occur. "It is important to tie down the LCO's promises early" says the CEO. Formal safeguards are therefore vital in a partnership – he would consider entering a relationship with an unknown partner (i.e. no existing relationship) where there were formal controls in place, than entering a partnership based solely on trusting what the partner promises, e.g. huge sales turnover. One cannot rely solely on goodwill. However, he is of the opinion that some initial trust is required prior to entering a relationship with an LCO.

#### **4. SME4**

SME4 was established during January 1982 at a South African University. The original group comprised 3 Computer Science professors and 9 Computer Science Honours and Masters students. It became a closed corporation (CC) in March 1989. The CC was converted to SME4 (Pty) Ltd in 1993 and the overseas expansion of the company resulted in SME4 America Inc being established during 1998 as well as SME4 Limited that handled the UK business. During 2000 at least 3 subsidiary companies were created as new "venture capital"-oriented companies and SME4 supplied all the funding. The abovementioned companies now employ approximately 400 people.

SME4 initially supplied "systems programming" solutions to companyA and companyB. Companies A and B were in computer networking systems and were medium sized companies. The founder of SME4 commented that having capabilities and competencies was critical for partnership success as it was because of a product that SME4 had developed (a human resource (HR) module) that LCO4 had approached them in the first instance. LCO4 AG and LCO4 South Africa concentrated on ERP (enterprise resource planning), "an industry term for the broad set of activities supported by multi-module application software that helps a manufacturer or other business manage the important parts of its business, including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service, and tracking orders.

ERP can also include application modules for the finance and human resources aspects of a business. Typically, an ERP system uses or is integrated with a [relational database](#) system. The deployment of an ERP system can involve considerable business process analysis, employee retraining, and new work procedures.” ([www.Webopedia](#)). LCO4 recognized that SME4 had certain competencies and asked them to customize the LCO4 HR module for the South African market. SME4 then entered into a Memorandum of Agreement with LCO4. SME4 later became an LCO4 implementation partner after they had been fully trained and gained the required experience. SME4 has grown from 12 full-time employees with a turnover of  $\leq$  R4 million in 1994 to over 400 people having a turnover of in excess of R240 million in 2006. Most of the staff in the earlier days of SME4 was recruited from the University’s Department of Computer Science. It is hence no longer an SME but today qualifies as a LCO. The experience shared below, however, relates to the experience of SME4 when it was still a start-up company (1994), and had a turnover of  $<$  R1,2 m.

SME4 had both competencies and capabilities that had attracted LCO4. It had a broad spectrum of knowledge and skills for developing applications and new developments, as well as systems processing skills and an ability for complex programming for example, software protocol development – i.e. capabilities. In addition the company had some knowledge of the domain. The founder clarified that his understanding of capabilities was the ability to bring about new developments, and a competency was an ability to deliver something now. For example, SME4 used its payroll competency to customize the LCO4’s payroll system.

The founder believed that both competencies and capabilities were important for a successful partnership. The SME must demonstrate some competency, although this competency did not need to be specifically in the domain of the LCO. However, a demonstration of the SME’s capabilities and competencies was important for a prospective partnership. The founder further commented that because of domain independence, capabilities were possibly more important than competencies, for example, an LCO in the financial sector might have seen the SME’s capabilities to develop systems in the mining sector, and request them to develop similar systems for the financial sector. This would clearly indicate recognition of certain capabilities that could be used to develop a new competence in a new sector or domain.

When the SME is really small, it appears that the LCO is more interested in the SME’s capabilities, but as it grows and develops certain competencies, it appears that the LCO



shifts its interest to the SME's competencies. The founder commented that this would be in line with Geoffrey Moore's "chasm"-discussion on how to introduce a technology product to the market as some LCOs tend to be risk averse and would be more interested in accessing a demonstrated competence than merely a capability that would need to be developed into a competence. However, the interest in accessing competencies and capabilities would also be dependent on the situation and the specific need of the LCO, for example, if specialist skills were required for instance to develop cutting edge innovation and radical thinking, then the LCO would be more interested in accessing capabilities to include in its own systems and processes than looking for a competence. Alternatively, and citing examples like Cisco and Microsoft, an LCO may recognize a domain competence in some of the individuals of an SME and acquire the SME, strip it of the people who are not core to the competence, and integrate the competence into its own company. The founder is of the opinion (and talks from SME4's current position as an LCO) that LCOs are looking for complementarity with their own business focus.

The founder believes that integrity (a confidence or trust that the one company will not try to deceive the other and that the company will deliver on what it promised) is critical to a partnership. The founder referred to work done by Fernando Flores, who obtained a PhD in Philosophy from the [University of California, Berkeley](#) on *Management and Communication in the Office of the Future*, and who discusses a four stage cycle for coordinating effort, which he refers to as the "atom of work". This is an iterative process of negotiation, commitment, and delivery on expectations. For this process to be effective there must be inherent trust and this trust gets further developed as one follows the process. The founder believes that a contract is mostly about the process of discussing the expectations (including capturing the specifications), and then having an ability to monitor the outputs against the expectations. Where there is a deviation, a contract provides the point of departure for addressing the deviation. He believes that having a contract for punitive measures is less important as if it gets to that stage, then the relationship is already broken and the partnership cannot be successful. He is of the firm opinion that contracts are put in place to avoid misunderstanding, and that they become increasingly important as the business grows. The founder stressed the importance of a contract and especially for setting the framework for the partnership and clarifying expectations. Also, contracts were important for continuity such that if the negotiator(s) left the company, the terms of the agreement are codified for the successors. However, he cautioned that SMEs need to be very alert to opportunistic clauses in contracts e.g. a clause that says should the LCO find a buyer for x% of their shares, then the SME is

obliged also to sell x% of its shares. He did not believe that a partnership could exist purely on trust.

An important way of protecting the company's capabilities and competencies, the founder commented, was to retain their competent employees. This SME4 did by creating a family culture where people felt they belonged. As the company grew, so the culture changed, but it also became less important to retain critical people as critical mass had been built up by that stage and the company had gained a momentum of its own. Another way of protecting itself against opportunism by the LCO was to ensure that it could offer a better service than the LCO.

To conclude, therefore, the founder believes that good service delivery, trust, contracts and culture are important to improve the relationship between competencies, capabilities and partnership success. Where the contract serves as a safety net, a trusting relationship is critical. If there is no trust, then a contract will not save the relationship.

## Appendix 3

### Experts' analysis of case studies

#### Expert 1:

**Qualifications:** PhD in Solid State Physics

**Current position:** Managing Director of a (Pty) Ltd

**Disciplines of expert knowledge:** Technology Management; Innovation Management; Knowledge Management; Business Solutions Engineering

Experience in the field: business consulting in the field of technology management for 17 years, including strategic market assessment, technology strategies, innovation strategies and knowledge management strategies, with an emphasis on small business, government policy development in the science and technology sector and small/large business interfaces.

	General/Specialist capabilities/competencies	Discipline specific/multidisciplinary	Capabilities/competencies	Weak/strong Safeguards
SME1	3	2	3	3
SME2	1	4	1	2
SME3	4	1	2	1
SME4	2	3	4	4

#### Expert 2:

**Qualifications:** BSc. Eng (Electronic). BSc.(Hons) MBA. OPM (Harvard). Fellow of SAAE

**Current position:** CEO BrainWorks Management (Pty) Ltd. Business Coach.

**Disciplines of expert knowledge:** ICT, Strategy, Marketing, Product Development, Leadership Development, Venture Capital & Business Coaching. 29 Years in ICT industry, 10 years founder CEO of ICT company with R100m turnover; board member of 4 ICT companies.

	General/Specialist capabilities/competencies	Discipline specific/multidisciplinary	Capabilities/competencies	Weak/strong Safeguards
SME1	4	1	4	2
SME2	3	3	3	3
SME3	1	2	1	1
SME4	2	4	2	4

**Expert 3:****Qualifications:** D.Comm; MSc; MBA**Current position:** Director of Innovation at a South African University**Disciplines of expert knowledge:** Technology Management; Innovation Management; in the field for 23 years.

	General/Specialist capabilities/competencies	Discipline specific/multidisciplinary	Capabilities/competencies	Weak/strong Safeguards
SME1	4	1	2	3
SME2	2	3	3	2
SME3	1	4	1	1
SME4	3	2	4	4

**Expert 4:****Qualifications:** MBL; MSc; BSc (Eng)**Current position:** Assoc. Prof in Software & Telecoms Engineering at a South African University**Disciplines of expert knowledge:** Technology management; software engineering; telecommunications engineering; knowledge management; geospatial information systems; innovation management.

	General/Specialist capabilities/competencies	Discipline specific/multidisciplinary	Capabilities/competencies	Weak/strong Safeguards
SME1	4	1	1	2
SME2	2	3	2	1
SME3	3	2	3	3
SME4	1	4	4	4