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"All you need is trust" - to overcome the liability of newness by forming alliances.

MSc in Innovation and Entrepreneurship

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Abstract

The liability of newness can be seen as the root problem new ventures need to address in order to survive and prosper. The development of an appropriate alliance network at founding may enable a start-up to enjoy relationships and resources typical for a more established firm, hence, overcoming liability of newness. This study has used a longitudinal action research complemented with a multi-case study. It investigates how alliances influence liability of newness experienced by start-ups, what effect trust can have, and how it can be built in an alliance formation process.

The reviewed literature and the findings in this study link the alliance formation, overcoming the liability of newness and trust building processes. In order to successfully form an alliance, entrepreneurs can choose to combine “borrowed” legitimacy with trust-building behavior, which includes maintaining communication and gaining inter-personal legitimacy.

Although trust as a governance mechanism can be beneficial because it tends to lower transactional costs, this study suggests not to rely on trust as the only type of governance mechanism.

(Key words: Liability of Newness; Alliances; Alliance Formation Process; Trust; Action Research)

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Purpose and rationale

There are some characteristics that almost every start-up shares, for example, the lack of resources and legitimacy. This issue is often linked to the so called “liability of newness” (Stinchcombe 1965). This lack is often compensated with a lot of enthusiasm and creativity, but in the long run every entrepreneur has to build legitimacy and access external resources in order to survive.

The importance of resources is highly emphasized in an extensive amount of scientific publications, and makes the foundation for several theories, of which the most well-known is the resource based view. One common way of getting access to resources is to develop it in house or out-source it, both strategies are costly and external funding is often needed.

Another strategy to get access to new resources and gain legitimacy is through formation of alliances. Alliances, or collaborative relationships between organizations, have clearly altered the business landscape in the last two decades. The business press frequently uses terms such as cooperation, ecosystems, network organizations, clusters, open innovation, and related concepts. Although such collaborations have been recognized by most organizations and entrepreneurship scholars, there is still a gap in the understanding of how to select partners, form and maintain alliances.

The objective of this study is to understand how a high-tech start-up has coped with the “liability of newness” while lacking resources and legitimacy since its foundation. Four different projects with different partners in different phases of entrepreneurial alliance formation have been studied. Some of the projects were initiated through a reputable key opinion leader in the nanotechnology environment. Others were initiated by the entrepreneur (CEO of the start-up), together with externals. Therefore, this study addressing the following research question:

How can entrepreneurial alliances help a start-up to overcome the liability of newness?

Although alliances are recognized to be important and necessary, it is always a challenge to build and maintain a good alliance relationship. Many alliances have failed due to the lack of trust causing unsolved problems, lack of understanding, and despondent relationships. It has been suggested that trust enables people to be vulnerable to their partners, essentially taking

risks from engagement, such as joining a strategic alliance. Therefore an entrepreneur’s ability to build and maintain trust can be a competitive advantage in an alliance formation process. Therefore, this study addresses the second research question:

How can trust be built in an alliance formation process?

Additionally, all four projects navigate in an institutional field where there is some acknowledgment of the project ideas and their technological basis, for example, the medical and nanotechnology environment, and may represent different epistemic cultures. This particularly challenges the entrepreneur in monitoring and facilitating entrepreneurial alliances. Naturally, the entrepreneur’s ability to facilitate the alliances is of particular importance. New venture's limited resources influence what type of governance mechanisms could and should be used. This study proposes that trust could be an important governance mechanism in the alliance formation process, and enable the entrepreneur to focus on the new venture's development. Therefore, this study addresses the third research question:

How can trust influence the alliance formation process?

Another purpose of the study was to contribute to improvement of the entrepreneurial collaboration in the University of Oslo by taking part in the SFE's initiative “entrepreneurs in residence”. In addition, the action research methodology has rarely been applied in entrepreneurial context. This study attempts to contribute in broadening the application range of action research methodology, and improve the local entrepreneurial context at the University.

Theoretical Grounding

The theoretical grounding presents a vast amount of literature on following topics: liability of newness, alliances and their formations, trust and its formation. It also discusses how these factors and processes interfere with and influence each other.

The literature research was conducted in databases *Google Scholar* and *Web of Knowledge* using search phrases like “liability of newness + alliance”, “trust + transactional costs”, “trust formation alliance”.

The publications that most significantly contributed in theoretical grounding are presented in the table 1.

Table 1: Significant publications for the theoretical grounding in the study.

Author	Reference title	Focus	Year
Arthur L. Stinchcombe	Social structure and organizations	Study of the effect of outside society to the internal life of organization. The term “liability of newness” was first introduced.	1965
Barney and Hansen	Trustworthiness as a Source of Competitive Advantage	Investigation on the condition under which trust and trustworthiness in exchange relationship can be a source of competitive advantage for firms	2007
Reuer and Arino	Entrepreneurial alliances	Introduction on the entrepreneurial alliance and how to build and maintain the relationship.	2011
Friederike Welter	All you need is trust? A critical review of the trust and entrepreneurship literature	The review of the literature on trust and entrepreneurship. Highlights the diversity and complexity of this construct. In addition, the interdependency of trust with context, as well as its duality in relation to control is explored.	2012

Liability of newness

The term “liability of newness” was first introduced by Stinchcombe in 1965 (Stinchcombe 1965). Stinchcombe argues that start-ups suffer from the “liability of newness” and have a greater risk of failure than older organizations, because they depend on the cooperation of strangers, have low levels of legitimacy, and are unable to compete effectively against established firms. In this light, new firms face a variety of barriers they must overcome on their way to success, and these challenges pose serious threats to organizational success for young enterprises.

Further, Stinchcombe argues that new organizations of a new form are more likely to fail than new organizations with an established form. As time passes, structures stabilize and ties with environment become durable, causing death rates to fall for organizations with both common and innovative forms (Stinchcombe 1965). In management research, an organization’s newness has been used to indicate the negative aspects of new organizations in addressing and responding to major management challenges of adaptation, which is supposed to create their high mortality risk. Most research and policy literature on organization failure assumes that new organizations are more likely to die than old organizations (Choi and Shepherd 2005).

Stinchcombe’s findings were accepted by organizational theorists, and the argument has been frequently used. A number of studies on firm failure have confirmed the principle of a liability of newness. Carroll (Carroll 1983) conducts an exhaustive study using 52 different data sets to find that organizational death rates decline with firm age. Phillips and Kirchoff (Phillips and Kirchhoff 1989) find that three out of five new firms fail within their first six years. In a study of over 5,000 Australian businesses, Watson and Everett (Watson and Everett 1996) found that a higher percentage of failed firms were younger enterprises. Using data on U.S. firms, Nucci (Nucci 1999) also finds that business dissolution declined with age regardless of industry, size grouping or region.

Besides the impact on organizational survival, new firms also suffer from a “liability of newness” in their attempts to secure debt capital. Coleman (Coleman 2004) finds that new firms are significantly less likely to have lines of credit. This is a particular problem for small firms because a line of credit is a very flexible type of loan that can be used for a variety of business purposes. Further, although new firms were significantly more likely to have applied for a loan within the previous three years, they were significantly more likely to be turned

down. Finally, new firms were significantly less likely to apply for a loan at all, because they assumed they would be turned down. All of this suggests capital constraints for newer firms that are not present for more mature firms.

Sacks (Sacks 2002) develops an argument that new firms are not homogeneous in their access to social, financial and reputational capital, and this produces a "differential liability of newness". Therefore some new firms have heightened access to venture capital funds because of their advantages in the above three factors. Entrepreneurial reputation is the informal assessment of an entrepreneur's skills and character along with their intelligence, motivation, and ability to work effectively with others.

Freeman (Freeman et al. 1983) notes that new organizations are more likely to fail because they depend upon the cooperation of strangers and have low levels of legitimacy. As time passes, organizational structures stabilize, as do ties with external sources of support. Hannan and Freeman (Hannan and Freeman 1984) observe that new organizations have weak claims to sources of support. Thus, they are highly vulnerable to environmental shocks. In contrast, older organizations have developed "dense webs of exchange".

However, start-ups vary considerably in their access to resources and stable relationships, and these variations may lead to differences in their early fates (Levinthal 1991). The burgeoning literature (Gulati 1998) on alliance networks contends that alliances enable firms to gain access to resources, particularly when time is of the essence. If so, then alliances are likely to be particularly beneficial to young, resource-constrained firms. In short, development of an appropriate alliance network at founding may enable a young firm to enjoy relationships and resources typical of a more established firm, hence overcoming liabilities of newness

Counter liability of newness by forming alliance

Alliances can counter a firm's liability of newness in at least two different ways, directly and indirectly. First, alliances can help address a new venture's resource shortfalls by teaming up with a larger or more established firm. A new venture might also team up with a more established partner to distribute the new venture's product. In effect, new venture not only gains access to the established firm's expertise and relationships in particular marketing channels, but it "bonds" itself to this firm, or borrows its good reputation, while the legitimacy of the new venture might otherwise still be in question (Reuer et al. 2011).

Second, relationships with reputable partners can also have beneficial effects on the new venture's ability to secure resources from other sources. In this way, alliances can bring important indirect benefits to firms. Because new ventures are difficult to evaluate for investors and potential partners, it can be challenging to obtain the resources they need. Alliances with reputable partners can have the effect of "endorsing" the new venture, or providing a signal to other potential exchange partners that the new venture is of high quality. Therefore alliances can have an important impact on the new venture's ability to obtain funds or other resources from other organizations (Reuer et al. 2011).

This suggests that partnerships with other organizations can both directly as well as indirectly help reduce entrepreneurial firms' liability of newness. Based on the literature above, we suggest two following propositions.

Proposition 1: *Alliances can directly help a new venture to overcome liability of newness by providing access to valuable resources.*

Proposition 2: *Alliances can indirectly help a new venture to overcome liability of newness by "lending" reputation, which helps to attract other potential partners*

Alliances

Inter-firm cooperation has reached a feverish pace over the past decade. By the estimates of some experts (Brown 1999), throughout the 1990s, the number of alliances increased at a rate of around 20% annually. Harbison and Peker (Harbison and Peker 1998) estimate that 32,000 strategic alliances were formed worldwide between 1994 and 1997. Alliance indeed plays a central role in the new models of competition, innovation and organization. In a 2007 survey of management practices, Bain & Company (Bain & Company) reports that alliances were one of the most widely used current tools (68%). For technology companies in particular, alliances have moved to the forefront of competitive strategy. A study of high-technology executives (Frerichs 1999) finds that 94% of CEOs surveyed believed that alliances were becoming more important to their companies' strategies.

There are many different ways to define the term "alliance", and people hold various conceptions of what such collaborative agreements are, or are not. For instance, some entrepreneurs define alliances based on their objectives and state that partners need to have common goals; others submit that partners' goals need to be complementary rather than

identical. Others who define alliances based on their governance structure, or legal organization, enter debates as to whether joint ventures, mergers, or other arrangements should, or should not, be considered alliances (Reuer et al. 2011).

In order to gain a precise understanding of alliances, they need to be defined in a way that would distinguish them from other types of investments, while also recognizing the diversity of inter-organizational relationships that might be considered as alliances. In this study, the following definition of alliances is used: *agreements between independent organizations that work together under an incomplete contract* (Reuer et al. 2011).

After having clarified what an alliance is, there is a need to define what an entrepreneurial alliance is. Alliances intersect with entrepreneurship in several important ways: first, alliances themselves can be seen as sources of entrepreneurial opportunities that are well defined at the outset; second, alliances can be seen as the means of discovering or creating completely new opportunities that are not well known prior to the formation of the collaboration; third, alliances are one of several "modes of action" by which individuals or firms exploit the opportunities they have recognized or created. The previous definition can be supplemented with: *agreements between independent organizations that work together under an incomplete contract to access, discover, or exploit opportunities for future goods and services* (Reuer et al. 2011).

As mentioned at the end of the "Liability of newness" section, organizations tend to form partnerships with other organizations in order to reduce entrepreneurial firms' liability of newness. Reuer et al. (Reuer et al. 2011) summarize some different reasons for why firms enter into strategic alliances, which are illustrated in Table 2.

Table 2: Illustrates different reasons for why firms enter into strategic alliances

Environmental Trends	***Alliance Objectives***
• Globalization • Technological changes • Deregulation • Industry convergence • Hyper-competition • De-integration of value chains	• Overcoming the liability of newness • Tapping into new skills and resource • Accessing financial resources/substitutes • Creating new businesses and market space • Accelerating growth in markets • Achieving rapid internationalization • Managing risk

Recourse-based view of strategic alliances

A resource-based view seems particularly appropriate for examining entrepreneurial alliances because new ventures essentially use alliances to gain access to valuable resources. As entrepreneurial alliances are essentially the result of resource integration among firms, a resource-based view has the potential for helping to understand alliances better.

From a resource-based perspective, Eisenhardt and Schoonhoven (Eisenhardt and Schoonhoven 1996) define alliances as: *cooperative relationships, driven by logic of strategic resource needs and social resource opportunities*. Thus, firm resources provide a relevant basis for studying alliances. Dollinger et al. (Dollinger et al. 1997) find that a target firm's reputation, including elements such as product and management reputation, encourages decision-makers to form a strategic alliance with a firm.

The resource-based logic suggests that the competitive advantage of alliances is based on the effective integration of the partner firms' valuable resources. Consequently, the way resources are aggregated will significantly influence the performance of the alliance (Hagedoorn 1993).

Miller and Shamsie (Miller and Shamsie 1996) suggest that, based on the notion of barriers to limitability, all resources may be classified into two broad categories: property-based resources and knowledge-based resources.

Property-based resources are legal properties owned by firms, including financial capital, physical resources, human resources, etc. Owners enjoy clear property rights to these resources, or rights to use the resources, so that others cannot take them away without the owners' consent. Thus, property-based resources cannot be easily obtained, because they are legally protected through property rights in such forms as patents, contracts, and deeds of ownership (Miller and Shamsie 1996). Because others cannot take property-based resources away, alliance partners will not be overly concerned about unintended transfers of these resources.

Knowledge-based resources refer to a firm's intangible know-how and skills. In contrast to property-based resources, knowledge-based resources are not easily imitable owing to knowledge and information barriers. Others cannot easily copy or imitate knowledge-based resources, because they are vague and ambiguous. Thus, tacit know-how, skills, and technical and managerial systems not protected by patents, all fall in this category (Hall 1992).

According to Das and Teng (Das and Teng 2000), a single firm may be able to contribute multiple types of resources to an alliance. Therefore, it is important to identify which types of resources ought to be committed to the alliance at a significant level—that is, which is their primary resource type. Thus, a prospective partner will expect to contribute either primarily property-based or primarily knowledge-based resources to the alliance. It would rarely be the case that property-based and knowledge-based resources are equally significant.

Alliance formation

In the literature, there are two theoretical perspectives and insights provided on alliance formation: alliance process and organizational justice theories. The former recently has made major contributions to the alliance literature. Arino and Ring (Arino and Ring 2010) find that over the last decade, increased research emphasis has been placed on the processes that drive alliance evolution. The literature distinguishes three general phases in which these processes can be grouped: formation, operation, and reconfiguration.

For the formation phase, Zajac and Olsen (Zajac and Olsen 1993) argue that during the negotiations that take place in alliance initializing stages, perceptions of value and the parameters of exchange emerge. Through preliminary communication and negotiation, initial relational exchange norms start taking shape, and commitments are tested to determine credibility.

Ring and Van de Ven (Ring and Van de Ven 1994) propose that alliances are formed because parties successfully engage in a variety of sense making activities that result in establishing psychological contracts, which consist of congruent expectations and assumptions about each other’s prerogatives and obligations.

Arino and de la Torre (Arino and J. de la Torre 1998) further explore Ring and Van de Ven’s research and suggest that initial conditions are outcomes of preliminary negotiation and commitment stages. They also found that positive feedback loops are critical in the evolutionary process when external shocks influence partners’ perception of efficiency and equity. The relational quality is both an in-put to the success of the venture and an out-put of the interactions between partners.

Challenges in early stage of alliance

Despite the growing popularity of alliances, collaborative success remains elusive for many companies. Many inter-organizational relationships fall short of meeting the expectations of their participants or fail for other reasons. A number of studies have noted alliance failure rates in the 50-60% range (Spekman et al. 1996; Frerichs 1999; Kalmbach and Roussel 1999). The result is approximately the same alliance failure rate identified in studies by Bleeke and Ernst (Bleeke and Ernst 1993) that upwards 60% of all alliances fail. Evidences also suggest that even those ventures that eventually succeed must frequently overcome serious problems in their early years.

In every ten alliance negotiations that end in an agreement, five will fail to meet the partners' expectations and of the other five, only two will last for more than four years (Rigby and Buchanan 1994). While many researchers have identified difficulties in the formation of alliance, the question of why some attempts to form alliances fail, has not been well developed. Hence the ability to form and manage alliance more effectively than competitors can become an important source of competitive advantage.

Doz and Hamel (Doz and Hamel 1998) note that the early process of the collaboration is at least as important as the strength of the strategic premise on which it is based. The decisions made, and particularly the nature of the interactions that take place during the initial stages of the alliance initiatives, will likely play a determining role in its future development and success.

Kelly et al. (Kelly et al. 2002) find that the management of the initial steps of an alliance is critical to its subsequent development, and especially that the management of relationship among key players needs to receive significant attention.

More and McGrath (More and McGrath 1996) attribute alliance success to the ability of firms to effectively manage relationship issues. The relationship aspects of cooperation provide the greatest early challenges in alliance. Wildeman and Erens (Wildeman and Erens 1996) find that relationship problems were the cause of the premature termination of 70% of alliance.

Das and Teng (Das and Teng 1996) suggest that there is relational risk in an alliance formation process, which is concerned with cooperative relationships, or the probability that the partner does not comply with the spirit of cooperation.

Parkhe (Parkhe 1993) suggests that a successful alliance depends substantially on effective

cooperation between the partners, since the motivation for entering into an alliance is to exploit the benefits of cooperation. Thus, it would be a serious problem if one partner firm does not commit itself to cooperation, as fully expected by the other partners. The perception of "relational risk" reflects the concern of a partner about possible default by other partners (Das and Teng 1998).

Kelly et al. (Kelly et al. 2002) note that communication is the dominant issue in relationship related challenges. Poor communication within an alliance and between partners can significantly undermine an alliance's performance. It can create an atmosphere of mistrust and suspicion that can undermine both the legitimacy and effectiveness of the venture.

Culture clash is also cited as one of the common reasons for alliance problems and failures (Child and Faulkner 1998; Duysters et al. 1999), which is inevitable when firms have different values, beliefs and attitudes interact in the context of cooperative relationship. Culture differences are likely to be particularly pronounced in the early stages of cooperation, since the partners have little prior experience with each other.

Another relational risk Kelly et al. (Kelly et al. 2002) find in the early stage of an alliance is related to confusion over the respective roles and responsibilities of the partners. The difficulties encountered arise from either lack of definition of partner’s role and responsibility or a poor understanding of who is responsible for what.

Given all the uncertainties and problems that typically occur at the launch of an alliance, it may be wise to view the early stages of cooperation as a period of mutual discovery, sense-making and trust building by the partners. Buchel et al. (Buchel et al. 1998) suggest that the early establishment of a trust-based relationship is a critical factor in setting up the condition for success.

Ring and Van de Ven (Ring and Van de Ven 1992) suggest that inter-firm trust helps reduce the concern about opportunistic behavior, and thus decreases relational risk. Many alliances have failed due to the lack of trust causing unsolved problems, lack of understanding, and despondent relationships. It has been suggested that trust enables people to be vulnerable to their partners, essentially taking risks from engagement, such as joining a strategic alliance (Schoorman et al. 2007).

Trust

According to the liability of newness theory, new organizations lack “relationships of trust” with individuals and organizations. The entrepreneurial alliance theory also highlights the importance of trust in decreasing transactional costs in-between individuals or organizations. Thus, both the “liability of newness” and the entrepreneurial alliance literature suggest that trust is an important factor in collaboration.

Sabel (Sabel 1993) defines trust as the mutual confidence that no party to an exchange will exploit another’s vulnerabilities. According to Sabel, when parties to an exchange trust each other, they share a mutual confidence that others will not exploit any adverse selection, moral hazard, holdup, or any other vulnerability that might exist in a particular exchange.

Lewicki and Brinsfield (Lewicki and Brinsfield 2011) suggest that reciprocity, expectations or beliefs about the intentions and trustworthiness of others are the common elements in a collective trust.

Rousseau (Rousseau et al. 1998) argues that reciprocity signals to both trustor and trustee that the trust they extend to each other will be returned. Trust is based on the perception of the probability that other parties will behave in a way that is expected and benevolent. In the entrepreneurial context, a firm owner expects a business partner to act in their own interest, or at least to take such interests into account. Such expectations are based on interpretation of signals, and on a willingness to be vulnerable to another party (Rousseau et al. 1998). According to Mayer (Mayer et al. 1995), individuals can signal that they are worthy of trust, thus encouraging trustful behavior.

Resource based view of trust

Trust, in economic exchanges, can be a source of competitive advantage. However, to be a source of competitive advantage, trust must be available to only a few firms in their exchange relationships, not to most firms in most exchange relationships (Peteraf 1993).

There are many debates between behavioral and economically oriented researchers about the role of trust in exchange relationships. On the one hand, behaviorally oriented researchers often criticize economic models that assume exchange partners are inherently untrustworthy (Mahoney et al. 1993) and constantly tempted to behave in opportunistic ways (Donaldson 1990). On the other hand, more economically oriented scholars respond by observing that it is

difficult to distinguish between exchange partners that are trustworthy and those that only claim to be trustworthy (Arrow 1974; Arrow 1985; Williamson 1985).

According to Barney and Hansen (Barney and Hansen 1994), trust is the mutual confidence that one's vulnerabilities will not be exploited in an exchange, and different types of trust can exist in different economic exchanges. These different types of trust depend on different reasons why parties to an exchange can have the confidence that their vulnerabilities will not be exploited. At least three types of trust can be identified: weak form trust, semi-strong form trust, and strong form trust (Mitchell 2008). Some obvious parallels exist between the types of trust and trustworthiness identified, and the stages of moral development identified in developmental psychology here are summarized by Barney and Hansen (Barney and Hansen 1994) in Table 3.

Barney and Hansen argue that weak form of trust is possible because exchange vulnerabilities do not exist. In the semi-strong case, trust is possible, despite exchange vulnerabilities, because of the significant social and economic governance mechanisms on the opportunistic behavior of exchange partners. In strong form trust, trust emerges in the face of significant exchange vulnerabilities, independent of whether elaborate social and economic governance mechanisms exist, because opportunistic behavior would violate values, principles, and standards of behavior that have been internalized by parties to an exchange.

Table 3: Parallels between stages of moral development and types of trust.

Stage in moral development	**Types of trust and trustworthiness**
• *Amoral stage:* When there are no moral choices to be made	• *Weak form trust:* Limited opportunities for opportunism
• *Conventional morality:* Decisions and behaviors conform to standards in order to avoid the cost of being caught violating standards	• *Semi-strong form trust;* Trust emerges in response to social and economic governance mechanisms that impose costs on opportunistic behavior
• *Post-conventional morality:* Decisions and behaviors conform to standards because they have been internalized as principles and values	• *Strong form trust:* An exchange partner behaves in a trustworthy manner because to do otherwise would be to violate values, standards, and principles of behavior

Levels of Trust

Zaheer (Zaheer et al. 1998) argues that trust is a micro-level phenomenon and has its basis in individuals. Trust can be exhibited by one individual towards another individual or towards a group of individuals. However, individuals in an organization may share an orientation toward individuals within another organization. From this point of view, inter-organizational trust describes the collectively held trust toward the partner firm.

The key characteristics of trustworthy individuals include personal characteristics, past behavior and emotions such as demonstrated honesty, loyalty, sympathy and empathy (Nooteboom 2002).

Additionally, trust stems from the characteristics of a community or organization. This includes, for example, ethnic groups, professions, networks, firms, associations or whole industries. Collective trust depends on reputation, which refers to knowledge held by individuals about a potential partner in terms of their behavior in prior network relations, or on shared rules and codes of conduct within particular groups (Welter and Smallbone 2006).

Business relationships are also governed by norms, values and codes of conduct within a society (Welter and Smallbone 2011). This refers to institutional trust as a form of general trust in the functioning of the overall political, legal or economic framework and its informal rules (Zuker 1986; Williamson 1993; Luhmann 2000; Welter 2012). Determinants of institutional trust are both endogenous and exogenous (Hudson 2006), where the endogenous factors refer to institutional performance: the higher the levels of institutional trust generated, the better they perform. The exogenous factors are related to individual characteristics, such as income and education (Hudson 2006). Moreover, institutional trust is easily destroyed, as negative experience leads to a generalized loss of trust across all institutions.

Table 4 illustrates forms of trust in relation to the levels upon which it occurs, its object and sources. Trust is a multidimensional concept, with recursive links between different levels, forms and sources.

Table 4: Illustrates of trust in relation to the levels upon which it occurs, its object and sources.

Forms	Level	Object	Source
Personal trust	Micro	Relationship, person	Emotions, intentions, goodwill, benevolence, characteristics of persons, experiences, knowledge, competencies
Collective trust	Meso	Community Organization Industry	Characteristics of groups, information, reputation, recommendation certification, professional standards'
Institutional trust	Macro	Cultural rules Formal regulations Business infrastructure Government	

Personal and collective trust overlap in terms of trust objects and trust sources; communities and organizations consist of people and relationships between people. Therefore, personal trust can foster collective trust; and competencies which foster personal trust at micro level are reflected in reputation and recommendations which in turn influence collective trust at the meso-level. Collective and institutional trust has similar sources: conventions at the meso-level, for example, within a profession or industry, are informal; and culturally-based rules, in this case the culture of a profession or industry (Welter 2005). Institutional trust is both an object and a source for collective as well as personal trust (Nooteboom 2002).

According to Welter (Welter 2012), although there is an agreement in the literature that institutional trust draws attention to the context in which trust occurs, organizational scholars and economists disagree as to whether institutional trust is a form of individual or collective action that is constitutively embedded in the institutional environment in which a relationship is placed (Bachmann and Inkpen 2011).

The role of trust in overcoming liabilities

As explained by Welter (Welter 2012), trust in the context of entrepreneurship is strongly connected with networks and social capital. Trust is believed to support network relations, while network contacts play a role in recognizing and constructing opportunities, fostering

business creation, mobilizing complementary resources, obtaining advice and other forms of assistance, and establishing viable business relations. The importance of support from strong relational ties has been demonstrated (Jenssen and Greve 2002) particularly with respect to enterprise survival and success in the early stages of venture creation (Bruderl and Preisendorfer 1998).

According to Welter (Welter 2012), trust can be crucial in entrepreneurial success, because strong ties tend to bind individuals with similar or complementary interests into long-term relationships. Such ties add to the capability of quickly pursuing market opportunities (Uzzi 1997). During the early stages of enterprise development, strong ties can encourage entrepreneurial persistence (Davidsson and Honig 2003). Greve (Greve 1995) argues that trust-based personal relationships enable entrepreneurs to gain greater feedback on their business idea. Therefore, trust is one of the key properties of social capital, which is essential for a functional network (Anderson and Jack 2002).

According to Welter (Welter 2012), trust is considered to be important for addressing liability of newness. Aldrich and Fiol (Aldrich and Fiol 1994) found that successful new founders were more likely to build networks of trust which assist in signaling legitimacy.

Newbert and Tornikoski (Newbert and Tornikoski 2011) argue that relational ties may help new entrepreneurs by reducing the costs of gaining resource. They suggest a strategic approach to relationship-building where new entrepreneurs should focus on establishing a strong sense of trust.

Welter (Welter 2012) introduces a number of studies, which argue that for networking to be successful at any stage of business development, business ties must be trust-based to some extent. Over time, in business-related networks, calculative ties are supplemented by affect-based relations (Jack et al. 2008; Smith and Lohrke 2008; Jack et al. 2010).

According to Neergaard and Ulhøi (Neergaard and Ulhoi 2006), trust can be institutionalized in networks if it is transferred from the personal to the organizational level.

Welter (Welter 2012) explains that network relations can vary in nature at different stages of business development: strong ties are of high value in initial phase of business development, but excessive reliance may become a constraint as the business develops. During the pre-start-up phase where entrepreneurs identify business opportunities, they rely on strong network ties and contacts, but in the later stages the network becomes more business-oriented.

Welter (Welter 2012) argues that opportunities for the business-oriented type of networking tend to increase as the business develops. Therefore, personal trust might decrease in importance over time and institutional trust becomes more important, indicating recursive interactions between both forms of trust.

As the business develops and the institutional environment becomes stable, impersonalized contracts slowly force out old practices (Peng 2003). However, personal trust remains where survival strategies and coping strategies of individuals are concerned (Welter and Smallbone 2009).

Dietz (Dietz 2011) suggests that institutional and personal trusts co-exist and co-evolve, complementing or substituting each other. This draws attention to the complex and dynamic nature of trust.

Proposition 3: *The functionality of an entrepreneur's network and the ability to exploit their partner's resources are heavily supported by trust in the alliance formation process*

Complexity of trust

According to Welter (Welter 2012), several authors have analyzed whether strong ties, in the form of trust between small business owners and advisers (Bennett and Smith 2004; Bennett and Robson 2005; Dyer and Ross 2007), can result in "ties that blind" (Kautonen et al. 2010). Zahra (Zahra et al. 2006) focuses on the downside effects of trust in corporate entrepreneurship, including lock-ins, over-confidence and the lack of effective controls due to over-reliance on trust.

Bennett and Robson (Bennett and Robson 2004) compare the use of legal contracts and personal trust, showing that a higher reliance on trust alone is associated with lower levels of client impact and satisfaction, while a combination of trust and contracts fosters higher levels of client impact and satisfaction in the advisory relationship.

According to Welter (Welter 2012), the duality of trust and control depends on the context in which it occurs: it is visible at both the macro and micro levels and across forms of trust. Therefore, Welter suggests that it is not only the duality of trust and control, but also of institutional and personal trust that needs to be considered. Trust and control as well as institutional and personal trust can simultaneously complement and substitute each other.

Institutional and personal trust is always accompanied by control mechanisms, for example, contractual provisions and legal enforcement at the macro level, regulations within a profession and a loss of reputation for an entrepreneur at the micro level (Welter and Smallbone 2006).

Welter (Welter 2012) argues that in contexts where institutional control and legal sanctions do not properly function, levels of institutional trust may be low. The roles of trust and sanctions can change as entrepreneurs move from simple transactions to more complex relationships, and from the early stages of venture development towards growing their businesses. It is not pure personal or institutional trust, but the combination of them and also an element of control, that dominates business relationships.

Legitimacy

Legitimacy and trustworthiness are closely related and highly important qualities of an alliance partner. Suchman (Suchman 1995) defines legitimacy as a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions. The determination of legitimacy is made by the constituents or the societal groups to which the organization must be responsive. A firm's legitimacy, for example, is determined by the various stakeholders on whom it is dependent for survival (e.g. consumers, regulatory authorities, etc.).

The concept of legitimacy can be particularly relevant to the case of strategic alliances as it concerns how a member firm in an alliance perceives another member firm, which can also influence the way in which inter-firm cooperation unfolds. An organization is said to be legitimate if it meets the expectations of its key constituencies in the environment (Suchman 1995).

In the alliance context, we define inter-partner legitimacy as 'the mutual acknowledgment by the alliance partners that their actions are proper in the developmental processes of the alliance'. Kumar and Das (Kumar and Das 2007) propose that inter-partner legitimacy is important because it can facilitate cooperation, lower transaction costs, and enhance the reputational capital of the partners. Thus, inter-partner legitimacy has a critical role in alliance success. Inter-partner legitimacy is not only a state but also a process. It is a state in that it reflects a collective judgment made by the alliance partners about each other at any given point in time (Das and Teng 2002).

Proposition 4: *Inter-partner legitimacy is crucial to build trust, thus it is important in facilitating cooperation in the alliance formation process*

Trust as a governance mechanism

Alliances, as well as more traditional relationships, require some degree of agreement between different parties. Relationships between exchange partners can be stabilized through governance mechanisms, either formal or informal.

Formal mechanisms clearly specify the required degree of co-operation, conformance and inter-organizational integration through the use of written documents or agreements. Bucklin and Sengupta (Bucklin and Sengupta 1992; Bucklin and Sengupta 1993) discuss the benefit of a written contract in terms of creating an "opportunity to design desired patterns of partner behavior and to extract penalties from failures to perform". Macneil suggests that formal contracts represent promises or obligations to perform particular actions in the future (Macneil 1978).

Informal mechanisms consider the historical and social context of a relationship as well as specifically acknowledging that the performance and enforcement of obligations are an outcome of mutual interest between parties (Macauley 1963; MacNeil 1980). The use of informal mechanisms, such as implicit contracts (Klein, Crawford et al. 1978), are defined as unwritten agreements between firms, which are enforced not by formal authority and power but rather by the desire to create and maintain a positive reputation for integrity and fairness (Barney and Ouchi 1986) and build trust (Larson 1992).

Welter (Welter 2012) suggests that trust is of most economic value when it is based on non-contractual, rather than contractual mechanisms. Barney and Hansen (Barney and Hansen 1994) suggest that trust eliminates the need for formal contracts, which are costly to write, monitor, and enforce. Gulati (Gulati 1995) suggests that trust in exchange relationships has been proposed to add economic value and increase performance by lowering transaction costs and allow for greater flexibility to respond to changing market conditions.

Transaction costs involve all of the costs associated with conducting exchanges between firms (Williamson 1985). Some scholars, among them Nobel prize winner Douglas North, claim that transaction costs are significant and have a major impact on economic efficiency. North estimates that transaction costs may represent as much as 35-40% of the costs associated with economic exchange (North 1990), Barney and Hansen (Barney and Hansen 1994) argue that

trustworthiness reduces trans-action costs in exchange relationships and could be a source of competitive advantage

Proposition 5: *Trust as a governance mechanism in an entrepreneurial alliance formation process reduces transactional costs*

Trust Formation

Relatively few entrepreneurship studies have concentrated explicitly on how trust in entrepreneurship is built. Welter (Welter 2012) argues that this lack of focus on trust formation in entrepreneurship might be due partly to the fact that very few studies have undertaken the longitudinal work on trust required to adequately capture its complex nature.

Welter (Welter 2012) suggests that trust may be built through initial control, a "leap of faith" or discursive processes, depending on the objectives and the extent of the risk involved that are likely to be associated with the nature and extent of the cooperation and its importance to the partners.

Mollering (Mollering 2006) argues that at the center of the concept of trust is vulnerability and uncertainty (the leap of faith), which enable actors to have positive expectations of others.

Nooteboom (Nooteboom 2002) distinguishes three major stages of building trust: first, control in the absence of trust; second, assessing trustworthiness and developing tolerance levels of trust; and third, widening these tolerance levels. These three stages may overlap and do not have to occur sequentially.

In the control stage, partners need to decide if there is a need for formal or informal mechanisms. If the alliance partner chooses to proceed with an informal mechanism such as trust, he or she will have to take some initial risks because only then is it possible for the trustee to demonstrate his or her trustworthiness (Das and Teng 1998).

In the second stage, knowledge and experience allow partners to evaluate their trustworthiness, thus, experiences made during the relationship formation allow trust to grow or fade (Coriat and Guennif 1998).

In the third stage, tolerance levels are widened as a result of shared cognitive frames. It is here that personal trust may play a more important role, dominating in some relationships but not others, depending on the experiences of entrepreneurs, their familiarity with each other and the nature of their business partnership (Welter 2012).

Poppo and Zenger (Poppo and Zenger 2002) argue that trust formation in the context of new product development is an outcome of two types of factors. The first consists of elements expected to positively influence trust formation: communication behavior, shared problem-solving, and perceived fairness. The second consist of elements expected to negatively influence trust formation: the continued existence of conflicts and partner egoism during the project. Together, these five elements are expected to regulate trust formation between exchange partners.

Welter (Welter 2012) suggests there is an important element of learning to the process of trust formation, where learning and trust may enhance or hinder each other, although this relationship has received little attention so far in the entrepreneurship literature. Bergh et al. (Bergh et al. 2011) draw attention to the different learning outcomes that entrepreneurs can achieve through building trust and understanding trust-building as basic factors to entrepreneurial learning. While trust might be required for entrepreneurial learning to occur, learning also can contribute to both personal trust and institutional trust. Based on experiences, individuals learn to trust each other as they become familiar with each other's competencies, motivations and sense of fairness (Bowey and Easton 2007; Welter et al. 2008).

Proposition 6: *Communication is an important element to promote trust formation*

Proposition 7: *Alliance partners can learn to trust each other as they become familiar with each other's competencies, motivations and sense of fairness*

Case Introduction

The entrepreneurial activity in Norway had been studied by GEM (Global entrepreneurship monitor). Early-phase entrepreneurship was measured in a representative sample of the population between 18 and 64 years by asking whether they currently are starting up a company, or if they own and manage a company established less than 42 months ago. The report in 2008 shows that 8.7 % of the adult population is involved in entrepreneurial activity (6.5 % in 2007, 9.1 % in 2006, and 9.3 % in 2005). Comparing to other European countries, Norway scores relatively low on traditional innovation indicators.

As the biggest university in Norway, University of Oslo has significant contribution both in research and innovation. In 2010, Inven2 - the technology transfer office partly owned by the University of Oslo, filed 184 new disclosures of inventions, started 4 new start-up companies, and has 21 start-ups in their portfolio.

The action researcher in this study is a master student of Innovation and Entrepreneurship at SFE (Senter for entreprenørskap) at the University of Oslo. The action researcher, hereafter referred to as the entrepreneur, joined the new initiative at SFE - the “entrepreneurs in residence” program. He introduced this idea to the professor at material science department that he knew from his previous studies. The professor liked the idea of setting up a new company and inviting students from the Innovation and Entrepreneurship program as a management team to develop business.

In January 2011, the entrepreneur started the process of registering the start-up, and from March 2011 there was an active management team that included three students. The entrepreneur is the CEO of the start-up and also a member of the board. The professor is the chairman of the board.

Since June 2011, the start-up has formed four different entrepreneurial alliances, which are the research objects in this study.

Nano-Cluster

The main partner in the Nano-Cluster project is the photo-catalysis group at the material science department at the university. The photo-catalysis group is an initiative that the professor launched in March 2011; the main goal of this group was to coordinate all activities in the field of photo-catalysis at the university. The professor and another researcher at the material science department had at this point started to collaborate with an external company (referred to as company Sola later in the document) and had a research contract with them. Activities regarding this contract are coordinated and conducted through the photo-catalysis group (referred to as Nano-Cluster later in the document). The Nano-Cluster consists of approximately 20 persons with different background. They meet once a month to update each other on all the projects that are linked to this group. The start-up's motivation for being a part of this cluster is to generate new knowledge and develop this technology further both scientifically and commercially.

Emission Cleaner

The entrepreneur sent the disclosure of invention to the TTO of the university in January 2011. The idea started as an oil remediation idea, but has been changed many times since. The entrepreneur implemented this idea in the start-up project portfolio, and the start-up has formed an entrepreneurial alliance with an owner of company Informatic. The partner has experience in air emission and has a unique network in Norwegian and international clean-tech industry.

The start-up, the partner and the entrepreneur’s private holding company have divided ownership, in case of a potential technology breakthrough, in three equal parts. The partner is responsible for the initial seed money and development of the test-bed, while the start-up is responsible for developing the technology and the proof of concept.

Med-Tech Cleaner

The entrepreneur started a strategic management course at the university in January 2011, where students from different programs at the university were participating. Here he met and worked together with a PhD student at the intervention center at the university hospital. This center is led by one of key players in Norwegian and international medical science.

After this course, the entrepreneur and the PhD student came up with the idea of making self-cleaning medical devices. The entrepreneur has education in nanotechnology and connections to the researchers at the material science department. As it turned out, the leader of the intervention center and one of the leaders at the material science department had for many years been talking about doing something together, but they had not found any project of common interest.

The PhD student and the entrepreneur initiated the meeting between the two centers at the university. The start-up's main goal is to get scientifically significant results that would prove the superior efficiency of their created material for surface self-cleaning. The alliance with the Intervention center could make it easier to conduct a feasibility study on the self-cleaning technology in a hospital environment. Since then, the alliance between the start-up and the Intervention center has been formed.

The intervention center has also included the head of sterilization department in this collaboration, which is responsible for the validation of the material efficiency. Unfortunately, they did not get a significant result, and everyone understood that this can take more time than first expected. All stakeholders in the project wanted the collaboration to be continued, but it is clear that there is a lot more fundamental research to be done.

Water Cleaner

The original idea came from a publication about cleaning water with energy from the sun and a photo-catalyst that the professor presented in Apollon December 2009. The founder of company Sola saw this article and contacted the professor for a meeting. Sola is a start-up that's main goal is to find a novel way of treating waste-water. The partner company is owned by two companies, one of them is the company Informatic that later entered into an alliance with the start-up in Emission Cleaner project. The second company, Automation, is owned by two persons that are specialized in automation and business development.

Sola filed an application for Innovation Norway funding based on this project. It got the application granted in April 2011 and has paid the university 200 KNOK for doing research until October 2011. In the contract between Sola and Thin-film (company founded by two researchers at the material science department and Inven2), Thin-film specialized in making novel nano-materials. Sola is responsible for looking for business opportunities. In this project, the start-up is working closely with Sola to develop an efficient photo catalyst for waste-water

treatment. The two companies got in contact with each other for the first time through the Nano-Cluster meeting. The entrepreneur was a very active participant at those meetings, and the CEO of Sola initiated a meeting between the two companies in May 2011. They discussed how they could develop this relationship and have a common strategy towards Innovation Norway and the Norwegian research council.

Current State

The start-up is in different phases of entrepreneurial alliance formation with four projects with four different partners.

The entrepreneur within the research time-frame has conducted action research on multiple cases imbedded in the start-up. He has investigated the challenges in the formation of entrepreneurial alliance, and how start-ups can position themselves to be attractive alliance partners. This is particularly important for the start-up's further strategy, so it can build legitimacy in a new technology market and attract investors. New knowledge and insight in the processes and mechanisms around the start-up's four projects has been investigated and presented in this master thesis. Establishing the proof of concept has been essential both in the Water Cleaner and the Emission Cleaner projects. This has been the start-up's main focus within the research time-frame.

The Nano-Cluster project is more managerially complex because it is an initiative to join an existing cross-sectional group of scientists and externals into a center for photo-catalysis. It is important for the start-up to be a key player in the formation of this center.

Desired State

The desirable future for the start-up within the action research time-frame is to have a positive result that would be scientifically significant, and to have established a photo-catalysis center. Table 5 gives an overview of actions planned in the start-up within the research time-frame and the desired state when finished.

Table 5: Overview of current state of all projects and the desired state after the research time-frame is finished.

Project	Current State	Desired state	Research time-frame
Nano-Cluster	The photo-catalysis group has fixed meetings at least once a month and it consists of researcher with different fields of expertise.	Photo-catalysis center is established at the start-up has a key role in its facilitation	From 26th of January until 26th of Mars
Emission Cleaner	Working on the proof of concept for purification of water together with the university and company Sola. The start-up and Sola are in the initial phase of negotiating terms for an entrepreneurial alliance.	The positive proof of concept for water purification and a formal agreement for an entrepreneurial alliance	From 26th of January until 26th of Mars
Medical Equipment	Working on a proof of concept for reducing NOx in air emission together with company Informatic. There is an informal agreement between the start-up, Informatic and entrepreneur's private holding company to divide the ownership in three equal parts in the case of a potential technology breakthrough	Positive proof of concept for reducing NOx in air emission	From 26th of January until 26th of Mars
Water Cleaner	Working on a proof of concept for self-cleaning surfaces, together with two leading research centers; center for materials and nanotechnology and the intervention center at the university hospital	The start-up should continue to facilitate communication between all parties	From 26th of January until 26th of Mars

Methodology

Since in depth knowledge about a contextual complex environment is hard to obtain, this study has combined a participative method with a descriptive multiple case approach to reveal important know-how about alliance formation process. The action researcher sampled data from his own start-up, and two collaborating researchers conducted interviews with the key players in each case.

Research Design

A *longitudinal design* on entrepreneurial alliances has been investigated in this study in order to have a valid understanding of an alliance formation process and start-up activities. An *action research* based methodology, defined by Coghlan and Brannick (Coghlan and Brannick 2010), has been used and supplemented with a *multiple case study,* which involves interviewing key players among four alliances.

Data generated from action research and case study has been cross-checked with each other, and an additional *comparative analysis* has been conducted. In addition, the data have been supplemented with *archival material*, notes, e-mails and reflections from operations in 2011 and early 2012.

Figure 1 illustrates the research design and how different methodologies interchange with each other. There is a reciprocal flow of information between the action research and the multiple case study.

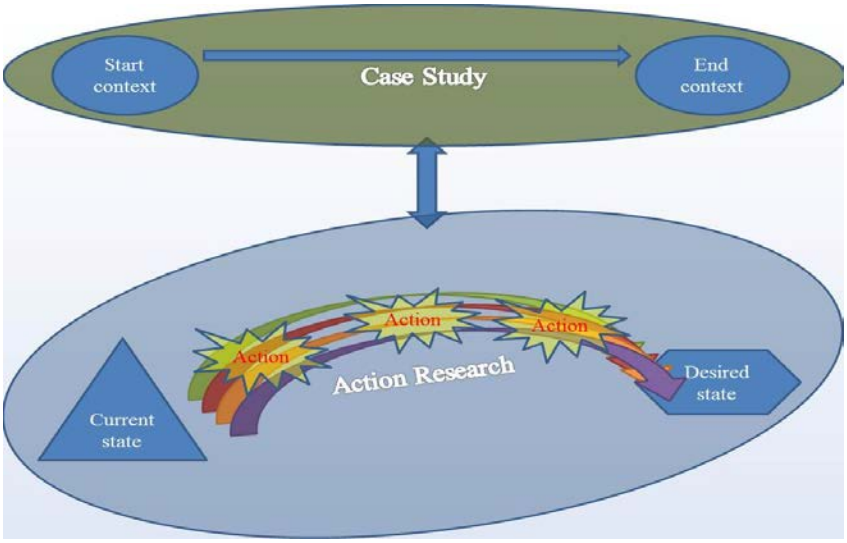

Figure 1: illustration of the research design and interaction between different methodologies.

Research Strategies

Action Research

Managers are increasingly undertaking action research projects in their own organizations. Action research involves opportunistically planned interventions in real time situations and a study of those interventions as they occur, which in turn informs further interventions (Coghlan and Brannick 2010). Insider action research has its own dynamics, which distinguishes it from an external action researcher approach. The manager-researchers are already immersed in the organization and have a pre-understanding from being an actor in the processes being studied. Challenges facing such manager-researchers are that they need to combine their action research role with their regular organizational roles and this role duality can create the potential for role ambiguity and conflict.

You can compare doing action research in your own organization with being an actor, directing your own movie, as Riorden expresses it, action research projects represent: a kind of studying social reality without separating (while distinguishing) fact from value, they require a practitioner of science who is not only an engaged participant, but also incorporates the perspective of the critical and analytical observer, not as a validating instance but as integral to the practice (Riorden 1995; Fisher et al. 2000).

There are two research cycles operating in parallel when you are doing action research. The first cycle is called the *core action research cycle* (Zuber-Skerritt and Perry 2002) and allows a researcher to follow four pre-defined steps; constructing, planning action, taking action, and

evaluating action. The second cycle is called the *thesis action research cycle* (Zuber-Skerritt and Perry 2002) or the meta-cycle, in this cycle a researcher can reflect over the core action research cycle. As Coghlan argues, a researcher has to be continually inquiring on the four main steps, asking how these steps are being conducted, and how they are consistence with each other and, this way, shaping how the subsequent steps are conducted (Coghlan and Brannick 2010).

Mezirow (Mezirow 1991) identifies three forms of reflection: content, process and premise. Content reflection is when you are reflecting over the issue, process reflection is where you think about the strategy, procedure etc., and premise reflection is where you evaluate underlying assumptions and perspectives.

Mezirow's three forms of reflection are parallel to the four territories of experience commonly used in action research (Fisher et al. 2000; Torbert and Associates 2004). These four territories operate at the individual, interpersonal, organizational level. The four territories are: intentions, planning, action and outcomes. Action research aims to develop awareness, understanding and skills across all these territories. An action researcher can also inquire about the connection between these phases.

The activities of the meta-learning are not confined to one's first person practice as the individual action researcher; they can add another layer of complexity with the second person practice and include techniques from the qualitative research.

As one of the streams of collaborative research, action research cannot be classified as one single methodology; rather it includes a wide range and levels of inquiry approaches, activities and methods (Reason and Bradbury 2000). Action research is viewed as a holistic process that is contextually bound.

Multiple Case Study

Researcher Robert K. Yin defines the case study research method as *an empirical inquiry that investigates a contemporary phenomenon within its real-life context*; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin 2009). Case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. Case studies are complex because they generally involve multiple sources of data, may include multiple cases within a study, and produce large amounts of data for analysis. The advantages of the case study method are its

applicability to real-life, contemporary, human situations and its public accessibility through written reports (NA 1997). Case study results relate directly to the common readers everyday experience and facilitate an understanding of complex real-life situations.

A multiple case study enables the researcher to explore differences within and between cases. The goal is to replicate findings across cases. Because comparisons will be drawn, it is imperative that the cases are chosen carefully so that the researcher can predict similar results across cases, or predict contrasting results based on a theory (Yin 2009).

Data Collection Techniques

Reflection report

The action research has been documented with reflection from the researcher, in addition, most of the meetings have been recorded. The action researcher has used the ladder of interference to avoid hasty conclusions, and questions from CIT to inquire important knowledge about mechanisms between the four territories of experience.

Since it's a challenge for the action researcher to remain objective, it is important to develop procedures for addressing authenticity. This is characterized by the four process imperatives: be attentive (to the data); be intelligent (in inquiry); be reasonable (in making judgments); be responsible (in making decisions and taking action) (Coghlan and Brannick 2010). They address issues related to how a researcher engages in inquiry and action. All the imperatives points to an operation with associated activities, Table 7 give an illustration of it.

Table 6: Illustration of authenticity (Coghlan and Brannick 2010).

Operations	Activities	Process Imperative
Experience	Attending, sensing, imagining	Be attentive
Understanding	Inquiring, understanding	Be intelligent
Judgment	Reflecting, weighing evidence, judging	Be reasonable
Decision	Deliberating, deciding, acting	Be responsible

Techniques from the action research, such as the ladder of interference, the right/left hand column and treating facts as hypothesis provide valuable tools for testing consistency between the process imperatives. The ladder of interference plots how meanings and assumptions are attributed to selected observable data and experiences, and conclusions and beliefs are adopted on which action are based. (Argyris et al. 1985; Ross 1994). This technique helps researchers to avoid hasty conclusions, and allows them to follow the structure, where they begin at the lowest point of the ladder of interference every time. Figure 2 illustrates the ladder of interference.

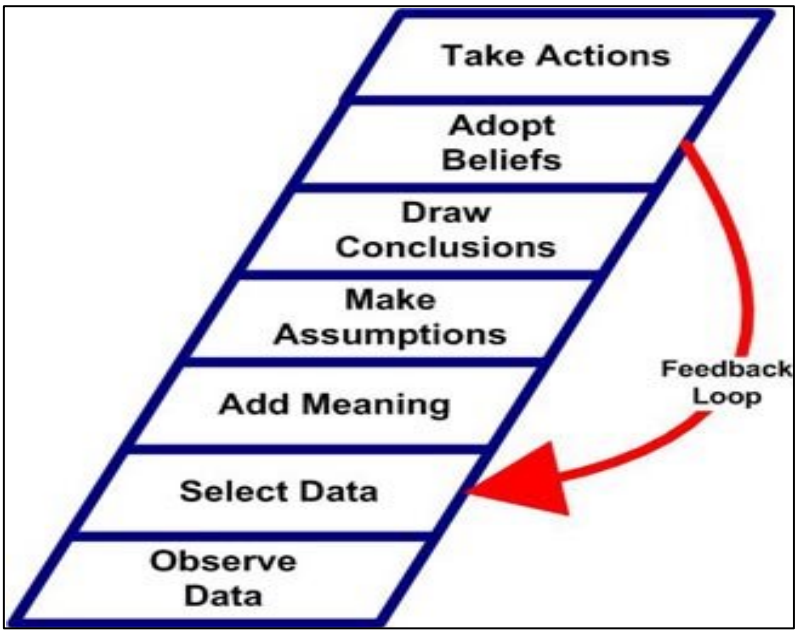

Figure 2: The ladder of interference

Journal keeping is also a significant tool for developing reflective skills, when one is generating data from his or her own observations and experiences. Over time one can learn to differentiate between different experiences and ways of dealing with them (Moon 1999; Raelin 2008). This is important if a researcher wants to engage in inquiry about his or her own core action research cycle and gain new knowledge.

Interview

Interviews have been carried out and recorded by two interviewers; notes of the most important facts mentioned were taken by one of the interviewers. This allows easier analysis of the collected data.

A focused interview, which is described by Merton (Merton 1990) has been chosen to conduct the interviews. The interviewees were interviewed for approximately an hour. The interviews were carried out in a conversational manner and were open-ended, but the interviewers followed the certain set of questions that were prepared in advance, regarding the main research objectives.

The realist interview type was chosen, this type of interviews provides insight into interviewees' psychological and organizational lives outside the interview situation. This requires a concern with accuracy of accounts. Therefore the results obtained through interviews are compared with those obtained through other methods (as action research), in order to create triangulation.

Critical incident technique

The *critical incident technique - CIT* has been used to sample critical incidents in the alliance formation process both in the action research and interview. CIT provides researchers with better understanding of the process, the frame of reference, and the feelings about an incident or the set of incidents, which have meaning for the respondent. And CIT helps the researcher to be more aware of the context he or she is imbedded in, and add important data about how the context continual changes throughout the core action research cycle.

CIT was first used in a scientific study conducted by Flanagan in 1954 (Flanagan 1954), Flanagan defined the CIT as;

[A] Set of procedures for collecting direct observations of human behavior in such a way as to facilitate their potential usefulness in solving practical problems and developing broad psychological principles… By an incident is meant any specifiable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act. To be critical the incident must occur in a situation where the purpose or intent of the act seems fairly clear to the observer and where in consequences are sufficiently definite to leave little doubt concerning its effects (Flanagan 1954).

In this study, CIT was used in two ways. First, as an expansion of the analytical tools Coghlan's action research provides, and the researcher has systematically used questions such as "what triggered the event", "what are the consequences", and "what are the alternatives". Each incident was discussed in order to address the issues of interest for the research team and to strengthen the analysis of the pre- and post-unintended incidents and context. In the event

of an unintended incident that occurred within the data sampling time-frame, CIT was used to evaluate emotions, context, strategy and outcome. Further, it reveals knowledge about how the researchers' personal assumptions influence processes within the observed environment.

Secondly, CIT was used as a complementary technique for conducting case interviews. According to Cassel (Cassell 2004), qualitative research interviews should have: a low degree of structure imposed by interviewer, a preponderance of open questions, a focus on specific situations and action sequences rather than abstractions and general opinions.

Data analysis

The data analysis strategy was designed in accordance with the research questions, review of the literature, and propositions proposed in this study. Several techniques for data analysis have been used.

Firstly, a pattern matching analysis. Such logic compares empirically based pattern with a predicted one or several. If the patterns coincide, the results can help a case study to strengthen the internal validity. However, if the results fail to show the entire pattern as predicted - that is, even if one variable does not behave as predicted - the initial proposition would have to be questioned (Yin 2009)

Each case has also been screened for convergence of evidence, which means that they have evidence from different sources in each case. If identical results between multiple cases are identified, it strengthens the validity of the analysis (Yin 2009).

Further, a cross-case analysis has been conducted on two different levels. First, on the micro-level, where methodologies are triangulated, and secondly, on the macro-level, where case competencies happens within the methodology. The macro level analysis from action research and case study has further been compared, to strengthen the validity of the findings.

A time series analysis has been conducted to reveal how important factors from the pattern matching technique evolve in time; this can also increase the validity.

Lastly, rivalry explanation has been used to broaden the theoretical grounding of propositions proposed in this study, and it has also been a good strategy for an analytical approach.

Figure 3 illustrates all the analysis conducted in this study, and the highlighted area, which is

the micro level, has been prioritized.

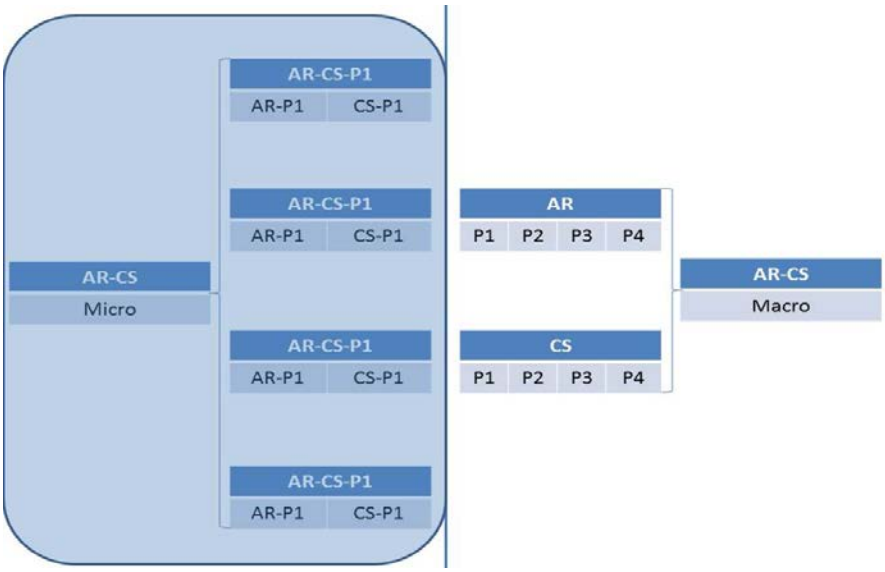

Figure 3: illustration of all analysis conducted in this study and the highlighted area - micro level has been prioritized. (P1-Nano-Cluster; P2-Emission Cleaner; P3-Medical Equipment; P4-Water Cleaner)

Validity and reliability

When participating in your own research, the researcher can be very subjective and has to be aware of assumptions he or she held towards the research itself, or personal assumptions he or she makes when analyzing meta-learning from the core action research cycle. In this study, data sampling was triangulated with interviews conducted by two “outsiders” - researchers who did not participated in the action research. Further, a clear and transparent database of the results was established so it would be easy for outsiders to review and follow the chain of evidence.

From a case study perspective, it is important to establish a plan for how one will ensure validity of the research (Yin 2009). The interviews were designed under the consideration of both internal (content) and external (construct) validity.

The research results are built on information obtained from both sides of the partnership. Given the reciprocal nature of trust, it gives validity and reliability that perceptions of respondents of both partnership participants are taken into account. The data is able to capture the bilateral aspects of trust and trust formation. Table 7 illustrates a frame-work defined by Yin to ensure validity and reliability.

Table 7: Case study tactics

Tests	Case Study Tactic	Research Phase in which tactic occurs	Action taken in this research
Construct validity	Use multiple sources of evidence	Data collection	Use of participating action research, interviews of both sides have been conducted, documentary evidence and archival material.
	Establish chain of evidence	Data collection	Action research data has been generated by diary and recorded when possible. Interview data has been recorded and additional notes were taken in real time; multiple evidence sources entered into customized object-oriented database in chronological order
	Have key informants review draft case study report	Composition	The supervisor has reviewed this study.
Internal validity	Do pattern matching	Data analysis	Patterns identified across cases
	Do explanation building	Data analysis	Some cause and effect relationships have been identified
	Do time series analysis	Data analysis	The time series analysis has been conducted for a period of one and a half year.
	Do logic models	Data analysis	Not performed fully, but findings from the time series analysis has been cross checked with findings from the pattern matching
External validity	Use rival theories within single cases	Research design	Has been used on one some of the literature, unfortunately there is at gap in the literature and rivalry theories are hard to find
	Use replication logic in multiple-case studies	Research design	Multiple-cases are investigated using replication logic
Reliability	Use case study protocol	Data collection	Same data collection procedure followed for each case; consistent set of initial questions used in each interview
	Develop case study database	Data collection	Action research data, interview data, additional notes and emails have been stored into a database, an overview of the data collection is presented in the appendix

Results

Results were triangulated and findings from different studies on the same case were compared. The main objective was to identify patterns and differences among the data from different sources. Data and the comparisons were presented in templates. Results of comparisons were described and synthesized.

Later on, results from each case were compared and have been presented in a template called AR-CS (Action Research – Case Study) micro. Results of the comparison were described and synthesized.

Additionally, a time-line analysis was conducted in order to reveal how the alliance formation evolved in four different projects. Data generated from the action research, case study and archival data has been used.

AR-CS Nano-Cluster

The results from the interview with the professor (which is behind the idea of creating an alliance among several research groups at the university and external firms) and action researcher were first compared and conduct as table CS Nano-Cluster. Then the conducted data table was further compared with results from action research. The final results of the comparison were described in the following text.

The parties of the alliance have no formal agreements. The alliance is cluster-like, and it includes several members from academic and industrial environments. The cluster provides access to resources and network, but the collaboration has more academic than commercial value. The professor is currently working with external collaborators on forming a Gemini center, which will allow the cluster to develop in the direction of a more formal collaboration.

From the analysis there have been identified several issues in the collaboration:

Firstly, there is the lack of general commitment from the academic environment. Secondly, the cluster does not have a clear structure and control mechanisms, which makes it difficult to facilitate. The cluster does not add enough value for external firms. The entrepreneur's ability to facilitate the communication with the academic part of the cluster is limited, because he is not in the position to demand anything from the researchers.

The professor and the entrepreneur perceive the collaboration performance differently. In the professor's opinion, the best way of working is when maximum independence is allowed. But according to the entrepreneur, this makes the facilitation harder, because of the lack of clear structure and management.

The entrepreneur facilitates the communication and coordinates meetings within the cluster. He has taken responsibility for facilitating the collaboration, but it faces the task overload, when the capacity is not large enough to match it. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.

The resources in the alliance are aligned complementary. The professor has in-depth knowledge of the scientific background behind the technology, and provides the access to research facilities at the university. The entrepreneur uses time, energy, brings new initiatives, facilitates projects with external partners.

It can be identified from that the entrepreneur takes initiative, delivers on time, follows up, and keeps promises. The professor emphasizes that "without him few things would have happened". The entrepreneur is enthusiastic about new ideas and opportunities. He also has the capabilities and willingness to "make it happen". The entrepreneur is trusted by stakeholders in the cluster.

The entrepreneur and the professor met each other in the academic environment. First the entrepreneur was professor’s student, then later they shared some of their ideas at a social gathering at the university, which led to the beginning of the collaboration. The professor and the entrepreneur both contributed with their contacts to creating a valuable complementary network. The professor describes the entrepreneur as a "unique" personal, a serial entrepreneur, while usually entrepreneurial minded persons are rare in the academic environment.

The communication is mostly informal, and usually initiated by the entrepreneur. The entrepreneur does not have legitimacy in the academic environment (is not specialized in the field of nanotechnology), therefore he tends to use the advantage of the professor's high position and reputation in the communication with researchers.

Table 8: descriptive analysis AR-CS Nano Cluster

Cases	General	Content and issues	Process	Premise	Collaboration performance
AR Nano Cluster	Cluster-like alliance No formal agreements.	Facilitating and coordinating is an issue that needs to be solved. The start-up lacks integrity in the academic environment and does not have the mandate to demand anything from the researchers. The partners are busy, and it is hard to communicate sufficiently. The cluster does not add the expected value for external firms, which are more commercially minded.	The cluster provides access to new resources and network. The entrepreneur facilitates communication. The cluster is in the process of forming a gemini center.	Stakeholders in the cluster acknowledge that the entrepreneur facilitates communication and action within the cluster. There is a relational and institutional gap between the academic environment and externals firms. The entrepreneur has expirenced a task overload and has taken too much initiative without being able to sufficeiently follow it up.	The cluster could be more structured.
CS Nano Cluster	No formal agreement.	The professor is very busy and does not have enough time to follow up the cluster. He sometimes feels pressure from the entrepreneur, which can be frustrating. The entrepreneur feels that it is hard to collaborate with the professor, since the professor expects a lot, but does not always follow up. The entrepreneur thinks that the meetings and the cluster are too unstructured.	The collaboration with the cluster is more of academic value than commercial value.	The entrepreneur sees himself as a essential facilitator of the project.	The professor thinks the collaboration is excellent but challenging. The entrepreneurs thinks the result of the collaborations could be better.
AR-CS Nano Cluster	No formal agreement. The alliance is cluster-like.	The cluster initiative lacks the general commitment, mostly from the academic environment. Partially from the professor because of the lack of time. The cluster could be more structured, which would make facilitation easier.	The cluster provides access to new resources and network. The collaboration with the cluster is more of academic value than commercial value. The entrepreneur facilitates communication and coordination.	There is a relational and institutional gap between the academic environment and externals firms. The entrepreneur has experienced a task overload and has not been able to facilitate close enough.	The professor and the entrepreneur precieve the collaboration performance differently.

Table 8: descriptive analysis AR-CS Nano Cluster

Cases	Resource	Network	Trust	Personal features	Communication
AR Nano Cluster	The entrepreneur contributes with R&D, network and different initiatives. The entrepreneur facilitates communication within the cluster. The cluster contributes with network and reserch facilities.	The entrepreneur has identified severel potential partners and actively contributed to include them in the cluster. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.	The entrepreneur has responded on every initiative that has been launched. The entrepreneur has built trust by being a facilitator within the cluster.	The entrepreneur contributes with, creativity, enthusiasm and administrative help. The entrepreneur shows commitement through actions	The entrepreneur uses the advantage of the position and reputation of the professor in communication with the people in the academic environment. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.
CS Nano Cluster	The professor has the in depth knowledge and provides access to research facilities at the university. The entrepreneur brings initiative, time and energy, facilitates projects with external partners.	The entrepreneur met the professor on his bachelor studies course, but first started to talk about possible business idea at a social gathering at university.	The professor fully trusts the entrepreneur, and feels that without the entrepreneur few thing would have happened. The entrepreneur tries to behave in a trust building way, and feels that he is trusted.	The first impression the professor had of the entrepreneur is not very serious in a scientific perspective. But it turned out to be unique (entrepreneurial minded person in an academic environment), when known better. The entrepreneur pays less attention to details, which could be a problem in academic environment.	Mainly by informal meetings and e-mails. Professor admits, that he often does not reply e-mails and shows little initiative. The entrepreneur has to use a lot of energy to keep the project going. The entrepreneur points out that the value of monthly meetings is not as high it could be.
AR-CS Nano Cluster	There is a complementary alignment of resources within the cluster. The entrepreneur's ablity to facilitate the cummunication with the academic part of the cluster is limited. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.	The entrepreneur met the professor in the academic environment. Both the professor and entrepreneur contribute in building a complementary network.	The entrepreneur focuses on a trust building behavior. The entrepreneur is trusted by the stakeholders in the cluster.	Entrepreneurial minded persons are rare in the acdemic enviroment. The entrepreneur is enthusiastic about new opportunities and has the capability to pursue them. The entrepreneur pays less attention to details, which could be a problem in academic environment.	The communication is mainly informal and initiated by the entrepreneur. The entrepreneur himself is not in a position to demand anything from and researchers, but that is necessary, therefore he uses the advange of the professor's position and reputation. The communication with the professor is mainly initiated by the entrepreneur,

Synthesis AR-CS Nano-Cluster

The entrepreneur and the professor met each other in the academic environment, which seems to have made it easier to trust each other, share their ideas, networks, and start the collaboration. This could be due to a shared understanding of culture and context.

The professor and the entrepreneur perceive the collaboration performance differently. That could be caused by the different mindset (academic v. entrepreneurial). Furthermore, it is identified that the cluster does not have a clear structure or control mechanisms, therefore it is difficult to facilitate. This results in the performance that does not add enough value for external firms. Because of this, the entrepreneur tries to take the role of the main facilitator and compensate the lack of control mechanisms in the cluster.

The entrepreneur consciously tries to behave in a trust-building way (takes initiative, delivers on time, follows up, keeps promises). The entrepreneur's ability to facilitate the communication with the academic part of the cluster is limited, because he is not in the position to demand anything from the researchers. Since he does not have legitimacy in an academic environment (is not specialized in the field of nanotechnology), in the communication with researchers he tends to use the advantage of the professor's high position and reputation. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.

AR-CS Emission Cleaner

The results from the interview with an owner of a partner-firm in the Emission Cleaner project and action researcher were first compared and conducted as table CS Emission Cleaner. Then the conducted data table was further compared with results from action research. The final results of the comparison were described in the following text.

The entrepreneur and his partner have no formal contracts so far. There is only an informal agreement about mutual intentions and goals.

Several issues in the collaboration have been identified: The partner points out that the business plan is not clear; the collaboration is without any formal agreements, which is quite a naive way from the business perspective (both partners agree on that); the entrepreneur mostly focuses on the development of the proof of concept, while the partner is more focused on the business development.

The patent application was started before there was a proof of concept.

The proof of concept has changed the environment of the collaboration in a way that the entrepreneur gained easier access to the resources provided by the partner's company. The focus of the work has shifted to the business development.

There is high degree of independence in the collaboration. The entrepreneur can make many decisions on his own.

The collaboration in this case is evaluated as very good. The partners are satisfied with the way the work is distributed. They both feel motivated. The collaboration was highly improved after the entrepreneur has got full responsibility for the development of the POC, because that has speeded up the process.

According to the partner, the collaboration should be more formal in the future (e.g. clear understanding of how the shares are distributed), because that is important in order to maintain the feeling of equality and motivation.

There is the complementary alignment of resources in this project, and the partner has given the entrepreneur access to many of his resources. Both sides are willing to share information and let the other part exploit their resources.

The alliance partners complement each others' networks, which they actively exploit in order to access various resources or while seeking advises. The key findings of the comparison were synthesized and presented in the following text.

The entrepreneur has good contact with people in the academic environment, which is a valuable asset, because that provides access to various resources, researchers' advice.

The partners met through another collaboration in the academic environment.

The partner trusts the entrepreneur, mentions that the relationship between them is equal and gives him freedom to operate. The entrepreneur trusts the partner, feels equal in the collaboration. The communication between both sides regarding expectations is mutually open.

The partner has started the process of application for the patent before they had POC, and has not demanded to validate the results.

The entrepreneur is recognized to be result-oriented, tries to take initiative, work fast and independently, which helps to build trust. The partner considers him to be very enthusiastic, dedicated and self-motivated. According to the partner, the entrepreneur is commercial-minded and able to identify opportunities.

Both parties do not communicate on a daily basis, only when it is necessary. They are good at identifying what is important to discuss. The entrepreneur has the freedom to make many decisions himself.

Table 9: descriptive analysis AR-CS Emission Cleaner

Cases	General	Content	Process	Premise	Collaboration performance
AR Emission Cleaner	The alliance formation process has been controlled with an informal intentions agreement and clear goals and tasks. It is an alliance between two stakeholders.	It has been a challenge to facilitate this project sufficiently due to coordination issues with third parties. The entrepreneur has clarified expectations in order to ensure commitment and focus from both sides of the alliance.	The partner started the patenting process before they had proof of concept. Tight coordination and close communication has been crucial to speed up the work done by third parties. The proof of concept has changed the environment of the alliance formation process. They choose to set up a joint venture, to avoide uncertainties.	High degree of independency and commitment.	The collaboration performance improved a lot after the entrepreneur started to facilitate and coordinate the experimental setup.
CS Emission Cleaner	There is no formal contract. But the partners have a mutual understanding that one day they will come to some agreement when the proof of concept is ready.	The partner recognizes that the business plan is not very clear. The way partners collaborate in this project is quite naive from the business perspective. The entrepreneur notices that there is different understanding of an investment size and dividing of shares.	Both partners admit that although the informal way they collaborate works for them so far. Started the patent application process.		The collaboration is very good. But it should be more structured. It is based on a mutual reliance, which may seem a little naive.
AR-CS Emission Cleaner	There is an informal agreement on partners' mutual intensions.	The start-up mainly focuses on the proof of concept. The partner is more focused on the business development. Both partners admit that although the informal way they collaborate works for them so far, it is quite naive way from the business perspective.	The patent application process started before proof of concept. The proof of concept has changed the alliance formation process.	High degree of independency and commitment.	The collaboration performance improved when the entrepreneur was given the full responsibility for the proof of concept. The collaboration should be more formal.

Table 9: descriptive analysis AR-CS Emission Cleaner

Cases	Resource	Network	Trust	Personal features	Communication
AR Emission Cleaner	The entrepreneur contributes with knowledge and experimental research. The entrepreneur has more time to facilitate and coordinate the development of the experimental setup. The partner contributes with financial resources and the test facility. The partner contributes with knowledge on business development.	The alliance partners complement each other's networks. They have actively worked together to exploite opportunities in their own and each others network They have actively used their network to get access to new resources and advices. Tight connection to the academic environment has been an important asset for the entrepreneur.	The entrepreneur trusts his partner enough to let him go on the first patenting meeting alone. The partner has given away some of the control over his own resources. The partner has not deeply validated the results from the proof of concept. The partner has given the entrepreneur freedom to operate.	The entrepreneur tries to take initiative, work fast and independently. The entrepreneur has facilitated and coordinated the development of the experimental setup. The entrepreneur acknowledges that he has a lot to learn from the partner and he tries to be humble and curious.	The entrepreneur needs to communicate closely with third parties, to ensure that they deliver what promised. The entrepreneur is open in the communication with the alliance partner when clarifying expectations.
CS Emission Cleaner	The partner provides the funding for the test rig. The partner is also ready to give an input on patent application. The entrepreneur brings his network, his enthusiasm, energy and his time.	The partners got to know each other first through another collaboration.	The partner trusts the entrepreneur and mentions that the relationship between them is very equal, although he is the only investor. But the entrepreneur has doubt on the investment size and share distribution.	First impression is that the entrepreneur is enthusiastic, dedicated to what he is doing, and self motivated. What the partner values most is that the entrepreneur is very commercial minded that he sees opportunities.	There is no communication on daily basis only whenever it is neccesary. The partner thinks that the entrepreneur is good at identifying what is important and does not bother him with details that do not require discussion.
AR-CS Emission Cleaner	There is a complementary alignment of resources between the alliance partners.	The alliance partners complement each other's networks. They have actively used the network to get access to new resources and advices.	The partner trusts the entrepreneur and gives him freedom to operate. The entrepreneur trusts his partner. The partner has started the patent application before the proof of concept was ready, and has not validated the results.	The entrepreneur is enthusiastic, dedicated to what he is doing, and self motivated. The entrepreneur is commercial minded.	There is no communication on daily basis with the partner, only whenever it is neccesary. The entrepreneur is open in the communication with the alliance partner when clarifying expectations.

Synthesis AR-CS Emission Cleaner

The partners met through collaboration in the academic environment, which seems to have positively influenced the trust-building process at the beginning of the collaboration, which is based only on an informal agreement. There is also a high degree of independence in the collaboration, which motivates and maintains the entrepreneur’s high commitment.

In order to collaborate this way, high level of trust has to be exhibited from both sides. Partners are satisfied with it so far, but recognize the need to develop a more formal collaboration in the future.

Another proof of strong trust in this collaboration is the fact that the patent application was started before there was a proof of concept, and the partner has not demanded to validate the results. This signals that there is a possibility of "blind trust" in the entrepreneur.

There is a complementary alignment of resources in this project. Both sides are willing to share information and let the other part exploit their resources and networks. The entrepreneur has close ties with people in the academic environment, which is a valuable asset, because that provides access to various resources and advices. This is also beneficial for overcoming the liability of newness, because there is more legitimacy that can be “borrowed” from the academic environment.

The progress of the proof of concept development has been very important for the overall collaboration in this project. Positive results have changed the environment of the collaboration in a way that the entrepreneur gained easier access to the resources provided by the partner's company. The focus of the work has shifted to the business development.

AR-CS Medical Equipment

The results from the interview with the action researcher and a PhD student from Medical Equipment project (who is also one of the initiator of the project) were first compared and conduct as table CS Medical Equipment. Then the conducted data table was further compared with results from action research AR Medical Equipment. The final results of the comparison were described in the following text.

There is no formal agreement among the participants. So far this is just an “initial feasibility study”.

Since the test results were not as expected, there has been a shift in the direction of the project purpose from applied research to basic research. The project has entered into a stagnation phase.

The entrepreneur and the interviewed PhD student both agree that there is a commitment problem in this project, mainly from the material science department.

The communication between science departments is also difficult. The material science department does not communicate well enough, which makes the overall communication less efficient.

The communication between the entrepreneur and the PhD student is very well, they have regular contact maintained by informal meetings, calls, e-mails.

Since the project has shifted the direction to the basic research, there are different opinions on whether the entrepreneur adds value to this project.

All participants were enthusiastic at the beginning, but more initiative was showed by the entrepreneur later on.

Many important people were interested and involved from the beginning, but that could have been a wrong approach, because there were no results to show. When tests were conducted and results were received, expectations were not met.

Both parties think the collaboration is good, but could have been better. The collaboration lacks the mutual understanding of expectations and motivations. This collaboration still has value, but it has changed the direction.

There is complementary resource alignment in the collaboration. Different research departments have in-depth knowledge of their field and access to research facilities.

The entrepreneur and the PhD student work equally on the facilitation of this project. The interviewee maintains facilitation on the medical department part, the entrepreneur – on the material science department.

The PhD student and the entrepreneur met and worked together on a task in an entrepreneurial course in academic environment.

The PhD student points out that having ties with reputable people are important, because they help gain legitimacy.

The entrepreneur and the PhD student share their networks in order to exploit opportunities.

The entrepreneur and the PhD student from the medical department trust each other, but both of them notice that there is a commitment problem in the collaboration.

The entrepreneur has been taking initiative to coordinate the research process at a specialized unit, which shows his commitment. He is conscious that this is one of the ways to gain legitimacy and build trust.

The entrepreneur is enthusiastic, creative, can inspire others, responds quickly to any given task, and he has the good understanding of the scientific background behind the technology, demonstrator commitment to the project.

The entrepreneur shows good interpersonal skills, can easily approach new people.

Table 10: descriptive analysis AR-CS Medical Equipment

Case	General	Content	Process	Premise	Collaboration performance
AR Medical Equipment	Several stakeholders are involved. Informal agreement.	There is a shift from applied research to basic research.	There are different opinions on whether the entrepreneur adds value to this project.	This project went too fast, too early and the technology failed to meet expectations from both sides of the alliance. The entrepreneur is perceived differently at the leader level in the material science environment.	There is no mutual understanding of expectations and motivations.
CS Medical Equipment	No formal agreement. It is initial feasibility study so far.	The interviewed partner feels it is difficult to get in touch with the researchers at material science department, and there have been misunderstandings about how the tests should be done. The entrepreneur notices that there is a commitment problem in the project.	The interviewed partner suggests that the project should be narrowed down, a clear protocol should be made. The entrepreneur mentions, although both parties initiated the idea of collaboration at the beginning, more initiative was shown from the entrepreneur afterwards.		Both parties think the collaboration is good but can be better. The entrepreneur thinks he could have pushed others to follow up the project more.
AR-CS Medical Equipment	The alliace is based on informal agreement.	There is a shift from applied research to basic research. The entrepreneur and the PhD student from the medical department notice there is a commitment problem in the project.	There are different opinions on whether the entrepreneur adds value to this project. The entrepreneur mentions, although both parties initiated the idea of collaboration at the beginning, more initiative was shown from the entrepreneur afterwards.	This project went too fast, too early.	The collaboration lacks the mutual understanding of expectations and motivations.

Table 10: descriptive analysis AR-CS Medical Equipment

Case	Resource	Network	Trust	Personal features	Communication
AR Medical Equipment	There is complementary resources and knowledge in this alliance	The entrepreneur's ties to the material science environment has been important. The entrepreneur has used this project and his connections to build legitimacy in other projects.	The entrepreneur struggles to build trust in the material science environment. The entrepreneur has built legitimacy in the alliance formation process by responding quickly to given tasks.	The entrepreneur responds quickly to given tasks.	The entrepreneur has taken position as a facilitator together with the interviewed partner.
CS Medical Equipment	The entrepreneur has good connections at the material science department that provides the test material. The partner provides the access to a specialized unit that carries out the tests. The entrepreneur sees himself as a facilitator of the project.	Partners met and worked together in an entrepreneurial course in an academic environment. The inerviewed partner points out that ties with reputable people give credibility. The entrepreneur and the interviewed partner shared their networks in order to create a collaboration project.	The entrepreneur and the interviewed partner trust each other, but notice there is a commitment problem in the project. The entreprenuer is taking part of coordinating the test process at a specialized unit in order to show commitment and gain credibility.	The entrepreneur is enthusiastic, creative. Meanwhile, he also has a good understanding of the scientific background of the project. Good at interpersonal communication.	The interviewed partner thinks the communication with the entrepreneur is very good from the very beginning, that they have had regular contact. But it is difficult to communicate with the material science department.
AR-CS Medical Equipment	There is complementary resource alignment in this alliance. The entrepreneur and the PhD student work equally in facilitating this project.	The PhD student points out that ties with reputable people give credibility. Both parties share their networks in order to exploit opportunities.	The entrepreneur and the PhD student trust each other, but notice there is a commitment problem in the project. The entreprenuer is taking initiatives of coordinating the test to show commitment.	The entrepreneur is enthusiastic, creative, committed and has good scientific understanding of the project. Good at interpersonal communication.	The communication between the entrepreneur and the interviewed partner is good. The communication with the material science department is not good enough.

Synthesis AR-CS Medical Equipment

The PhD student and the entrepreneur met each other and worked together on a task in an entrepreneurial course in the university. They built mutual trust while working on a school task together; therefore it was easier to start the collaboration later. This study has identified that the entrepreneur and the PhD student share their networks in order to exploit opportunities, and they work equally on the facilitation of this project. This indicates that there is a mutual trust and commitment from both partners.

The PhD student also pointed out that ties with reputable people are important, because they help gain legitimacy.

Many important people were interested and involved from the beginning, but that could have been a wrong approach, because everyone was so eager to have collaboration that they did not bother to build a mutual understanding of expectations and motivations. When tests were conducted and results were received, expectations were not met. That might be one of the reasons for low level of enthusiasm and commitment later on. Another reason could be that the plan of action was too unstructured from the beginning. The lack of clear goals and poor results could have demotivated people in the project.

Since the test results were not as expected, there has been a shift in the direction of the project purpose from applied research to basic research. This has made the entrepreneurs position in the collaboration less viable.

The entrepreneur takes initiative to facilitate the collaboration. He believes that this is one of the ways to gain legitimacy and build trust. The communication between science departments is also difficult, mainly from the material science department, which could be due to the lack of commitment.

AR-CS Water Cleaner

The results from the interview with a CEO of the partner-firm in the Medical Equipment project and action researcher were first compared and conduct as table CS Water Cleaner. Then the conducted data table was further compared with results from action research. The final results of the comparison were described in the following text.

Partners have only informal agreement so far, but they are considering making a formal contract in the near future.

Responsibilities have been divided clearly between the start-up and partner. The entrepreneur focuses on R&D, whereas the alliance partner focuses on market opportunities and business development. But the partner talks about being frustrated over the slow development. He sees a need to have a demonstrator

Regarding the collaboration performance, the expectations of the partners are not completely met (process is too slow, there is no demonstrator for a proof of concept). According to the entrepreneur, the demonstrator is not the responsibility of the start-up, but of the partners' at the material science department. In this case, the collaboration between the partner firm and university, and between start-up and partner does not have clear borders.

The entrepreneur has taken over some responsibility from the material science department for making the POC, but has not focused as much as he should on this project. Not having a POC demonstrator leads to a problem of poor employment of complementary resource. The partners have not been able to share the information sufficiently, exploit each other's networks. The partner-firm is waiting for the POC to be ready, and then contribute with the access to market, but they could be involved in the POC development process more, connecting the entrepreneur with industrial players.

The entrepreneur provides access to research resources and test rig based on entrepreneur's good network at university.

The partner focuses on commercial side by providing the access to the market, knowledge of the industry, contacts in it, while at the same time providing some funding.

The entrepreneur functions as a "bridge" between commercial and academic partners. There is a need for that, because the collaboration lacks clear goals and transparency, and the partners from the academic environment lack understanding of the market.

The entrepreneur and the partner both value ties with reputable people. They think it can increase legitimacy and it makes it easier to get access to new potential partners.

The entrepreneur has valuable contacts in the academic environment, and the partner firm has the valuable contacts within industry, including global market players.

Seems that the alliance partner, although frustrated about not having the proof of concept, trusts the researchers, thinks "they know what to do".

The entrepreneur is seeking to gain legitimacy by taking initiatives of doing and making things happen. He attempts to show commitment by taking responsibility for many tasks, but then he experiences the overload of tasks, and is not always able to deliver what promised.

Both sides trust each other, but there is identified need to have a formal agreement.

The entrepreneur is described as enthusiastic, aware of the situation in both, academic and business environments, commercial minded.

The communication takes place mostly by informal meeting and e-mails. The entrepreneur is coordinating communication: he initiates meetings, sends out invitations, making agenda for the meetings. He is an essential initiator, there is very little initiative from other participants.

The entrepreneur has also initiated the preparation of a formal agreement on the cross-holding of shares.

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Table 11: descriptive analysis AR-CS Water Cleaner

Case	General	Content	Process	Premise	Collaboration performance
AR Water Cleaner	It is an alliance between two stakeholders.	The entrepreneur takes initiative and functions as a "bridge" between the academic environment and the partner. The partner is not satisfied with the collaboration with the academic environment, but they have not made any clear comments about this yet.	The entrepreneur focuses on R&D The alliance partner focuses on low barrier market opportunities. There is a lack of clear goals, focus and transparency between the partner and the academic environment, which needs to be addressed.	The two cofounders of the alliance firm, perceive the collaboration with the academic environment slightly different. The partners are frustrated because the academic environment lacks a good understanding of the market. The entrepreneur is seen as a "bridge".	
CS Water Cleaner	Partners have only informal agreement, but are considering signing a contract.	Alliance partner feels frustration over the slow development of the proof of concept, and the entrepreneur also notices that. According to the partner, it is not always easy for the people from the business environment to understand the nature of research.	Responsibilities have been divided clearly. The understanding of the technology is sufficient.		According to the partner, there is room for improvement, but collaboration is good. The entrepreneur understands that the expectations of the partners are not completely met (process is too slow, no proof of concept). On the other hand, the entrepreneur thinks that the partner does not put in that much effort either.
AR-CS Water Cleaner	Partners have only informal agreement, but are considering signing a contract.	The alliance partner is frustrated by the slow development progress of the demonstrator. The entrepreneur takes initiative and functions as a "bridge" between the academic environment and the partner.	Responsibilities have been divided clearly bwtween the start-up and the partner. There is a lack of clear goals, focus and transparency between the partner and the academic environment.	The entrepreneur is seen as a "bridge" connecting different parties from different environment. The partners are frustrated because the academic environment lacks a good understanding of the market.	The expectations of the partner are not completely met (process is too slow, no proof of concept). The entrepreneur has not focused as much as he should on this project.

Table 11: descriptive analysis AR-CS Water Cleaner

Case	Resource	Network	Trust	Personal features	Communication
AR Water Cleaner	The entrepreneur has access to some money through the R&D contract that the partner had with the academic environment. There are complementary resources in this alliance, but they are not fully exploited	The entrepreneur has not exploited his partner's network yet. The entrepreneur has strong ties to some key opinion leaders, which is interesting for the partner. The entrepreneur has consciously positioned himself close to the academic environment.	The entrepreneur is "bridging" the gap between the academic environment and the business partner.	The entrepreneur tires to show commitment in the relationship with his partner. The entrepreneur has too many projects running at the same time and have an overload of tasks. The entrepreneur has taken too much initiative in the collaboration between the alliance partner and the academic environment.	The entrepreneur is coordinating activity within the alliance.
CS Water Cleaner	The entrepreneur provides access to research resources and test rig based on entrepreneur's good network at university. The partner focuses on commercial side by providing the access to the market, knowledge of the industry, contacts in it, while at the same time providing some funding (that comes from Innovasjon norge). The entrepreneur has some contacts that are valuable for the partner.	First met in April 2011. Introduced by the professor. The professor included the entrepreneur into meetings with the partner company. According to the alliance partner, it might be important to have ties with reputable people, in order to show credibility The entrepreneur has some contacts that are valuable for the partner.	The partner exhibits trust in entrepreneur, although there is a need for more formal agreements. The alliance partner, although frustrated about not having the proof of concept, trusts the researchers, thinks "*they know what to do*". The entrepreneur is seeking to gain credibility by taking initiatives of doing and making things happen.	The entrepreneur is an enthusiastic person. The entrepreneur is aware of the situation in industry and academic world. He has gained a better understanding of how the market works, become more commercial minded.	Comunnication takes place in the form of informal dialog. Meetings are held when necessary. Regular updates on progress and attempts to clarify expectations towards each other. The entrepreneur always follows up and delivers what he promised.
AR-CS Water Cleaner	There is complementary alignment of resources in this alliance, but they are not fully exploited	The entrepreneur has consciously positioned himself close to the academic environment. The entrepreneur and the partner state that it is importnat to have ties to reputable people. There are complementary networks in this alliance, but they are not fully exploited	The alliance partner, although frustrated about not having the proof of concept, trusts the researchers, thinks "they know what to do". Both sides trust each other, although there is a need for more formal agreements.	The entrepreneur is enthusiastic and commercial minded. The entrepreneur has taken too many initatives, and faces a task overload.	Informal meetings when necessary to update each other and clarify expectations. The entrepreneur is coordinating activity within the alliance.

Synthesis AR-CS- Water Cleaner

The partners met through a collaboration in the academic environment (in the Nano-Cluster meeting), which seems to have positively influenced the trust-building process at the beginning of the collaboration. They have only an informal agreement so far, but they recognize the need and are considering signing a formal contract in the near future.

The entrepreneur and the partner both think that ties with reputable people can increase legitimacy and make it easier to get access too new potential partners. The entrepreneur has valuable contacts in the academic environment, and the partner firm has valuable contacts within industry, including global market players.

The entrepreneur is described as enthusiastic, aware of the situation in both academic and business environments, commercial minded. The entrepreneur is seeking to gain legitimacy and build trust by taking initiatives, showing commitment by taking responsibility for many tasks. Sometimes he experiences the overload of tasks, and is not always able to deliver what promised.

The entrepreneur has consciously positioned himself close to the academic environment. This way he can have good understanding of the academic environment and how it functions, and can use his academic contacts.

The collaboration between the academic and industrial environment lacks clear goals and transparency, and the partners from the academic environment lack understanding of the market. The partner is clearly frustrated over the slow development of the proof of concept demonstrator. The entrepreneur functions as a "bridge" between commercial and academic environment. It seems that the alliance partner, although frustrated about not having the proof of concept, trusts the researchers. It is possible that the institutional trust for the university “blinds” him.

Not having tde POC demonstrator leads to a problem of poor exploitation of complementary resource. The partner-firm is waiting for the POC to be ready, and then contribute with the access to market, instead of getting involved in the POC development process more, connecting the entrepreneur with industrial players.

The entrepreneur is an essential initiator in the collaboration, there is very little initiative from other participants.

AR-CS-micro

The results of the above comparative analysis on the four cases were compared together in the analysis. Results and their comparison have been presented in a template and described in the following text.

In all cases, there are no formal agreements so far.

There can be identified the lack of commitment in several projects. This problem occurs mainly in the academic environment. There is also the lack of mutual understanding of goals, expectations among the different partners. The entrepreneur takes a role of a facilitator of the communication between academic and business environment.

There is complementary resource alignment in all the cases, although the resources are not always fully exploited.

The entrepreneur positions himself close to the academic environment. That way he can access academic resources and have ties with reputable people and “borrow” their legitimacy.

The entrepreneur has gained trust through consciously exhibiting trust-building behavior by taking initiatives, responsibilities, showing commitment.

The industry partners tend to trust the academic environment even when they are aware of the lack of commitment from the other side.

The entrepreneur is commercial-minded, enthusiastic and initiative, able to work independently. However, he sometimes takes too many initiatives and tasks and faces a work overload.

The communication is mainly informal, initiated and coordinated by the entrepreneur. He sends out e-mails, invitations to the meetings, creates agendas for meetings etc. There occur some communication problems with the academic environment, for example slow response, lack of initiative.

The POC progression situation has strong influence on the overall progression of the project. Positive results speed up the business development (Emission Cleaner) and influence the alliance formation process, negative results (Medical Equipment) makes the partners shift the direction of the collaboration. Slow POC (Water Cleaner) development slows down the process of business development.

Table 12: descriptive analysis AR-CS micro

Case	General	Content	Process	Premise	Collaboration performance
AR-CS - Nano Cluster	No formal agreement. The alliance is cluster-like.	The cluster initiative lacks the general commitment, mostly from the academic environment. Partially from the professor because of the lack of time. The cluster could be more structured, which would make facilitation easier.	The cluster provides access to new resources and network. The collaboration with the cluster is more of academic value than commercial value. The entrepreneur facilitates communication and coordination.	There is a relational and institutional gap between the academic environment and externals firms. The entrepreneur has experienced a task overload and has not been able to facilitate close enough.	The professor and the entrepreneur precieve the collaboration performance differently.
AR-CS – Emission Cleaner	There is an informal agreement on partners' mutual intensions.	The start-up mainly focuses on the proof of concept. The partner is more focused on the business development. Both partners admit that although the informal way they collaborate works for them so far, it is quite naive way from the business perspective.	The patent application process started before proof of concept. The proof of concept has changed the alliance formation process.	High degree of independency and commitment.	The collaboration performance improved when the entrepreneur was given the full responsibility for the proof of concept. The collaboration should be more formal.
AR-CS - Medical Equipment	The alliace is based on informal agreement.	There is a shift from applied research to basic research. The entrepreneur and the PhD student from the medical department notice there is a commitment problem in the project.	There are different opinions on whether the entrepreneur adds value to this project. The entrepreneur mentions, although both parties initiated the idea of collaboration at the beginning, more initiative was shown from the entrepreneur afterwards.	This project went too fast, too early.	The collaboration lacks the mutual understanding of expectations and motivations.
AR-CS - Water Cleaner	Partners have only informal agreement, but are considering signing a contract.	The alliance partner is frustrated by the slow development progress of the demonstrator. The entrepreneur takes initiative and functions as a "bridge" between the academic environment and the partner.	Responsibilities have been divided clearly bwtween the start-up and the partner. There is a lack of clear goals, focus and transparency between the partner and the academic environment.	The entrepreneur is seen as a "bridge" connecting different parties from different environment. The partners are frustrated because the academic environment lacks a good understanding of the market.	The expectations of the partner are not completely met (process is too slow, no proof of concept). The entrepreneur has not focused as much as he should on this project.
AR-CS-micro	Partners have informal agreements	Some projects lack committment, mainly from the academic partners. The proof of concept progression has high impact on the progression of the project in all cases.	The entrepreneur is the main facilitator and coordinator in all cases, although in one case, there are different opinions on whether the entrepreneur adds value to the project. The proof of concept strongly influences the alliance formation process.	The entrepreneur alway takes initiatives and works independently, but sometimes experiences a task overload. There is a relational and institutional gap between the academic environment and externals firms due to different mind-sets and lack of understanding of each other.	Lack of mutual understanding of expectations influences the collaboration performance.

Table 12: cont descriptive analysis AR-CS micro

Case	Resource	Network	Trust	Personal features	Communication
AR-CS - Nano Cluster	There is a complementary alignment of resources within the cluster. The entrepreneur's ablity to facilitate the cummunication with the academic part of the cluster is limited. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.	The entrepreneur met the professor in the academic environment. Both the professor and entrepreneur contribute in building a complementary network.	The entrepreneur focuses on a trust building behavior. The entrepreneur is trusted by the stakeholders in the cluster.	Entrepreneurial minded persons are rare in the acdemic enviroment. The entrepreneur is enthusiastic about new opportunities and has the capability to pursue them. The entrepreneur pays less attention to details, which could be a problem in academic environment.	The communication is mainly informal and initiated by the entrepreneur. The entrepreneur himself is not in a position to demand anything from and researchers, but that is necessary, therefore he uses the advange of the professor's position and reputation. The communication with the professor is mainly initiated by the entrepreneur, and the professor does not respond effeciently.
AR-CS – Emission Cleaner	There is a complementary alignment of resources between the alliance partners.	The alliance partners complement each other's networks. They have actively used the network to get access to new resources and advices.	The partner trusts the entrepreneur and gives him freedom to operate. The entrepreneur trusts his partner. The partner has started the patent application before the proof of concept was ready, and has not validated the results.	The entrepreneur is enthusiastic, dedicated to what he is doing, and self motivated. The entrepreneur is commercial minded.	There is no communication on daily basis with the partner, only whenever it is neccesary. The entrepreneur is open in the communication with the alliance partner when clarifying expectations.
AR-CS - Medical Equipment	There is complementary resource alignment in this alliance. The entrepreneur and the PhD student work equally in facilitating this project.	The PhD student points out that ties with reputable people give credibility. Both parties share their networks in order to exploit opportunities.	The entrepreneur and the PhD student trust each other, but notice there is a commitment problem in the project. The entreprenuer is taking initiatives of coordinating the test to show commitment.	The entrepreneur is enthusiastic, creative, committed and has good scientific understanding of the project. Good at interpersonal communication.	The communication between the entrepreneur and the interviewed partner is good. The communication with the material science department is not good enough.
AR-CS - Water Cleaner	There is complementary alignment of resources in this alliance, but they are not fully exploited	The entrepreneur has consciously positioned himself close to the academic environment. The entrepreneur and the partner state that it is importnat to have ties to reputable people. There are complementary networks in this alliance, but they are not fully exploited	The alliance partner, although frustrated about not having the proof of concept, trusts the researchers, thinks "they know what to do". Both sides trust each other, although there is a need for more formal agreements.	The entrepreneur is enthusiastic and commercial minded. The entrepreneur has taken too many initatives, and faces a task overload.	Informal meetings when necessary to update each other and clarify expectations. The entrepreneur is coordinating activity within the alliance.
AR-CS-micro	There is complementary alignment of resources in all cases, although they are not alway fully exploited. The entrepreneur facilitates the communication between the academic environment and external firms.	The entrepreneur has positioned himself close to the academic environment, so he could have access to resources and ties with reputable people which gives him legitimacy.	The entrepreneur has gained trust by concious trust building behavior. The industry partners tend to trust the academic environment, even when they are aware of the lack of commitment.	The entrepreneur is enthusiastic, committed and commercial minded. The entrepreneur has taken too many initatives, therefore he pays less attention to details, which could be a problem in academic environment.	The communication is mainly informal and initiated by the entrepreneur. There are communication problems with the academic environment.

Synthesis AR-CS-micro

In all cases, there are no formal agreements so far, but in at least two of them partners identify the need to have it.

The POC progression situation has strong influence on the overall progression of the projects. Positive results speed up the business development (Emission Cleaner) and influence the alliance formation process, negative results (Medical Equipment) makes the partners shift the direction of the collaboration. Slow POC (Water Cleaner) development slows down the process of business development.

There can be identified the lack of commitment in several projects. This problem occurs mainly in the academic environment. This could be related to the fact that there is a big difference in mindsets that are typical to those environments, which causes a relational and institutional gap between them. There is also the lack of mutual understanding of goals, expectations among the different partners. The entrepreneur takes a role of a facilitator of the communication between academic and business environment.

The entrepreneur seems to be the most committed party in all of the cases. Obviously, the collaborations add more value to him than to the partners. Different levels of commitment make the collaboration more difficult to maintain. The entrepreneur has gained trust through consciously exhibiting trust-building behavior by taking initiatives, responsibilities, showing commitment.

The communication is mainly informal, initiated and coordinated by the entrepreneur. There occur some communication problems with the academic environment, for example slow response, lack of initiative.

The entrepreneur collaborates with reputable people to get access to new resources and networks, and for building legitimacy and consciously positions himself close to the academic environment. That way he can access academic resources and have ties with reputable people and “borrow” their legitimacy.

There is complementary resource alignment in all the cases, although the resources are not always fully exploited, e.g. in the Emission Cleaner project. The reason for that could be not

only the sow POC demonstrator development, but the lack of trust, unwillingness to share resources before the partner sees real value in the collaboration.

The industry partners tend to trust the academic environment even when they are aware of the lack of commitment from the other side. The reputation of the academic institution could be the factor that causes “blind trust”.

The entrepreneur is commercial-minded, enthusiastic and initiative, able to work independently. However, he sometimes takes too many initiatives and tasks and faces a work overload.

Time-line analysis

The time-line analysis has been conducted on the alliance formation process; the main objective of the analysis has been to identify patterns and differences among all the four cases. Data generated by the action researcher within the research time frame and archival data has been used, additionally a cross checking of data from the case interviews has been conducted. All four cases have been analyzed and data is presented in a template on the next four pages. The time-line analysis is presented in a chronological order and reveals how different incidents influence the overall picture of the progression in each case.

The Nano-Cluster case started with the initial meeting between the entrepreneur and the professor, the professor chose to collaborate with the entrepreneur and asked him to be the CEO of his new company. The collaboration between the professor and the entrepreneur has been close. The case analysis reveals that there is mutual trust between them. Development of a new cluster has lately been the main focus of this collaboration.

The entrepreneur was introduced to the Emission Cleaner partner by the professor at the first cluster meeting. The entrepreneur later pitched his idea of a new emission cleaning technology, and the partner immediately saw a big potential in the idea. They had a meeting short after were clear goals were made, the partner agreed to build and finance a test bed. Not even at this point were there any formal agreements, and it took another five months before the question was discussed.

In the Medical Equipment case the entrepreneur met his partner who is a PhD student from medical department for the first time in an entrepreneurial course at the university. They worked together on a group assignment and got to know each other well. They later initiated a meeting with key leaders from their research environment, and managed to agree on an initial feasibility study. Unfortunately they got a negative result, but interestingly enough, they did not terminate the project and they are still working on it.

In the Water Cleaner case the entrepreneur was introduced by the professor at the first cluster meeting to the future partner. The Water Cleaner partner already had a formal contract with the professor and they had regular meetings. Later on, the partner invited the entrepreneur to participate at these meetings. There have been some challenges in the collaboration between the Water Cleaner partner and the university, since it has taken very long time to develop the demonstrator of the technology.

Table 13: Time line analyis

Case	15.09.2010	15.11.2010	19.01.2011	17.02.2011
Nano Cluster	The entrepreneur met the professor at an event at Forskningsparken The entrepreneur referred to the "entrepreneurs in residence program" and named dropped the principal of the University as one of the initiators.	The professor decided to set up a new company and let the entrepreneur be the CEO		First meeting in the cluster The professor introduced the entrepreneur as the CEO of his start-up
Emission Cleaner				The entrepreneur met the partner for the first time, through the cluster.
Medical equipment			The entrepreneur met the partner from the medical environment for the first time in an entrepreneurial course at the University. They worked together on a project assignment.	
Water cleaner				The entrepreneur meet the partner for the first time, through the cluster.

Table 13: Time line analyis

Case	01.04.2011	14.04.2011	24.05.2011	18.08.2011	26.08.2011
Nano Cluster	Ronald starts and will last for 6 months.	Meeting in the cluster		Meeting in the cluster	
Emission Cleaner		The entrepreneur pitched his idea of a new emission cleaner technology for the first time after a cluster meeting	First emission cleaner meeting, the partner agrees to cover all costs and build the test bed and they discussed patenting. They choose to have an informal agreement .		
Medical equipment					First meeting with participaters from the nanotechnology and the medical research environment. They decide to initiate a feasibility study
Water cleaner	Ronald was launched together in collaboration with the professor and the cluster.	The partner has specifically asked if it is possible to include the entrepreneur in meetings between their company and the professor.		Meeting in the cluster. The partner asked for the demonstrator of the technology for the first time.	

Table 13: Time line analyis

Case	01.11.2011	03.11.2011	11.11.2011	15.11.2011	21.01.2012
Nano Cluster					The professor decides to apply for Norwegian research council money. The entrepreneur participate in the discussion.
Emission Cleaner	Test bed was still not finished. The partner allows the entrepreneur to use and exploit some of his resources and coordinate directly with his employees.				
Medical equipment			Meeting with everyone in the collaboration, a negative results is presented Shift in focus from applied to basic research. .		
Water cleaner		The partner initiated a meeting at their office. They wanted to discuss a formal collaboration between them and the start-up The partner wants a more stabilized consolidation.			

Table 13: Time line analyis

Case	26.01.2012	27.01.2012	16.02.2012	09.03.2012	15.03.2012
Nano Cluster					
Emission Cleaner		Patenting process starts			Proof of concept The partner decides that he wants to continue this project.
Medical equipment			The entrepreneur meet the partner. They discussed how they could make synergies between the nanotechnology environment and the medical environment ,		
Water cleaner	The demonstrator of the Proof of Concept was discussed. The entrepreneur took more responsibility for finalizing the demonstrator, together with the researcher. Partner is getting more frustrated about the lack of understanding for their needs of a demonstrator.			Meeting in the cluster They are discussing on which terms an alliance should be established	

Synthesis of the time-line analysis

From the time-line analysis it can be identified that the proof of concept progression varies among the different cases. The Emission Cleaner idea did not evolve as good as expected and the partner agreed to let the entrepreneur access some of his resources and this increased the progression and the entrepreneur was finally able to get a positive proof of concept. Through case interviews and the time analysis it has been identified that they had a mutual reliance, and the level of trust increases.

In the Medical Equipment case they got a negative proof of concept, and the project went into a stagnation phase, even if everyone wanted to continue the collaboration. It has been identified in the time-line analysis that there has been significant less coordination and facilitation in this project. Considering the slow progression of the collaboration and the fact that it is embedded in the academic environment, the probability of success is decreased without a formal agreement.

The Nano-Cluster and the Water Cleaner project have many overlapping interest and will be covered as a whole in the synthesis. The professor initiated independently of each other collaboration both with the entrepreneur and the Water Cleaner project. The entrepreneur became the CEO of his company and the professor functioned as an adviser in the Water Cleaner project. After some time the professor initiated a new cluster partly founded by the Water Cleaner project. The entrepreneur got access to some money and resources. From the time-line analysis it has been identified that the Water Cleaner partner has been asking for a technology demonstrator for a while, which the cluster has not been able to provide. From the case interviews and the action research this has been identified as a source of frustration and it could be one of the reasons why the alliance formation process between the entrepreneur and the Water Cleaner partner has taken so long time.

Discussion

Research Question 1

How can entrepreneurial alliances help a start-up to overcome the liability of newness?

New ventures face many barriers that must be overcome to survive, such as lack of relationships, important experience and tangible resources (Reuer et al. 2011). Together these problems worsen new venture's risk of failure and contribute to their liability of newness (Stinchcombe 1965).

The generated and analyzed data shows that the entrepreneur consciously positions himself close to the academic environment in order to get access to valuable resources. Being close to the academic environment has helped the start-up to get access to research facilities, valuable network and knowledge about the university's internal processes.

According to Gulati (Gulati 1998), alliances enable firms to gain access to resources, particularly when time is of the essence. If so, development of an appropriate alliance network at founding may enable a young firm to enjoy relationships and resources typical of a more established firm, hence overcoming liabilities of newness. In this study, the collaboration with the professor gives the start-up access to in-depth knowledge of the scientific background behind the technology, and provides access to research facilities at the university.

By being part of the Nano-Cluster, the start-up has gained access to research funding from Water Cleaner project and to nano-coating technology. One of the reasons why the Medical Equipment project was initiated was the fact that the start-up could provide coated samples for testing.

The above discussion supports **proposition 1**:

Alliances can directly help a new venture to overcome liability of newness by providing access to valuable resources.

The academic network is one of the main assets the collaboration with the university provides. The fact that the entrepreneur consciously positions himself close to the academic

environment, can not only help him access academic resources, but also allows him to have ties with reputable people and “borrow” their legitimacy.

By having close ties with the professor that is well known for being excellent in his field, the entrepreneur gained enough legitimacy to attract partners for other projects. The entrepreneur was introduced by the professor to the Water Cleaner and emission technology project partners. The partner from the Water Cleaner project explains that the first time he met the entrepreneur was at the first cluster meeting, where the entrepreneur was introduced by the professor. Further he emphasizes that “ties with reputable people are important in order to show credibility”.

The PhD student from the Medical Equipment project claims that “the nanotechnology group is one of the research groups with the highest impact at this university”, which has made it possible to form the project together with the key players in the medical research environment.

It is also suggested in the literature that relationships with reputable partners can indirectly help entrepreneurial firms reduce liability of newness by increasing the new venture’s ability to secure resources from other sources. Because new ventures are difficult to evaluate for investors and potential partners, it can be challenging to obtain the resources they need. Alliances with reputable partners can have the effect of “endorsing” the new venture, or providing a signal to other potential exchange partners that the new venture is of high quality (Reuer et al. 2011).

The above supports the **proposition 2:**

Alliances can indirectly help a new venture to overcome liability of newness by “lending” reputation which helps to attract other potential partners.

Research Question 2

How can trust be built in the alliance formation process?

As perceived in the study, the entrepreneur consciously tries to exhibit what he believes to be a trust-building behavior. He takes initiatives, responsibilities and shows commitment.

According to the partner from the Water Cleaner project, the entrepreneur “always follows up and delivers what is promised”. The interviewees also emphasized that the fact that the

entrepreneur works on several different projects positively influences their perception of his trustworthiness. “The fact that he is running several projects also increases the credibility, because that shows he has experience” says the PhD student from the Medical Equipment project.

However, the entrepreneur pointed out that “he sometimes takes too many initiatives and tasks, and faces a work overload”. This could be seen as a threat to his legitimacy, because it can be decreased if one party is not able to perform as well as it was expected. The POC (proof of concept) progression situation has strongly influenced the alliance formation process.

Positive results of POC development have speeded up the business development (Emission Cleaner) and positively influenced the alliance formation process. The entrepreneur gained easier access to the resources provided by the partner's company. The focus of the work has shifted towards business development. The collaboration in this case is evaluated as very good from both parties, and they both feel motivated.

Negative results of POC development in the Medical Equipment case have made the partners shift the direction of the collaboration from applied to basic research, and the collaboration has entered into a stagnation phase. In this case, many important people were interested and involved from the beginning, but when tests were conducted and results were received, high expectations created by the entrepreneur (initiator) were not met. Hence, the entrepreneur has partially lost his legitimacy.

The above supports the **proposition 4**:

Inter-partner legitimacy is crucial to build trust, thus it is important in facilitating cooperation in the alliance formation process.

Zajac (Zajac and Olsen 1993) indicates that during the negotiations that take place in initializing stages of an alliance formation, through preliminary communication and negotiation, initial relational exchange norms start taking shape, and commitments are tested to determine credibility. Kelly et al. (Kelly et al. 2002) note that communication is the dominant issue in relationship related challenges. Poor communication within an alliance and between partners can derail the start-up of a venture or significantly undermine its performance. It can create an atmosphere of mistrust and suspicion that can undermine both the legitimacy and effectiveness of the venture.

In the studies cases, the communication is mainly informal, initiated and coordinated by the entrepreneur. He initiates meetings, sends out invitations, and sends follow-up e-mails.

“The entrepreneur takes the responsibility to contact the “nano-people”, and I took the other side. If we hadn’t done this, nothing would have happened” says the PhD student from the Medical Equipment project.

Some problems have occurred in the communication with the academic environment, for example slow response and lack of initiative. This could be related to the finding in the data analysis which identifies a difference between the mind-sets that are typical for academic and business environments. This causes a relational and institutional gap between them. Therefore there is a need to have someone who is able to understand both, academic and business environment, and can facilitate the communication between them. For example, both the professor and the Water Cleaner partner acknowledge that the entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster, since “he is unique – an entrepreneurial-minded person in the academic environment” (the professor). And the Water Cleaner partner says “the entrepreneur is skilled at opening doors at the university".

The efficiency of communications seems to be more dependent on the quality than on the frequency. In the case of Emission Cleaner project, there is clear mutual understanding of intentions and goals. Therefore both parties do not communicate on a daily basis, only when it is necessary. The partner explains: "We have very few emails during the process. I like that he (the entrepreneur) is good at identifying what needs to be discussed and what does not. "

Because of this, the entrepreneur has the freedom to make many decisions himself, which makes him feel that he is trusted.

The above supports the **proposition 6**:

Communication is an important element to promote trust formation, thus it is important in facilitating cooperation in the alliance formation process.

All the partners recognize the entrepreneur as enthusiastic and initiative. For example, the partner from Medical Equipment project described the entrepreneur as “commercial-minded, enthusiastic and initiative, and able to work independently”.

Welter (Welter 2012) suggests the process of trust formation includes “learning” to trust each other. Based on experiences, individuals learn to trust each other as they become familiar with each other’s competencies, motivations and sense of fairness.

The professor met the entrepreneur for the first time, when the latter started his material science bachelor studies. The professor describes his first impression on the entrepreneur as “not very serious. A student that was saying “I want to do business, that’s why I study science””. After getting to know the entrepreneur better, he “turned out to be unique (entrepreneurial minded person in the academic environment)”.

The PhD student from the Medical Equipment project points out that he trusts the entrepreneur. One of the factors that maintain the trust is the motivation that he recognizes and appreciates: “He is trying to improve the entrepreneurship environment in the university system, which increases credibility of what he is doing, because he is doing things not only for himself.”

The partner from the Water Cleaner project and the PhD student from the Medical Equipment project emphasize that responsibilities have been divided clearly and fairly. The partner from the Emission Cleaner project describes their collaborations as “based on the mutual reliance”.

The above discussion supports the **proposition 7**:

Alliance partners can learn to trust each other as they become familiar with each others’ competencies, motivations and sense of fairness

The partner from the Water Cleaner project trusts the entrepreneur and the academic partners, even though he has not received the POC demonstrator that has been promised. He believes that “they know what they are doing”. That could be linked to the institutional trust towards the university. According to Bachmann and Inkpen (Bachmann and Inkpen 2011), the institutional trust is a form of individual or collective action that is constitutively embedded in the institutional environment in which a relationship is placed.

The institutional trust role and its positive/negative influence on business relationships has not been in the focus of this study, but it proposes an interesting topic for further research.

Research Question 3

How can trust influence the alliance formation process?

Trust can be crucial in entrepreneurial success, because strong ties tend to bind individuals with similar or complementary interests into long-term relationships. Such ties add to the capability of quickly pursuing market opportunities (Uzzi 1997).

From the time-line analysis it can be identified that the entrepreneur has gradually gained better access to the partner's resources in the Emission Cleaner project. This could indicate that the level of trust has increased, which has positively influenced the process of the alliance formation and business development. As suggested by Ring and Van de Ven (Ring and Van de Ven 1992), inter-firm trust helps reduce the concern about opportunistic behavior, and thus decreases relational risk. The increased level of trust between the entrepreneur and the alliance partner help them effectively exploit each other's networks to get access to new resources. As suggested by Schoorman and others (Schoorman et al. 2007), trust enables people to be vulnerable to their partners, essentially taking risks from engagement, such as joining in a strategic alliance

On the other hand, many alliances have failed due to the lack of trust causing unsolved problems, lack of understanding, and despondent relationships. For example, the slow development of the POC demonstrator in the Water Cleaner project (the partners from Sola have required a demonstrator for the technology, but their requirement has not been fulfilled) has slowed down the process of the business development and alliance formation. From the time-line it can be identified that the alliance formation had entered a stagnation phase, and the entrepreneur is not able to sufficiently exploit his partner's network and resources.

The entrepreneur seems to be the most committed party in all of the cases. Obviously, the collaborations add more value to him than to the partners. Different levels of commitment make the collaboration more difficult to maintain.

The discussion above supports the **proposition 3**:

The functionality of an entrepreneur's network and the ability to exploit their partners' resources are heavily supported by trust in the alliance formation process.

Trust is believed to support network relations, while network contacts play a role in recognizing and constructing opportunities, fostering business creation, mobilizing complementary resources, obtaining advice and other forms of assistance, and establishing viable business relations (Welter 2012). Newbert and Tornikoski (Newbert and Tornikoski

2011) argue that relational ties may help new entrepreneurs by reducing the costs of gaining resources. They suggest a strategic approach to relationship-building where new entrepreneurs should focus on establishing a strong sense of trust.

In all the studied cases, there are no formal agreements so far. Most of the collaborators identify the need to have it.

“We have never had formal meetings or agreements. The collaboration is based on mutual understanding that one day we will come to some agreement when we know that we have something. This seems a bit naive, but sometimes it works” says the partner from the Emission Cleaner project.

The entrepreneur explains that the fact that he feels trusted and has freedom to make decisions motivates him to work harder, which has been one of the main success factors in this project: it can be seen from the time-line that this project has had a break-through after the entrepreneur has taken full responsibility for the POC development.

However, trust as the only governance mechanism is often not enough for the successful facilitation of an alliance.

The lack of commitment and communication has been identified in several projects. This problem occurs mainly in the collaboration with the academic environment. In the above discussion this has been related to the difference between the mind-sets that are typical for academic and business environments. This causes a relational and institutional gap between them. According to the entrepreneur, this has made the facilitation difficult and the collaboration less effective.

The entrepreneur has had to use a lot of effort on the facilitation (coordination of meeting, communication etc.), but he felt that the efficiency of the collaboration was not as good as it could have been. Due to the lack of control mechanisms, the projects (Medical Equipment and Water Cleaner) have not developed as expected, because some of the academic partners have not worked on the projects as promised.

This can also be linked with the lower level of risk experienced by academic partners. Comparing with industry partners, academic partners feel less pressure in time and cost.

In the collaboration with the academic environment, trust as the only governance mechanism has rather increased than reduced transactional costs. Formal governance mechanisms could have helped the entrepreneur to facilitate the collaborations more effectively.

From the discussion above it could be suggested that trust as a governance mechanism helps to reduce transactional cost in an entrepreneurial alliance formation process. But when there is a cognitive gap and the lack of mutual understanding among partners, trust as a governance mechanism does not reduce transactional costs.

Proposition 5 is partially supported by the findings discussed above. It can be suggested that: *Trust as a governance mechanism can help reduce transactional costs only in collaborations where there is mutual understanding and similar mind-set.*

Conclusion and recommendation

This study has investigated how alliances influence liability of newness experienced by new ventures, and how trust can affect the alliance formation process. From the discussion, it can be proposed that start-ups can overcome liability of newness by forming alliances. Alliances can help a new venture directly by providing access to partners' resources, as well as indirectly by helping to attract other potential partners. In this study, it was identified that the entrepreneur “borrowed” the professor’s legitimacy, and the professor has functioned as a mentor for the entrepreneur. Further, the professor has been a gate opener, which has helped the entrepreneur to exploit new business opportunities. This supports the first research question: *“How can entrepreneurial alliances help a start-up to overcome the liability of newness?”*

Alliances could also be seen as a strategy of spreading risk, where the entrepreneur uses a “hedging” strategy by having several projects at the same time. This has not been the focus of this study, but could be addressed in further research.

The second research question *“How can trust be built in the alliance formation process?”* was addressed by three propositions, which suggest that trust can be built by gaining and maintaining inter-partner legitimacy, and facilitating communication that would guarantee the mutual understanding among partners. Trust can also be “learned” during the relationship due to growing familiarity with each other’s personal competencies, motivations and sense of fairness.

One interesting finding of this study was the identified differences in mind-set between academic and industrial partners that can cause a relational and institutional gap between partners. One of the background reasons for this could be different levels of risk that different institutions are exposed to. For example, academic partners do not experience the same time pressure, financial obligations and high level of commitment as industrial partners, especially new ventures, do. Another interesting topic to investigate how academicals behave in contexts where there is collaboration between academic and business cultures.

It could be proposed that the liability of newness could be linked with perceived risk and different levels of tolerance for risk. Higher liability of newness creates lower tolerance for risk. This makes new ventures less flexible and more vulnerable; therefore they face risk

while trusting a partner that has higher tolerance for risk. High esteem in partners may increase the degree of freedom for trust-building capacities.

The identified gap can also make it difficult to facilitate collaboration without adequate governance mechanisms. The discussion around the fifth proposition within the third research question: "*How can trust influence the alliance formation process?*" addresses this problem. It was identified that trust positively influences partners' ability to share and exploit each other's networks and other resources. The lack of mutual trust can decrease the effectiveness of accessing and exploiting resources.

The obtained data also suggests that formal governance mechanisms are more appropriate for facilitating collaborations between industrial partners and institutions like universities that often lack understanding of commercial interests and risks.

The identified gap in mind-set can also be related with the risk to over-trust institutions like universities, which could result in "blind trust" from external collaborators. This introduces an interesting research topic that falls outside the scope of this study – trust duality, on how institutional and individual trust interferes with each other. Zahra (Zahra et al. 2006) also points out the downside effects of trust such as possible over-confidence and the lack of effective controls due to over-reliance on trust.

Contribution to the literature

From the discussion within the first research question, it has been identified that an entrepreneur can "borrow" reputation from a more legitimate partner to gain legitimacy that can be used to overcome liability of newness in forming new alliances. From research question two it has been identified that it is possible for an entrepreneur to build trust, but it is experiences that define how the partner perceives the entrepreneur's trustworthiness. Research questions one and two coupled with research question three, which focused on how trust influences alliance formation has been the main motivation for proposing a new model of how alliance formation and trust formation interfere with each other. Figure 4 illustrates how an entrepreneur can "borrow" legitimacy in the beginning of an alliance formation process, but as the process evolves, the entrepreneur has to focus on building trust. This model proposes that "borrowed" legitimacy can only last for some time, and the entrepreneur has to build enough trust within that period of time in order to be able to successfully form an alliance.

From this model it can be proposed that a legitimate partner, such as a professor, is an important success factor for new venture. Further research should be conducted to reveal correlations on how entrepreneurs ability to borrow and build legitimacy affect the success rate of an alliance formation process.

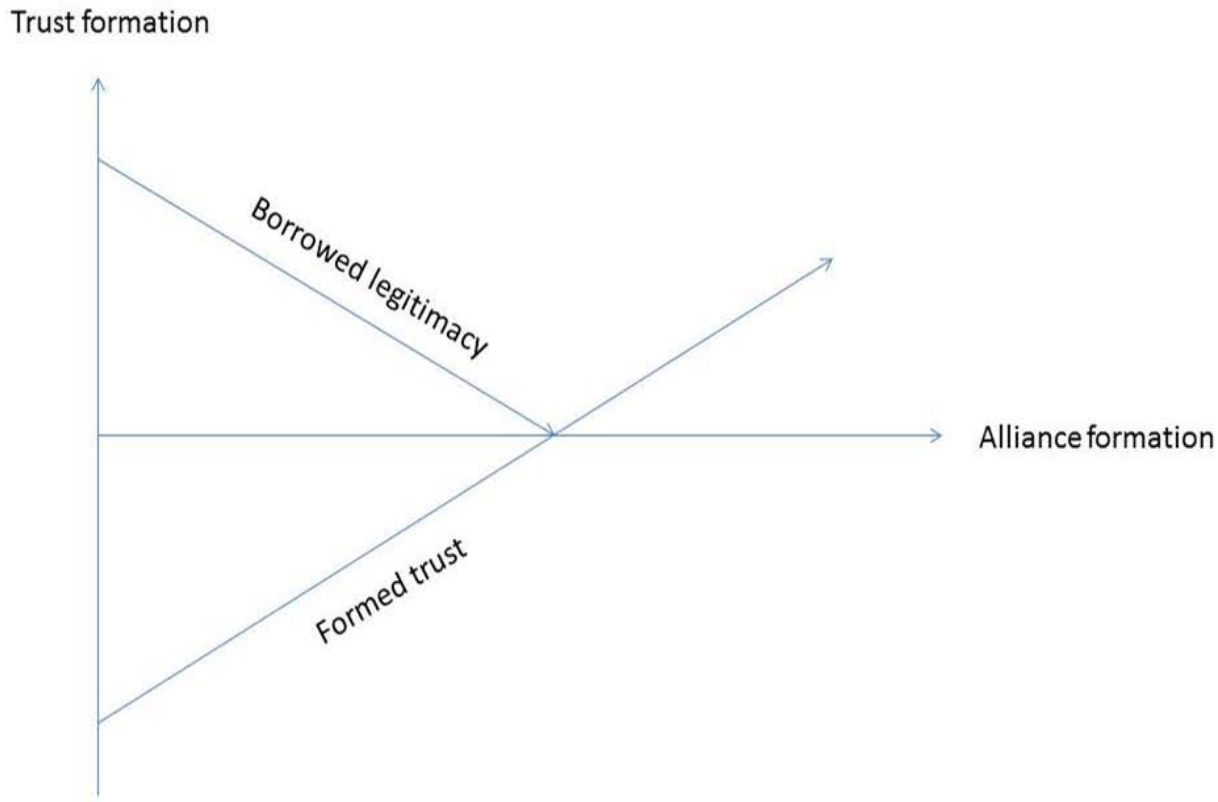

Figure 4: Illustration of how an entrepreneur can "borrow" legitimacy in the beginning of an alliance formation process, but as the process evolves, has to focus on building trust.

This study also contributes to the improvement of entrepreneurial collaboration in the University of Oslo by taking part in the SFE's initiative "entrepreneurs in residence". It is a pilot project, and will hopefully encourage future students to combine their entrepreneurial enthusiasm with research work. In addition, this longitudinal study contributes in widening the range of action research methodology applications by using it in entrepreneurial context.

Limitations

The above conclusion should be considered in the light of the constraints of the study.

First, the action research data in this study was sampled over a two months' time frame, which could be insufficient to identify and evaluate trust formation. The alliance formation process normally takes more than one year, and the trust formation during the process needs to be recorded all along the period to conduct a more critic conclusion. There also might be a need for several rounds of interviews to study the relational changes during the process.

Another limitation on the action research design is that one researcher was involved in that part. Usually a form of collaborative strategy with two or more researchers is recommended – in order to generate a reflective distance to one's own actions. In this study, this was to some extent compensated by having colleague researchers' cross-check the process with interviews and observational data.

Although an attempt was made to conduct an intensive longitudinal study of trust formation in alliances, the study focused on one start-up that is forming four alliances with different partners. The alliance partners and the start-up are closely related in the same industry segment. Therefore any claim as to the generalization of the findings to other contexts should be made with caution.

Future longitudinal research, and research across multiple industry settings, could provide both the validity of the causal links as well as the generalization of the findings to other industry segments.

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Appendix

Data sampling

Within the research time frame:

AR-CIT-P1: Audio recorded, in a data base

AR-CIT-P2: In a data base

AR-CIT-P3: In a data base

AR-CIT-P4: Audio recorded, in a data base

AR-Diary: In a data base

CS-Interview-P1: Audio recorded, in a data base

CS-Interview-P2: Audio recorded, in a data base

CS-Interview-P3: Audio recorded, in a data base

CS-Interview-P4: Audio recorded, in a data base

CS-Interview-Entrepreneur: Audio recorded, in a data base

Archival material:

Reflection report: First internship, in a data base

Reflection report: Second internship, in a data base

Notes P1: In a data base

Notes P2: In a data base

Notes P3: In a data base

Notes P4: In a data base

Emails: In a data base

Notebook: In paper

Diary: In a data base

Contracts: In a data base

Analysis overview

AR-CS-P1: In result

AR-CS-P2: In result

AR-CS-P3: In result

AR-CS-P4: In result

AR-CS-micro: In result

Time-line analysis: In result

AR: In appendix

CS: In appendix

AR-CS-macro: In appendix

AR-P1: In a database

AR-P2: In a database

AR-P3: In a database

AR-P4: In a database

CS-P1: In a database

CS-P2: In a database

CS-P3: In a database

CS-P4: In a database

Table 14: descriptive analysis CS CS_comparison

Case	General	Issues	Process
CS-Nano Cluster	No formal agreement.	The professor is very busy and doesn't has enough time to follow up the projects. He sometimes feels pressure from Stian, which can be frustrating. Meanwhile, the entrepreneur feels that it is hard to collaborate with the professor that he demands a lot, but does not follow up. Also the entrepreneur thinks the meetings and the Photocatalysis group are too unstructured.	Started to collaborate by writing a business plan for Innovation og Entrepreneurship course. The collaboration with photocatalysis group is in an more academic approach.
CS-Emission Cleaner	There is no formal contract. But the partners have a mutual understanding that one day they will come to some agreement when the proof of concept is ready.	The partner sees that the business plan for the idea isn't very clear. And the way partners work within the collaboration is quite naive. The entrepreneur sees that there is different understanding of an investment size and dividing of shares.	They have no formal agreement, but it works for now. Beginning the patent application process.
CS Medical Equipment	No formal agreement. It is initial feasibility study so far.	Alliance partner feels It is difficult to get in touch with the researchers at the nanotechnology department, and there are misunderstandings about how the tests should be done. The entrepreneur accounts the misunderstanding as a commitment problem.	The partner suggests that the project should be narrowed down, the clear protocol should be made. The entreprenuer is taking part of coordinating the test process at Hygiene Department in order to show commitment and gain credibility. The entrepreneur also mentions that although both parties initiated the idea of collaboration at the beginning, more initiative was shown from the entrepreneur afterwards.
CS-Water Cleaner	Partners have only informal agreement, but are considering signing a contract.	Alliance partner feels frustration over the slow development of the proof of concept, and the entrepreneur also notices that. According to the partner, it is not always easy for the people from the business environment to understand the nature of research.	Responsibilities have been divided clearly. The understanding of the technology is sufficient.
CS	No formal agreements so far, some of the partners recognize the need for it	There is a gap between the entrepreneurial and academic mindset and way of working. There are also different levels of commitment to projects, and that makes the collaborations more difficult and less effective.	All collaborations are in yet early phases, some developing faster (e.g. P2).

Table 14: descriptive analysis CS CS_comparison

Case	Premise	Collaboration performance	Resources	Network
CS-Nano Cluster	The entrepreneur sees himself as a essential facilitator of the project.	The professor thinks the collaboration is excellent but challenging, because the entrepreneur always follows everything up and "becomes a constant pressure". The entrepreneurs thinks the result of the collaborations could be better.	The professor has the deep knowledge and access to the researcher resource in the university. The entrepreneur brings initiative, time and energy, facilitates projects with external parties.	The entrepreneur met professor on his bachelor studies course, but first started to talk about possible business idea at a social gathering at UIO.
CS-Emission Cleaner		The collaboration is very good. But it should be more structured. It is based on a mutual reliance, which may seem a little bit naive.	Company M on behalf of the partner provides the funding for the test rig. The partner is also ready to give an input on patent application. The entrepreneur brings his network, his enthusiastic energy and his time.	The partners met at a photocatalysis meeting, then the entrepreneur was invited to P1 meeting. The partner says the entrepreneur is good at identifying what needs to be discussed and what does not.
CS Medical Equipment		Both parties think the collaboration is good but can be better. The entrepreneur thinks he could have pushed others to follow up the project more.	The entrepreneur has good connections at the nano-technology researchers at the university who provide the test material. The partner provides the access to Hygiene Unit that carries out the tests. The entrepreneur sees himself as a facilitator of the project.	Partners met on a strategy course at SFE and shared their ideas in a social gathering. The alliance partner agrees that ties with reputable people give credibility. The entrepreneur and his partner connected their networks in order to create a collaboration between two research departments.
CS-Water Cleaner		According to the partner, there is room for improvement, but collaboration is good. The entrepreneur understands that the expectations of the partners are not completely met (process is too slow, no proof of concept). On the other hand, the entrepreneur thinks that the partner does not put in that much effort either.	The entrepreneur provides access to research resources and test rig based on entrepreneur's good network at university. The partner focuses on commercial side by providing the access to the market, knowledge of the industry, contacts in it, while at the same time providing some funding (that comes from Innovasjon norge). The entrepreneur has some contacts that are valuable for the partner.	First met in April 2011. Introduced by the professor. The professor included the entrepreneur into meetings with the partner company. According to the alliance partner, it might be important to have ties with reputable people, in order to show credibility The entrepreneur has some contacts that are valuable for the partner.
CS	The entrepreneur seems to be representing the most committed side, in all the cases. He takes the responsibility of facilitating all the projects and making all the collaborating parties do what they are supposed to. Although, when it comes to high level scientists, the entrepreneur does not 'push' them as much, probably because out of respect.	All the partners from different projects generally evaluate the collaboration as good, but indicate that there is room for improvement. In the entrepreneurs' opinion the results of the collaborations could be better. External partners acknowledge that collaboration with the material science department is a valuable.	Partners provide some funding, access to testing facilities, different networks, knowledge of the science behind the technology. The entrepreneur contributes with initiative and energy, uses his time on the projects. He also has a good network, and connects the networks of different partners.	The entrepreneur made connections with different partners in academic and business environment, often he was introduced by the professor that he already was in a collaboration with. The entrepreneur has a broad network, especially in the academic environment. He connects different networks (academics-industry, or between different research departments at the university).

Table 14: descriptive analysis CS CS_comparison

Case	Trust	Personal features and behavior	Communication
CS-Nano Cluster	The professor fully trusts the entrepreneur, and feels that without the entrepreneur very few thing would have happened. The entrepreneur feels that he has a lot of freedom to make decisions, that he is trusted.	The first impression the professor had of the entrepreneur is not very serious in a scientific perspective. But it turned out to be unique (entrepreneurial minded person in an academic environment), when known better.	Mainly by informal meetings and e-mails. Professor admits, that he often does not reply e-mails and shows little initiative. The entrepreneur has to use a lot of initiatives to keep the project going. The entrepreneur also complains that the value of the monthly meeting is not as high it could be.
CS-Emission Cleaner	The partner trusts entrepreneur and mentions that the relationship between them is very equal. But the entrepreneur has doubt on the investment size and share distribution.	First impression is that the entrepreneur is enthusiastic, dedicated to what he is doing, and self motivated. What the partner values most is that the entrepreneur is very commercial minded that he sees the opportunities in the market.	No daily communication but contact whenever it is neccesary. The partner says the entrepreneur is good at identify what it needs to be discussed and what need not to be.
CS Medical Equipment	Although the alliance partner shows full trust towards the entreprenuer, the entrepreneur himself identified the commitment problem in the project. The entrepreneur senses the negative attitude from the high level professors that do not aknowledge him as equal. Also there might be a loyality problem, because entrepreneur's loyality to one professor may cause difficulty in communication with another.	The entrepreneur is enthusiastic, creative. Meanwhile, he is also has a good understanding of the scientific part of the project. Good at interpersonal communication.	The partner thinks the communication with the entrepreneur is very good from the very beginning, that they have had regular contact. But it is difficult to communicate with the photocatalysis group.
CS-Water Cleaner	The partner exhibits trust in entrepreneur, although there is a need for more formal agreements. The alliance partner, although frustrated about not having the proof of concept, trusts the researchers, thinks *"they know what to do"*. The entrepreneur is seeking to gain credibility by taking initiatives of doing and making things happen.	The entrepreneur is an enthusiastic person. The entrepreneur is aware of the situation in industry and academic world. He has gained a better understanding of how the market works, become more commercial minded.	Comunnication takes place in the form of informal dialog. Meetings are held when necessary. Regular updates on progress and attempts to clarify expectations towards each other. The entrepreneur always follows up and delivers what he promised.
CS	There seems to be mutual trust in all the cases, but most of the partners and the entrepreneur himself agree that there is a need to have more formal collaboration in the future. The fact that the entrepreneur is strongly connected with academics seems to add some legitimacy, makes it easier to develop relationships. The entrepreneur consciously takes a lot of initiative and positions himself as a facilitator, in order to gain trust.	All the partners describe the entrepreneur as very enthusiastic, initiative, dedicated person. Commercial minded, able to identify opportunities in the market, has a good understanding of the technology as well. Partners can notice the improvement on entrepreneur's understanding of business, which signalizes he is a fast-learner.	Communication is usually on the informal level, by e-mails, private meetings. There are some more formal meetings as well, but not often. The entrepreneur is the one taking initiatives, following up, 'pushing' others to communicate, keep the projects running. Most of the partners seem very positive about the communication with the entrepreneur, although the professor points out that it creates some pressure. There are some difficulties in the overall communication between different parties (e.g. researchers at the UNI), because of people being very busy and possibly lacking commitment.

Table 15: descriptive analysis AR AR_comparison

Cases	General	Content	Process
AR-Nano Cluster	Cluster-like alliance No formal agreements.	Facilitating and coordinating is an issue that needs to be solved. The start-up lacks integrity in the academic environment and does not have the mandate to demand anything from the researchers. The partners are busy, and it is hard to communicate sufficiently. The cluster does not add the expected value for external firms, which are more commercially minded.	The cluster provides access to new resources and network. The entrepreneur facilitates communication. The cluster is in the process of forming a gemini center.
AR – Emission Cleaner	The alliance formation process has been controlled with an informal intentions agreement and clear goals and tasks. It is an alliance between two stakeholders.	It has been a challenge to facilitate this project sufficiently due to coordination issues with third parties. The entrepreneur has clarified expectations in order to ensure commitment and focus from both sides of the alliance.	The partner started the patenting process before they had proof of concept. Tight coordination and close communication has been crucial to speed up the work done by third parties. The proof of concept has changed the environment of the alliance formation process. They choose to set up a joint venture, to avoide uncertainties.
AR – Medical Equipment	Several stakeholders are involved. Informal agreement.	There is a shift from applied research to basic research.	There are different opinions on whether the entrepreneur adds value to this project.
AR-Water Cleaner	It is an alliance between two stakeholders.	The entrepreneur takes initiative and functions as a "bridge" between the academic environment and the partner. The partner is not satisfied with the collaboration with the academic environment, but they have not made any clear comments about this yet.	The entrepreneur focuses on R&D The alliance partner focuses on low barrier market opportunities. There is a lack of clear goals, focus and transparency between the partner and the academic environment, which needs to be addressed.
AR	The entrepreneur works under informal agreements in the alliance formation process. The entrepreneur has an open approach and is willing to disclose ideas early on. The entrepreneur has several projects and some of them overlap in terms of network and interests.	There is a lack of clear goals, focus and transparency in projects within the academic environment, which needs to be addressed. The entrepreneur facilitates projects and this has been a huge part of the entrepreneurs daily tasks. The entrepreneur has been a "bridge" between external parties and the material science department The entrepreneur has clarified expectations with his partners regarding commitment and focus. This has been a challenge in the collaboration with the academic environment.	The entrepreneur has position him selves as a "bridge" between the academic environment and external partners. The state of the proof of concept progression has changed the environment of the alliance formation process.

Table 15: cont descriptive analysis AR AR_comparison

Cases	Premise	Collaboration performance	Resource
AR-Nano Cluster	Stakeholders in the cluster acknowledge that the entrepreneur facilitates communication and action within the cluster. There is a relational and institutional gap between the academic environment and externals firms. The entrepreneur has expirenced a task overload and has taken too much initiative without being able to sufficeiently follow it up.	The cluster could be more structured.	The entrepreneur contributes with R&D, network and different initiatives. The entrepreneur facilitates communication within the cluster. The cluster contributes with network and reserch facilities.
AR – Emission Cleaner	High degree of independency and commitment.	The collaboration performance improved a lot after the entrepreneur started to facilitate and coordinate the experimental setup.	The entrepreneur contributes with knowledge and experimental research. The entrepreneur has more time to facilitate and coordinate the development of the experimental setup. The partner contributes with financial resources and the test facility. The partner contributes with knowledge on business development.
AR – Medical Equipment	This project went too fast, too early and the technology failed to meet expectations from both sides of the alliance. The entrepreneur is perceived differently at the leader level in the material science environment.	There is no mutual understanding of expectations and motivations.	There is complementary resources and knowledge in this alliance
AR-Water Cleaner	The two cofounders of the alliance firm, perceive the collaboration with the academic environment slightly different. The partners are frustrated because the academic environment lacks a good understanding of the market. The entrepreneur is seen as a "bridge".		The entrepreneur has access to some money through the R&D contract that the partner had with the academic environment. There are complementary resources in this alliance, but they are not fully exploited
AR	There is a relational and institutional gap between the academic environment and external firms The entrepreneur failed to clarify expectations about the technology up-front in the P3 case and it has been initiated too fast and too early The startup is seen as a "bridge" to the academic environment for external partners. The entrepreneur has taken a lot of initiative, which is good, but it also means that he has to follow it up and be committed. The entrepreneur has experienced a task overload due to all this initiatives.	There is a lack of clear goals and transparency in the collaboration with the academic environment. The entrepreneur's collaboration with P2 has higher performance due to clear goals and mutual commitment. The entrepreneurs' ability to understand and communicate how the academic environment works has been important in the collaboration with external partners.	The entrepreneur seeks alliances with partners that can offer superior research knowledge and facilities. The entrepreneur seeks alliances with partners that can offer complementary resources. E.g. market knowledge, business development etc. The entrepreneur contributes with enthusiasm, ideas and some research

Table 15: cont descriptive analysis AR AR_comparison

Cases	Network	Trust	Personal features	Communication
AR-Nano Cluster	The entrepreneur has identified severel potential partners and actively contributed to include them in the cluster. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.	The entrepreneur has responded on every initiative that has been launched. The entrepreneur has built trust by being a facilitator within the cluster.	The entrepreneur contributes with, creativity, enthusiasm and administrative help. The entrepreneur shows commitement through actions	The entrepreneur uses the advantage of the position and reputation of the professor in communication with the people in the academic environment. The entrepreneur functions as a "bridge" between the academic and industrial parts of the cluster.
AR – Emission Cleaner	The alliance partners complement each other's networks. They have actively worked together to exploite opportunities in their own and each others network They have actively used their network to get access to new resources and advices. Tight connection to the academic environment has been an important asset for the entrepreneur.	The entrepreneur trusts his partner enough to let him go on the first patenting meeting alone. The partner has given away some of the control over his own resources. The partner has not deeply validated the results from the proof of concept. The partner has given the entrepreneur freedom to operate.	The entrepreneur tries to take initiative, work fast and independently. The entrepreneur has facilitated and coordinated the development of the experimental setup. The entrepreneur acknowledges that he has a lot to learn from the partner and he tries to be humble and curious.	The entrepreneur needs to communicate closely with third parties, to ensure that they deliver what promised. The entrepreneur is open in the communication with the alliance partner when clarifying expectations.
AR – Medical Equipment	The entrepreneur's ties to the material science environment has been important. The entrepreneur has used this project and his connections to build legitimacy in other projects.	The entrepreneur struggles to build trust in the material science environment. The entrepreneur has built legitimacy in the alliance formation process by responding quickly to given tasks.	The entrepreneur responds quickly to given tasks.	The entrepreneur has taken position as a facilitator together with the interviewed partner.
AR-Water Cleaner	The entrepreneur has not exploited his partner's network yet. The entrepreneur has strong ties to some key opinion leaders, which is interesting for the partner. The entrepreneur has consciously positioned himself close to the academic environment.	The entrepreneur is "bridging" the gap between the academic environment and the business partner.	The entrepreneur tires to show commitment in the relationship with his partner. The entrepreneur has too many projects running at the same time and have an overload of tasks. The entrepreneur has taken too much initiative in the collaboration between the alliance partner and the academic environment.	The entrepreneur is coordinating activity within the alliance.
AR	The entrepreneur has actively worked towards it's own and his partners network to identify market opportunities. The entrepreneur has shared his network with the partners The entrepreneur name drops reputable people he has a collaboration with to get access to new resources and networks, and for building legitimacy.	The entrepreneur is responding quickly to given tasks. The entrepreneur has taken initiatives to avoid unnecessary conflicts between copartners. The entrepreneur has position himself as a "bridge" and has been acknowledge for doing this.	The entrepreneur focuses on taking initiatives, facilitating, communication and coordination to build trust. The entrepreneur works fast and independently	The entrepreneur has tried to make a bridge between the academic environment and external partners. The entrepreneur has experienced that coordination and communication is challenging due to busy partners and lack of clear mandate for the entrepreneur.

Table 16: descriptive analysis AR-CS macro

Cases	General	Content	Process	Premise	Collaboration performance
AR	The entrepreneur works under informal agreements in the alliance formation process. The entrepreneur has an open approach and is willing to disclose ideas early on. The entrepreneur has several projects and some of them overlap in terms of network and interests.	There is a lack of clear goals, focus and transparency in projects within the academic environment, which needs to be addressed. The entrepreneur facilitates projects and this has been a huge part of the entrepreneurs daily tasks. The entrepreneur has been a "bridge" between external parties and the material science department The entrepreneur has clarified expectations with his partners regarding commitment and focus. This has been a challenge in the collaboration with the academic environment.	The entrepreneur has position him selves as a "bridge" between the academic environment and external partners. The state of the proof of concept progression has changed the environment of the alliance formation process.	There is a relational and institutional gap between the academic environment and external firms The entrepreneur failed to clarify expectations about the technology up-front in the P3 case and it has been initiated too fast and too early The startup is seen as a "bridge" to the academic environment for external partners. The entrepreneur has taken a lot of initiative, which is good, but it also means that he has to follow it up and be committed. The entrepreneur has experienced a task overload due to all this initiatives.	There is a lack of clear goals and transparency in the collaboration with the academic environment. The entrepreneur's collaboration with P2 has higher performance due to clear goals and mutual commitment. The entrepreneurs' ability to understand and communicate how the academic environment works has been important in the collaboration with external partners.
CS	No formal agreements so far, some of the partners recognize the need for it	There is a gap between the entrepreneurial and academic mindset and way of working. There are also different levels of commitment to projects, and that makes the collaborations more difficult and less effective.	All collaborations are in yet early phases, some developing faster (e.g. P2).	The entrepreneur seems to be representing the most committed side, in all the cases. He takes the responsibility of facilitating all the projects and making all the collaborating parties do what they are supposed to. Although, when it comes to high level scientists, the entrepreneur does not 'push' them as much, probably because out of respect.	All the partners from different projects generally evaluate the collaboration as good, but indicate that there is room for improvement. In the entrepreneurs' opinion the results of the collaborations could be better. External partners acknowledge that collaboration with the material science department is a valuable.
AR-CS macro	The alliance formation process is driven by informal mechanisms, although some of the partners recognize the need for formal mechanisms.	The entrepreneur facilitates projects and this has been a huge part of the entrepreneurs' daily tasks. There is a gap between the entrepreneurial and academic mindset and way of working. There are also different levels of commitment to projects, and that makes the collaborations more difficult and less effective.	All collaborations are in an early phase, but some are developing faster (e.g. P2). That is due to the state of the proof of concept progression, which has changed the environment of the alliance formation process. The entrepreneur has position him selves as a "bridge" between the academic environment and external partners.	The entrepreneur seems to be representing the most committed side, in all the cases. The entrepreneur has taken a lot of initiative, and he has to follow it up and be committed. The entrepreneur has experienced a task overload due to all this initiatives. The entrepreneur is seen as a "bridge" to the academic environment for external partners.	All the partners evaluate the collaboration as good, but there is a lack of clear goals and transparency in the collaboration with the academic environment. The entrepreneur's collaboration with P2 has higher performance due to clear goals and mutual commitment. External partners acknowledge that collaboration with the material science department is valuable. The entrepreneurs' ability to understand and communicate how the academic environment works has been important in the collaboration with external partners.

Table 16: cont descriptive analysis AR-CS macro

Cases	Resource	Network	Trust	Personal features	Communication
AR	The entrepreneur seeks alliances with partners that can offer superior research knowledge and facilities. The entrepreneur seeks alliances with partners that can offer complementary resources. E.g. market knowledge, business development etc. The entrepreneur contributes with enthusiasm, ideas and some research	The entrepreneur has actively worked towards it's own and his partners network to identify market opportunities. The entrepreneur has shared his network with the partners The entrepreneur name drops reputable people he has a collaboration with to get access to new resources and networks, and for building legitimacy.	The entrepreneur is responding quickly to given tasks. The entrepreneur has taken initiatives to avoid unnecessary conflicts between copartners. The entrepreneur has position himself as a "bridge" and has been acknowledge for doing this.	The entrepreneur focuses on taking initiatives, facilitating, communication and coordination to build trust. The entrepreneur works fast and independently	The entrepreneur has tried to make a bridge between the academic environment and external partners. The entrepreneur has experienced that coordination and communication is challenging due to busy partners and lack of clear mandate for the entrepreneur.
CS	Partners provide some funding, access to testing facilities, different networks, knowledge of the science behind the technology. The entrepreneur contributes with initiative and energy, uses his time on the projects. He also has a good network, and connects the networks of different partners.	The entrepreneur made connections with different partners in academic and business environment, often he was introduced by the professor that he already was in a collaboration with. The entrepreneur has a broad network, especially in the academic environment. He connects different networks (academics-industry, or between different research departments at the university).	There seems to be mutual trust in all the cases, but most of the partners and the entrepreneur himself agree that there is a need to have more formal collaboration in the future. The fact that the entrepreneur is strongly connected with academics seems to add some legitimacy, makes it easier to develop relationships. The entrepreneur consciously takes a lot of initiative and positions himself as a facilitator, in order to gain trust.	All the partners describe the entrepreneur as very enthusiastic, initiative, dedicated person. Commercial minded, able to identify opportunities in the market, has a good understanding of the technology as well. Partners can notice the improvement on entrepreneur's understanding of business, which signalizes he is a fast-learner.	Communication is usually on the informal level, by e-mails, private meetings. There are some more formal meetings as well, but not often. The entrepreneur is the one taking initiatives, following up, 'pushing' others to communicate, keep the projects running. Most of the partners seem very positive about the communication with the entrepreneur, although the professor points out that it creates some pressure. There are some difficulties in the overall communication between different parties (e.g. researchers at the UNI), because of people being very busy and possibly looking
AR-CS macro	There is a complementary alignment of resources between the alliances. The entrepreneur contributes with enthusiasm, ideas initiatives, energy and time He also has a good network, and connects the networks of different partners.	The entrepreneur has shared his own and exploited his partners network to identified potential collaboration opportunities He connects different networks (academics-industry, or between different research departments at the university). The entrepreneur name drops reputable people he has a collaboration with to get access to new resources and networks, and for building legitimacy. The entrepreneur collaborates with reputable people to get access to new resources and networks, and for building legitimacy.	There seems to be mutual trust in all the cases, but most of the partners and the entrepreneur himself agree that there is a need to have more formal collaboration in the future. The fact that the entrepreneur is strongly connected with academics seems to add some legitimacy, makes it easier to develop relationships. The entrepreneur consciously takes a lot of initiative and positions himself as a facilitator, in order to gain trust.	The entrepreneur is enthusiastic, initiative, dedicated and he works fast and independently The entrepreneur has a commercial mindset	Most of the partners seem very positive about the communication with the entrepreneur, although the professor points out that it creates some pressure. The entrepreneur is the one taking initiatives, following up, 'pushing' others to communicate, keep the projects running. The entrepreneur has experienced that coordination and communication is challenging due to busy partners and lack of clear a mandate for the entrepreneur.