



NTNU – Trondheim
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International Networking Strategies in Academic Spin-off Companies

A study of international network building
processes and the roles of the top
management team and board in influencing
internationalization speed and international
network range

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Preface

This paper has been written as a master thesis within the School of Entrepreneurship at the Norwegian University of Science and Technology (NTNU). The degree is being taken at the Department of Industrial Economics and Technology Management.

I would like to express my gratitude to Postdoc Ekaterina Bjørnåli, my supervisor, for valuable comments, suggestions and critique throughout this semester, as well as for the excellent foundation provided from the same cooperation during the preliminary study leading up to this master thesis. The input provided during the process of planning and performing research, and writing this report has been of great value. I would also like to express my gratitude towards the case firms that have a hectic schedule, but allocated time to contribute with their first hand experiences and knowledge. Finally professors and fellow students at NTNU have been of great help, particularly Professor Roger Sørheim and Associate Professor Øystein Widding, as well as my wonderfully talented and tolerant team members in the start-up Amok Equipment AS.

Abstract

Purpose – International Entrepreneurship (IE) is a new field of multi-disciplinary enquiry that has its roots in studying the fascinating phenomenon of the emergence of born globals. These small- and medium sized firms internationalize at or near their founding and represent a growing number of entrepreneurial firms. A considerable number of born globals are spin-offs which utilize technology originally developed in academic institutions. Academic spin-offs (ASOs) have been studied from different angles (e.g. spin-off formation rates, technology transfer offices, university systems), but the research on teams and boards in ASOs has so far been limited, and the research on internationalization issues in these firms is almost absent. This study addresses the understudied phenomenon of ASO's international network building, and the roles of the top management team and the board of directors in the internationalization of small academic spin-offs.

Theory – The dynamic capability view (DCV) suggests that firms need to develop new capabilities to identify opportunities and respond quickly to them. The DCV can be used as a framework to analyze internal capabilities and how these change over time as networks are built, reconfigured, added and split up. The resource dependence view (RDV) suggests that the long-term survival and success of a firm is dependent on its abilities to link the firm with its external environment. In this respect various organizational goals can be reached by building international relationships and by recruiting “outside” members to the team and board that can help link the firm and its environment by providing legitimacy and network resources.

Research problem – How and why do born global ASOs build international network relationships? The research problem guiding this study tries to deepen our understanding of ASO's international network building and what the respective roles of the top management team (TMT) and board of directors are in these processes.

Methodology/approach - The thesis draws on seven case studies that are high-technology ASOs from Norwegian academic institutions. The multiple case study is confirmatory, in the sense that earlier theories are reviewed, and at the same time inductive from the observation of the non-expected details and deeds of the cases. Data was collected through semi-structured in-depth face-to-face interviews with the

company Chief Executive Officers (CEOs) in the spring semester of 2014. Tentative propositions for future research is presented.

Findings – In most cases the firms have needed to build new international networks over a long period of time to acquire limited resources and build legitimacy. Useful behavioral characteristics of managers are those of innovativeness, proactiveness and risk-willingness (as earlier described in the literature), but also capabilities like trustworthiness, flexibility and determination seem to be important. The findings indicate that the CEO's entrepreneurial mind-set is an important determinant for internationalization speed. But the companies that use the TMT and board as a resource and make use of their international social networks achieve a higher success rate in terms of network range. Thus the CEO as the sole driving force behind internationalization can lead to early internationalization, but this does not necessarily lead to a broad network range and long-term success.

Originality/value - The study makes several contributions to the literature on international entrepreneurship, academic entrepreneurship and corporate governance by identifying the impact of dynamic networking capabilities and resource dependence, and arguing how the CEO, TMT, and board play varying but important roles in the context of born global ASOs. Future research directions and practical implications for those who are thinking of starting new international businesses are presented.

Keywords – Internationalization, Networks, born globals, Academic spin-offs, Team and Board roles

Samandrag

Føremål - Internasjonalt entreprenørskap (IE) er eit nytt felt med tverrfagleg bakgrunn som har sine røter i å studere den fascinerande framveksten av *born globals*. Desse små-og mellomstore bedriftene internasjoniserar ved eller nær etablering, og dei representerar eit aukande antal av entreprenørielle bedrifter. Eit betydeleg antal av *born globals* er selskap som har sine røter og teknologiske opphav i akademiske institusjonar. Akademiske *spin-offs* (ASOs) har vorte studert frå ulike vinklar (f.eks antalet etableringar av spin-offs, teknologioverføringskontor, universitets-system), men forskning på det daglege leiarteamet og styret i desse selskapa har så langt vore begrensa, og forskingen på internasjoniseringsspørsmål er nesten fråverande. Denne studien tek for seg eit fenomen som har fått for lite fokus, nemleg internasjonale nettverksbygging, og rollane til toppleiinga og styret i ASOs.

Teori – Synet på dynamiske kapabilitetar (DK) føreslår at bedriftene må utvikle nye evner, identifisere moglegheiter, og respondere raskt på dei. DK kan brukast som eit rammeverk for å analysere interne evner og korleis desse endrar seg over tid etter kvart som nettverk blir bygd, omstrukturert, lagt til og splitta opp. Synet på ressursavhengigheit seier at den langsiktige overlevinga og suksessen til et firma er avhengig av deira evner til å knytte seg til sitt ytre miljø. I denne samanhengen kan ulike organisatoriske mål nåast ved å bygge internasjonale relasjonar og ved å rekruttere "utanforståande" medlemmar til ledelsesteamet og styret som kan hjelpe til med å knytte firmaet og deira miljø ved å gi legitimitet og tilgang til nettverksressursar.

Problemstilling - Korleis og kvifor bygger *born global* ASOs internasjonale nettverk? Problemstillinga som styrer denne studien forsøker å utdjupe vår forståing av ASOs og deira internasjonale nettverksbygging, og kva dei respektive rollene til toppleiinga og styret er i desse prosessane.

Metode / design – Denne oppgåva bygger på sju case-studiar som er høgteknologiske ASOs frå norske akademiske institusjonar. Multiple-case studiet er bekreftende, i den forstand at tidlige teorier blir vurdert, og på samme tid induktivt fra observasjonen av de ikkje-forventede detaljane og hendingane i tilfella. Data blei samla inn gjennom semi-strukturerte djupneintervju, ansikt-til-ansikt med selskapet sine toppsjefar i vårsemesteret 2014. Tentative proposisjonar for framtidig forskning vert presenterte.

Funn - I dei fleste tilfella har bedriftene behov for å bygge nye internasjonale nettverk over ein lang periode for å tilegne seg begrensa ressursar og bygge legitimitet. Nyttige kjenneteikn ved leiarane er innovasjonsevne, proaktivitet og risikovilje (som tidligare omtalt i litteraturen), men også evner som pålitelegheit, fleksibilitet og pågangsmot ser ut til å vera viktig. Funna tyder på at den daglege leiaren si innstilling er ein viktig faktor for internasjonaliseringstempo, men selskapa som brukar toppleiinga og styret som en ressurs og bruker deira internasjonale sosiale nettverk oppnår ein høgare suksessrate når det gjeld rekkevidden til nettverket. Slik kan den daglege leiaren som einaste drivkraft bak internasjonalisering føre til tidleg internasjonalisering, men dette fører ikkje nødvendigvis til et breidt nettverk og langsiktig suksess.

Originalitet / verdi - Studien gir fleire bidrag til litteraturen om internasjonalt entreprenørskap, akademisk entreprenørskap og selskapsleiing ved å identifisere effekten av dynamiske nettverkskapabilitetar og ressursavhengighet, og argumenterar for at dagleg leiar, toppleiinga, og styret har varierende men viktige roller i sammenheng med born global ASOs-internasjonalisering. Framtidige forskingsretningar vert presentert, og praktiske implikasjoner for dei som tenkjer på å starte nye internasjonale bedrifter vert lagt fram.

Nøkkelord - Internasjonalisering, Nettverk, *Born globals*, Akademiske spin-offs, Toppleiing- og styreroller

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1. Introduction

International entrepreneurship (IE) is a new field of multi-disciplinary enquiry attracting scholars from disciplines such as marketing, management, international business and entrepreneurship (Mort and Weerawardena 2006). IE was identified as one of three key emerging research areas in an earlier review of international business research trends (Wright and Ricks 1994), and it has been suggested that the study of born globals has dominated the early development of the IE field (Dimitratos and Jones 2005).

Born globals represent a growing number of entrepreneurial firms that internationalize at or near their founding. These start-ups seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries (Oviatt and McDougall 1994). This definition is useful because it describes how some of the firms not only sell, but also enter into strategic partnerships, raise capital and manufacture products worldwide. A less strict definition of the term has been applied in this thesis, and it requires internationalization while the firm is still young and less than six years (McDougall, Oviatt et al. 2003).

Several terms have appeared in the literature referring to the phenomenon with many of the same characteristics: *international new venture*, *global start-up*, *instant international*, *early or young internationalizing firm*. Although there are some minor differences between the concepts and definitions, *born global* is used as a common term throughout this thesis.

Earlier theories from international business (IB) research, such as the product life-cycle theory and stage theory of internationalization, have been challenged (McDougall, Shane et al. 1994), and a substantial amount of new literature has looked at what differentiates born globals from domestic new ventures that start operating from their home country and slowly evolve to do business internationally.

Globalization and advantages in information and communication technology are two broad trends encouraging an increase of born globals (Cavusgil, Knight et al. 2012). International business has become much less expensive, opening up for smaller firms to participate, and compared to larger firms born globals tend to be more innovative and quicker to adopt new ideas and technologies. Studies show that

knowledge intensive industries such as information and communications technology (ICT) (Coviello 2006, Freeman, Ron et al. 2006) and biotech (Al-Laham and Souitaris 2008, Tolstoy and Agndal 2010) are common among born globals. Whereas innovativeness and technology enables faster internationalization, small domestic markets (Cavusgil, Knight et al. 2012) and increased competition are factors that encourage or even force it upon entrepreneurs (Oviatt and McDougall 2005).

In a traditional economic approach most of these entrepreneurial companies operate under *uncertainty* - referring to situations where it is impossible to calculate what the future outcomes of a decision will be (Knight 1921). Since it is difficult to predict the future, Knight argued that it is the entrepreneur's ability and willingness to deal with uncertainty that leads to profits.

Companies seeking rapid internationalization must overcome a number of barriers. But in predicting the future most entrepreneurs' choices to exploit business opportunities are made on overly optimistic predictions (Kahneman and Lovallo 1993). This is reflected in a high percentage of start-up failures.

The liability of newness hypothesis (Stinchcombe 1965) assumes higher risks of failure for young organizations compared with old ones, because they depend on the cooperation of strangers, have low levels of legitimacy and suffer from a liability of smallness. Born globals also often work with new and innovative products (Freeman, Ron et al. 2006) that have to gain market acceptance (Moore 2002).

In addition early internationalization makes born globals encounter liabilities of foreignness in their initial stages of the company's development process. This suggests that a foreign company has a disadvantage compared to companies that originate in the country where business takes place (Zaheer 1995).

On an overall basis born globals tend to lack substantial resources – both intangible resources and tangible resources such as financial and physical property, plant and equipment (Knight, Madsen et al. 2004). Thus the managers of born globals must tackle all the challenges confronting a newly established firm, as well as the challenges that come with internationalization.

When we look at all the challenges facing born globals it does not suggest an increased amount of such companies, but in fact early internationalizing firms are growing in numbers and many achieve considerable international success (Knight, Madsen et al. 2004). In this regard it has been argued that entrepreneurs behind born globals have competencies (background, knowledge and networks) that allows them to combine resources in an unique way not matched by other entrepreneurs (McDougall, Shane et al. 1994). It is suggested that those who lack networks face a *liability of outsidership* (Johanson and Vahlne 2009).

Born globals rely on strategic alliances and networks to deal with the fact that they cannot control all of their vital assets (Oviatt and McDougall 1994) and through networks opportunities arise to use financial and human capital (Burt 1993). An analysis of born globals compared to domestic new ventures argues that international network contacts is a resource leading to early internationalization, while the lack of such a network can act as a barrier to internationalization (McDougall, Oviatt et al. 2003). The benefits of increased social capital through networks can include better access to resources and international opportunities, and be a means to overcome the liabilities of newness and foreignness.

A recent focus has been to study networking as a dynamic capability (Teece, Pisano et al. 1997) that allows companies to build and reconfigure networks. Thus it is not only the entrepreneurial team's pre-founding network that is important. Management can learn to constantly build, reconfigure, add and split up network relationships. In addition shifts in the entrepreneurial team and board of directors take place. Firm's resource needs and challenges change during different stages of development, thus new people with other background competencies can help fill skill gaps (Bjørnåli and Gulbrandsen 2010, Bjørnåli and Aspelund 2012).

Given the growing number of born globals and their impact on society through innovation, job creation and economic growth (Moen 2002), it is important to better understand how entrepreneurial firms can relate to their network to reduce liabilities and increase their company's success rate.

This study continues by introducing ASOs as an important and understudied subgroup of born globals. Being a born global ASO can be extra challenging because the top management teams come from a non-commercial environment and often lack business experience (Lockett, Siegel et al. 2005). In addition the teams are often homogeneous with networks that are skewed towards academia and technology (Ibid.). This makes it especially interesting to study how and why ASOs build their networks while going international. The following section also summarizes the literature providing a rationale for focusing on small and early internationalizing ASOs, and specifically the top management team- and board's role in international network building.

1.1 Academic spin-offs

The importance of academic research to economic growth is widely accepted and earlier research has argued that the impact of ASOs represent incremental contributions to a country's gross domestic product (Vincett 2010).

ASOs are usually founded based on technology that is formally transferred from a parent organization, commonly a public research organization such as a university or research institute. These companies often introduce new and advanced technology and do for a number of reasons internationalize at or near their founding. Bjørnåli and Gulbrandsen (2009) show that ASOs typically choose such a strategy, and confirms that a considerable and growing number of born globals are spin-offs from academic institutions.

As for all born globals ASOs have resource constraints and must overcome liabilities of newness, foreignness and outsidership. And even though their technology may have great potential, it is commercially untested (Aspelund, Berg-Utby et al. 2005), and the road towards achieving sustainable returns and financial profitability is long. Two fundamental differences from other high-tech start-ups have been identified (Vohora, Wright et al. 2004). First, their foundation comes from a non-commercial environment, and the transition to become a competitive rent-generating firm can be tough. In particular, academic entrepreneurs may lack commercial skills. Second, there may be conflicting objectives of key stakeholders such as the university, the academic entrepreneur, the venture's management team and suppliers of finance

(such as venture capitalists). This may adversely affect the venture's ability to move forward.

The study of ASOs is considered to be methodologically difficult due to the complexity and often long timescales involved (Shane 2004). The establishment of international strategic alliances and securing international sales (Reuber and Fischer 1997, Johnson 2004) is used as a threshold in this study to indicate successful internationalization. These are considered important requirements for firm internationalization, and like for the credibility threshold (equity investment by an external private investor) (Lockett, Siegel et al. 2005), such agreements provide a third-party evaluation as an indicator of commercial potential. Thus the time to reach international agreements (internationalization speed) is considered. In addition international network range (number of ties to other actors) has been used to indicate successful internationalization. A larger network opens greater potential for access to information and other resources, and thus increased social capital (Borgatti and Jones et.al 1998, Greve and Salaff 2003).

1.2 Top management team and board of directors

ASOs and the important role of the management team and board of directors have only been examined to a limited extent in the literature on international and academic entrepreneurship (Huse 2007, Rothaermel, Agung et al. 2007, Cumming, Sapienza et al. 2009).

The composition of the top management team (TMT) in entrepreneurial firms appears to be an important determinant for new venture growth (Colombo and Grilli 2005, Vanaelst, Clarysse et al. 2006). A broad definition of TMT is adapted here and includes those individuals who have a direct influence on strategic decisions (Ensley and Hmieleski 2005). This extends a more traditional definition which states that the TMT only includes the essential founders who have financial interest in the firm (see Bjørnåli and Aspelund 2012 p. 354).

Homogeneity is shown within TMTs in terms of education, industry experience and functional expertise (Lockett, Siegel et al. 2005) and a gap in their knowledge is expected realizing the multidisciplinary tasks that has to be handled to be successful. In addition people within management vary in their willingness to build network relations

(Ronald S. Burt 2004) even though relationship building is considered important for all members of an entrepreneurial founding team (Ireland, Hitt et al. 2001). It is possible to argue that gaining access to resources through external relations and knowing how to make use of them is of particular importance for small ASOs as they come from a non-commercial environment. They need to make an effort to exploit both internal capabilities and external resources at a high performance level for the firm to survive and move from one development stage to the next.

The author of this thesis is an entrepreneur himself and supports the increased focus on studying the different roles played by individual actors in start-ups (Vesper 1987), and does this not only by studying the TMT, but by including the board's role in networking.

Uncertainty, liabilities and limited resources characterizes everyday life for most entrepreneurial firms. The board is considered to be a useful toolbox that provides access to scarce resources (Lynall, Golden et al. 2003). Commonly a board is said to have two institutional roles and functions; that of control and monitoring *and* that of resource gathering and strategizing. Earlier literature has focused on larger public companies and explored how their boards can act simultaneously as monitors and as builders of value. Later research has focused on the board's strategizing and resource providing roles in young entrepreneurial firms, while retaining interest in the monitoring role (Filatotchev and Bishop 2002, Zahra, Filatotchev et al. 2009).

When compared to other types of companies early stage ventures need the board more often to be part of strategic decision making (Hambrick and Abrahamson 1995, Forbes and Milliken 1999), and it has been suggested that active boards in such firms do not operate separately from top management, but rather as an extension of it (Zhang 2011). But the board's resource gathering role in early internationalization ASOs is an understudied phenomenon that deserves greater focus, and even fewer seem to look specifically at how the roles of and relationship between the TMT and the board affects academic spin-off companies, particularly not in a context of early internationalization (Bjørnåli and Aspelund 2012).

1.3. Research questions

Given limited prior research (as described above), this study addresses the roles of the TMT and the board in building international networks. I have examined seven ASOs that have been founded both by staff scientists and students at Norwegian universities. Drawing on existing theories on entrepreneurial dynamics such as networking capabilities and the resource dependence view (RDV), the research problem addresses why and how born global ASOs build international network relationships. It specifically does so by trying to answer the following two research questions:

RQ1) What are the distinctive characteristics of the international networks of born global ASOs?

(RQ2) What role does the TMT and board play in international network building?

By answering these research questions the study aims at improving our understanding of how and why born global ASOs build international networks, and whether the varying roles of the CEO, TMT and board influence successful internationalization. By doing so, the study contributes to the research on international entrepreneurship, academic entrepreneurship and corporate governance. This study also has practical implications, and hence is of importance for those who are thinking of starting new international businesses.

The remainder of this thesis is structured as follows. In the next sections the theories and methodology adopted in the empirical study are explained. Thereafter I thematically summarize the findings and present tentative propositions for future research. Finally there are some concluding thoughts, and here implications and limitations of the study are considered.

2. Theoretical background

To present dynamic components of network building I draw on literature on dynamic networking capabilities and resource dependency.

2.1 Dynamic capabilities

The dynamic capability view (DCV) has its roots in the resource based view (RBV) of competitive strategy. It is suggested that firms in the same industry performs differently because they differ in their resources and capabilities (Barney 1986, Barney 1991). Compared with the traditional RBV, the dynamic capability view suggests that the firm needs to develop new capabilities to identify opportunities and respond quickly to them (Jarvenpaa and Leidner 1998). The changeable nature of competitiveness is emphasized, and a venture's performance level is believed to be founded in the constant reconfiguring and redeployment of resources (Eisenhardt and Martin 2000, Teece 2007). The shift in focus from RBV's achievement of sustainable competitive advantage to issues of competitive survival appears to reflect the more volatile contemporary business realities.

In the DCV field networking capability (NC) has been defined as “abilities to initiate, maintain, and utilize relationships with various external partners” (Walter, Auer et al. 2006). This definition does not deal with the issue of terminating relationships. But for different reasons it is not uncommon that relations cease to exist. A number of contemporary studies tries to address this gap (Ritter and Geersbro 2011, Havila and Medlin 2012, Mitrega, Forkmann et al. 2012), and it is also part of Mort and Weerawardena's (2006) NC model, as illustrated in Figure 1:

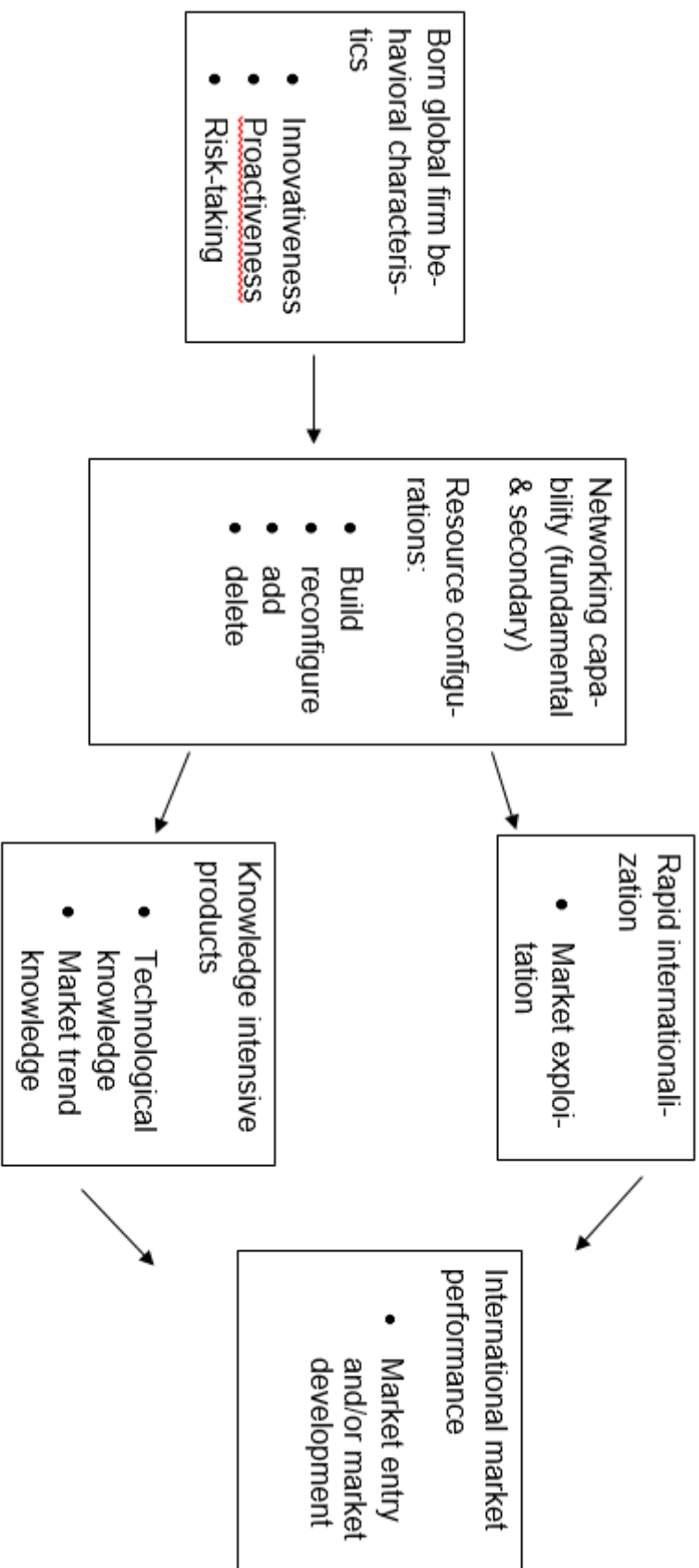


Figure 1 - Conceptual model of networking capability and IE in born global firms

Mort and Weerawardena (2006) suggest that the dynamic capability approach enables us to capture the development of capabilities that allow born global's rapid international market entry. In the model the understanding of NC is also rooted in the entrepreneurial mind-sets of innovativeness, proactiveness and risk willingness that are commonly used to characterize born global leadership (Lumpkin and Dess 1996). I have adapted Mort and Weerawardena's conceptual model of NC and IE in born global firms and their definition of NC (2006, p.558) which extends earlier research (Eisenhardt and Martin 2000, Ritter, Wilkinson et al. 2002) and defines NC as:

... the capacity of the firm to develop purposeful set of routines within its networks, resulting in generation of new resource configurations and the firm's capacity to integrate, reconfigure, gain and release resource combinations.

The need to be dynamic in network building is apparent as firms go through different stages of development (Kazanjian 1988, Vohora, Wright et al. 2004, Vanaelst, Clarysse et al. 2006, Clarysse, Knockaert et al. 2007), and within each development stage new challenges arise that require new resource combinations, capabilities and networks (Vohora, Wright et al. 2004). A conceptual model of firm's development stages is presented in appendix A. The handling of such networks is often seen a complex managerial and organizational capability (Roseira, Brito et al. 2010, Mitrega, Forkmann et al. 2012), and considered necessary to adapt to radical discontinuous change and further to stay dynamic to ensure competitive survival. Studying the role of the TMT in network building allows us to get a better understanding of how NCs are developed in small born global ASOs.

2.2 Resource dependence view

While DCV studies internal competencies, it is also assumed that the resources an organization needs are often in the hand of other organizations. Thus obtaining external resources is an important part of both the strategic and tactical management of any company. The resource dependence view (RDV) (Pfeffer and Salancik 1978) is commonly used to explain why firms (a) build international network relationships and (b) acquire new members to the TMT and board of directors (Hillman, Withers et al. 2009). It is acknowledged that firms are constrained by a network of interdependencies with other organizations and managers have to act to reduce environmental uncertainty and dependence. This differs from the resource based theory (Barney 1991)

which suggest that competitive advantage comes from firm-specific resources and competences inside-out.

A review of RDV (Hillman, Withers et al. 2009) presents it as a primary perspective in understanding inter-organizational relationships (e.g., joint ventures, strategic alliances, research & development agreements, research consortia, joint-marketing agreements, buyer–supplier relationships). Partnerships are viewed as a means to acquire limited resources which is beyond the control of the firm.

In addition the evolution of the TMT and board can be seen as a response to the changing resource needs in the firm. It is likely that new team members enter to fill skill gaps in the TMT (Ucbasaran, Lockett et al. 2003). The same way Pfeffer and Salancik (1978) identified ways new board members bring benefits by providing: (a) information in the form of advice and counsel, (b) access to channels of information between the firm and environmental contingencies, (c) preferential access to resources, and (d) legitimacy. Thus in the RDV the board is considered to be a critical resource provider reducing the firm's external dependency, along with their social networks attracting other external resources when needed. Alliance building is a quest for resources that cannot be controlled by the firm (Rothaermel 2001) and an arena for knowledge sharing (Larsson, Bengtsson et al. 1998, Kale, Singh et al. 2000) as the dominant objectives.

The efforts to manage external interdependencies are inevitably never completely successful and produce new patterns of dependence and interdependence (Pfeffer 1988), therefore combining the dynamics of NC and RDV seems to be a useful theoretical foundation when analyzing ASO's international network building.

2.3 Network constructs

Network structure, content and governance emerge as building blocks for models of network dynamics (Hoang and Antoncic 2003). The network constructs are presented in table 1 below and this framework has been used to structure the findings. The relationships between the constructs are acknowledged, even though they are analyzed and discussed separately.

Table 1 - Network constructs

Structure	<ul style="list-style-type: none">• Pattern of relationships / network size• Direct and indirect ties• Strong ties, weak ties, bridging position
Content	<ul style="list-style-type: none">• Resources and legitimacy through relationships• Information, advice, problem solving
Governance	<ul style="list-style-type: none">• Mechanisms that support the exchange of information• Trust, power/influence

Network structure is defined as the pattern of relationships that are engendered from the direct and indirect ties between actors. It looks at the dynamics of social structures – such networks can be inherited at the time of inception or built during the firm's evolution process. The position within different networks is considered important as information within one cluster tends to be rather homogeneous and redundant, whereas non-redundant information can be obtained through contacts in different clusters. When two separate clusters possess non-redundant (non-overlapping) information, there is said to be a structural hole between them (Burt 1992). A network that bridges structural holes is believed to provide network benefits.

Granovetter's (1973) study concerning the relative strengths of strong ties and weak ties commanded widespread research attention to structural attributes of networks. Research in this area is complementary to that of structural holes in the sense that it analyses relational strengths. Weak ties describe the extent to which actors can gain access to new information and ideas through ties that lie outside their immediate cluster of contacts.

When looking at network content interpersonal and inter-organizational relationships are viewed as the media through which actors gain access to a variety of resources held by other actors, both intangible resource and tangible resources such as capital. Contacts are used to acquire information, get advice and solve problems. In addition the reputation and signaling effect of seeking legitimacy through well-regarded individuals and organization can be of importance.

A key benefit of networks for the entrepreneurial process is said to be the access they provide to information and advice (Hoang and Antoncic 2003). While government agencies can provide fact based information concerning export laws, foreign markets and export processes (Riddle and Gillespie 2003), other vital (tacit) knowledge, information, physical and financial support is channeled through social network ties, and even through competitors (Evers and Knight 2008).

The governance construct looks at the mechanisms that support the exchange of information and how committed firms are to develop and maintain relationships. Trust and interdependency are key constructs. Voluntary and self-enforcing agreements refer to «implicit and open-ended contracts» that are upheld because it helps strengthen and preserve one's reputation. This can create cost advantages in comparison to coordination through market or bureaucratic mechanisms. Relationship commitment has been highlighted as a precursor of network development in internationalization, which is not surprising given the time it takes to gain market acceptance for new technologies.

The model below is applied to summarize the literature and theoretical foundation (see Figure 2). It shows how small and early internationalizing ASOs are constrained and constantly changing. As resource allocation needs continuously change and have to be reconfigured on a case to case basis, this places demands on the TMT to develop their networking capabilities and for board members to facilitate the building of international networks.

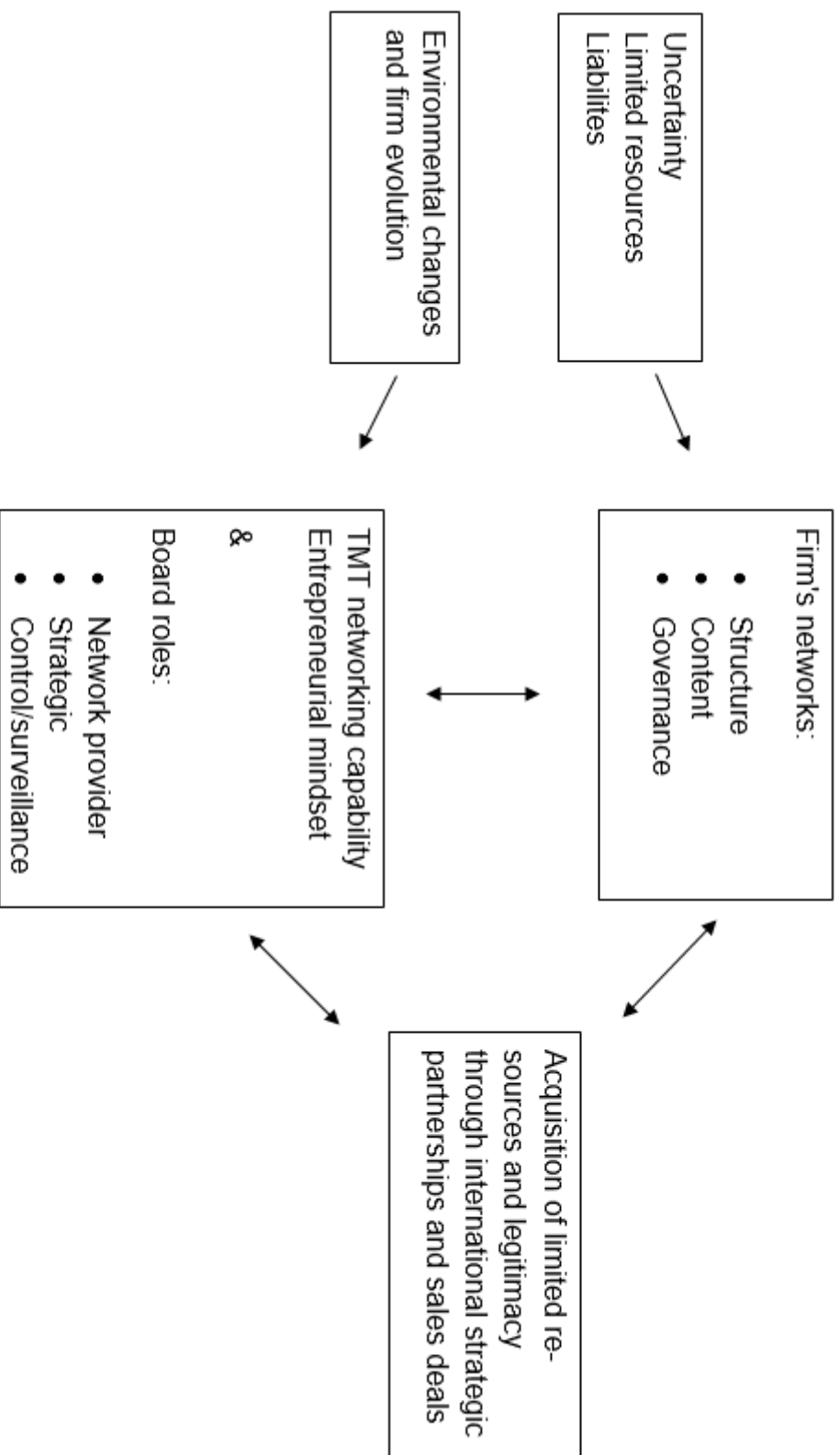


Figure 2 - Summary of the literature and theoretical foundation

3. Methods and empirical context

This thesis is based on a qualitative study of seven ASOs, which originate from three different Norwegian universities. There are few prior studies on TMT and board networking dynamics, especially in the context of young ASOs, which calls for a multiple case inductive study (Glaser and Strauss 1967, Eisenhardt 1989). A combination of an inductive study observing non-expected details and deeds in the cases is combined with a confirmatory approach in the sense that earlier theories are used as a basis for the study. These theories are reviewed in light of the collected findings to come up with new tentative propositions that can help structure future research.

The multiple-case study approach is considered to have important analytical benefits compared with a single-case design (Yin 2009). The replication logic used here sees multiple cases as a series of experiments, and each case can be used to confirm or not confirm the inferences drawn from others. This differs from pooled or sampling logic suitable for statistical studies where each observation is considered part of a larger sample (Ibid.).

Instead of applying a single-case study that offers insight into one particular example, the multiple-case approach provide broader empirical richness and may produce generalizable and accurate theoretical insights grounded in the data (Eisenhardt 1989, Brown and Eisenhardt 1997). The case study approach further allows us to get a rich understanding (Wright, Lane et al. 1988) about how NC evolve in born global organizations. This methodology is also considered helpful in generating sensitive, confidential or consequential data as required in this type of study (Rouse and Daellenbach 1999).

Following Eisenhardt (1989 p. 536) who has summarized literature on building theory from case study research an initial definition of research questions is useful to focus efforts, otherwise one would as a researcher be overwhelmed by the amount of data. As recommended, although not common in theory-building studies, the network constructs governance, structure and content by Hoang and Antoncic (2003) have been used to help to measure data and shape the theory-building.

The research problem guiding this study can be characterized as both descriptive and one that tries to understand the subject's understanding of their international networking building. Descriptive research is considered appropriate for collecting in-

formation to describe the world as it exists answering questions such as “what is” or “what does” (Bickman and Rog 1998). This is done to describe patterns and tendencies in the ways ASOs networks are structured and governed. The content part tries to understand the subject's understanding of their international networking building. It looks at the rationales behind born global ASOs international network building. Combining research questions that are descriptive with questions that try to understand the case subjects is common in case studies and can be used to describe typical characteristics about a phenomenon within a rich and holistic account (Andersen 2013).

The case companies were first contacted via email with an introduction letter explaining the purpose of the study. In the initial email the companies were notified that they would be contacted by phone within the next week to set up an interview. Seven out of eleven firms that were contacted participated in the study.

Data was collected through in-depth face-to-face interviews with the company CEOs in the spring semester of 2014¹. These were inductive interviews at each firm's office premises as outlined by Wright et al. (1988), Eisenhardt (1989) and Yin (2009). The CEO in each venture were the primary informants as they are considered to have the most direct experience and internal insight of the firm's evolution. In all cases the CEO had stayed with and followed the company through the founding process to this day. As follows the CEOs were the ones defining international network building in their venture based on being questioned about the TMT- and board's role in establishing international strategic alliances and securing international sales. These are considered important requirements for firm internationalization (Reuber and Fischer 1997, Johnson 2004) and the CEOs were found to be suitable informants because of their first-hand knowledge about the venture's operations (McCartan-Quinn and Carson 2003, Barringer, Jones et al. 2005). The choice of the CEOs as the primary informants was also due to direct communication with the board, and hence their knowledge about how the board has been able to influence the building of international networks.

¹ Note: In one of the cases a central co-founder who still works for the company was interviewed – CEO is used as a common reference point throughout this thesis.

The interviews started with a semi-structured questionnaire followed by a few open questions where the CEOs were allowed to speak freely about how their company build international relations and what the roles of the TMT and board have been. Further follow up questions were only used to elaborate on specific issues when needed for the replication logic. The semi-structured interview is characterized by flexibility as questions are asked in an order depending on the flow of the conversation, and this opens up a possibility for identifying new and interesting themes (Yin 2009, Saunders, Lewis et al. 2012). Following Eisenhardt (1989) I asked open ended questions where theory or hypothesis were not to guide the data collection. The inductive design allows openness to whatever would emerge from the data. Earlier theories and background information have been reviewed in light of the inductive findings and this is discussed in section 4 – findings and development of propositions. The tentative propositions can help structure future research and thus play a role in advancing the field's knowledge base.

3.1 Validity, reliability and limitations

Case studies trust that the researcher makes every effort to ensure high levels of construct-, internal- and external validity, as well as reliability. Yin's (2009) foundation for conducting case studies have been used as a guide for increasing the legitimacy of this study. Construct validity refers to the degree the operational definition of a concept actually reflect the true theoretical meaning of a concept. In the social sciences where there is a lot of subjectivity to concepts this is of particular importance. Two steps to ensure a high level of construct validity is to 1) define the concepts that you wish to study and 2) identify operational measures that match these concepts (Ibid.). The concepts to be studied have been clearly defined in the literature providing the rationale for the research questions, and further the theoretical section has introduced the operational concepts which are deeply rooted in the literature on network building (Hoang and Antoncic 2003). Yin (2009) further supports the direct involvement of key people and the use of multiple sources of data to increase the credibility of each case's presentation, as well as the construct validity. There is also a clear chain of evidence rooted in a biographic history for each case company and the propositions put forth in the following section, which again are linked back to the research questions guiding this study.

Sound techniques for analyzing data is introduced to increase internal validity (Yin 2009). Internal validity is a means to minimize systematic error and “bias”. All interviews were taped and transcribed immediately after the interviews. The transcribed data in combination with secondary data was used to reconstruct a biographic history for each case company, where key events in the external relationship building and TMT/board dynamics were presented (cf. Coviello 2006). Following Yin (2009), I identified patterns in each case, and then matched them with the patterns of all the other cases to identify similarities and differences. This was the basis for creating a thematic organization of the data based on network constructs (content, governance and structure – see section 2.3) as put forth by Hoang and Antoncic (2003).

This has also helped increase the reliability of the study. Reliability refers to the degree to which a study can be replicated at a later date (Creswell 2009) coming up with the same conclusions as the earlier study, in addition to its focus on reducing errors and bias (Yin 2009). The steps taken in performing this study are described above, which ensures the repeatability of the research, thus increasing the study's reliability (Ibid.).

The interviewees are also considered to be a source of potential error and bias. In cross-sectional studies potential recall bias and selective attrition providing answers they deem to be socially acceptable, must be taken into account, and actors being close to the situations referred to may not necessarily see their overall network pattern (Johanson and Vahlne 2003). Secondary data was examined to confirm the CEO's information, including websites, newspaper articles and the Brønnøysund Register Centre which coordinate data in the Norwegian public sector. I also employed anonymity to reduce incentives for interviewees to be less accurate.

Two fellow students writing their thesis about network building in a different environment helped review the transcribed data and contributed in categorizing the data into the network construct themes. This was done to ensure that all the case details were included, and to identify gaps in the data that had to be followed up by the case informants. Finally to consider whether responding firms differed systematically from the four cases that did not participate – two did not reply and two did not want to participate because of time and convenience issues – I analyzed secondary data, and no noticeable differences were revealed.

Other limitations related to case studies includes those of time and money, the amount of description, analysis and summary provided, and the role of the investigator (Yin 2009). A master's thesis is carried out during one intensive semester. In my case I got to have one face-to-face meeting with each company because of economic- and time reasons, and time limited the potential to follow up each case after the interviews. With a large amount of data some things have to be left out. In this presentation I have tried to reproduce what was perceived by respondents as most important in building international networks, and in doing so it has been important to be aware of biases that can affect the final product. As a researcher I have been the primary instrument in data collection and analysis, and where available I have used guidelines put forth by Yin (2009) and studies by more experienced researchers trained in interviewing and constructing final reports to improve the strength of this study.

3.2 Cases

The Research Council of Norway is actively involved in facilitating the creation of academic spin-offs through the FORNY program. This governmental agency provides an annually updated database through which the access to case companies was arranged. This database contains companies that involve academic researchers, university technology, or both, all of which fit a (strict) definition of an academic spin-off. In addition to using the FORNY list, the academic spin-off definition in this study has been expanded to include student spin-offs. In this regard, the sample also contains businesses that have been established by students at NTNU School of Entrepreneurship. The stated purpose of this study is to educate future entrepreneurs by stimulating students to pursue new technological business opportunities offering highly motivated students a two-year master study in commercialization of technology². Several companies have proven to be profitable and are run by the student founders after completing their studies. Some work with technology developed at the NTNU or other research institutions, often in collaboration with core scientists, while some take on a role where technology and product development starts from scratch.

The choice to study Norwegian companies is also relevant, because the domestic market in Norway is considered too small to support high enough growth even

² <http://entreprenorskolen.no/english/>

for SMEs, therefore knowledge about effective internationalization is of great interest (cf. Reuber and Fischer 1997).

Following theoretical sampling (Yin 2009) reduced the number of firms significantly from the total amount of identified spin-offs. Theoretical sampling logic allowed me to get representation from a variety of technology sectors and firms in different stages of development, such that it would be possible to reveal characteristics that are potentially connected to technology background and firm specifics. Information about the case companies is depicted in table 2 below, and it shows that the technological platforms cover oil and gas, biotech, ICT (software development), telecom, and technical sports equipment. This broad specter of sample firms was selected to give a substantial degree of variance regarding the stage of development, technological focus, and institutional background, both different universities and investor relations. According to Eisenhardt (1989) this is important to generate insights into the general evolutionary process of ASO's networking capabilities. The variance also covers a variance in terms of trade platforms – ranging from licensing production processes and technology, service trade which now accounts for about one-quarter of all international trade and is growing rapidly (Cavusgil, Knight et al. 2012) and retail. This approach also ensured that the case companies were active and achieve a decent revenue stream.

Four criteria for defining early stage high tech firms were applied. First, these start-up firms could not have existed for more than 10 years and as such were established between 2004 and 2014 (Burgel and Gordon 2000). Second, the ASOs were selected from multiple high tech sectors, as earlier classified (Butchart 1987, Bürgel, Fier et al. 2004), and further complemented by new high tech sectors. Third, all seven cases needed to identify international strategic relations and/or sales as important to their competitive advantage, but relaxing Oviatt and McDougall's (1994) definition that requires internationalization from inception, to use a newer definition requires internationalization while still being a young firm less than six years (McDougall, Oviatt et al. 2003). Fourth, there had to be at least two external board member who was neither TMT member nor employee. Several of the identified ASOs had the same TMT and board members which would not allow the study of specific TMT and board roles.

Table 2 - Information about the cases

	Company A	Company B	Company C	Company D	Company E	Company F	Company G
	Oil/gas	Natural gas	Biotech	ICT	Oil/gas	Telecom	Sporting goods
Establishment year	2005	2008	2008	2008	2009	2009	2011
Parent organization	NTNU	UIO	NTNU	NTNU	UIB	UIO	NTNU
Number of full time employees in 2013	5	4	2	8	6	6	3
TMT size in 2013	1	2	1 (2)	4	2	2	3
Board size in 2013	3	4	4	4	4	5	5
Number of external board members	2	4	4	3	2	4	3
Stage of development	Startup- /introduction	Early	Growth	Growth	Development / introduction	Startup- /introduction	Growth
Time to 1st international agreement (years)	6 years, USA	1 year, USA	(6 years), Germany	-	3 years, USA	3 years, Japan	First year, China
Time to 1st international sales (years)	6 years, Italy	5 years, USA	2005 – 2006, USA	1 year, USA	-	3 years, Germany	1 year, global retail
Internationalization speed	Low	Medium	Low/Medium	High	Medium	Medium/High	High
International network range	Low	High	Low	Low	Medium	High	High

4. Findings and development of propositions

This study confirms the important and varied role that networking activities play in influencing entrepreneurial processes and outcomes, but the case companies develop different network characteristics, and have a varying degree of success in terms of the criteria for internationalization speed and network range.

4.1 Network structure, content and governance

This section tries to answer RQ1 What are the distinctive characteristics of the international networks of born global ASOs? The results are organized according to the theoretical framework (table 1) by Hoang and Antoncic (2003): structure, content and governance.

4.1.1 Network structure

The evidence presented here suggests that no one pattern explains the nature of ties in born global networks. Even though networks seem inevitable for born global's evolution they are not able to be easily categorized, this is consistent with earlier research on the patterns of born global networking (Coviello 2006).

I observe that some companies take advantage of networks inherited at the time of inception and actively use existing networks to develop their knowledge of international markets. However, most of the case companies have needed to build new networks because of the advanced nature of their offering and the lack of international background experience.

Initial and Fundamental networks: These are networks held by key stakeholders which were inherited by the firm at the time of inception. It has earlier been acknowledged that the possession of international contacts and sales leads characterize born global managers (Freeman, Ron et al. 2006). While important to identify and exploit initial international market opportunities, only two of the CEOs described their pre-founding international network as particularly important. For company G, working with sporting goods, a connection was already established with a famous international athlete which served as a kickstarter for moving the project forward in the first place. This connection has been important for product development, marketing, and has helped the company gain credibility. The CEO of company E, working in the oil and gas sector, had a former colleague working in a

US company that they now co-operate closely with. As can be seen in table 2 company B and C also had early and pre-founding international deals. These were based on prior contacts, but they were not actively leveraged in the development of the companies. Others have gained from the existing networks of TMT members, like company F in telecom, where existing contacts have provided sales leads. And academic board members that have been following the company since founding have been a resource. The most notable example is company B, working with natural gas, where a board member got the company into talks that ended with an acquisition from a US company. Overall the broad pattern is however that there is a need and willingness to build new networks as the company develops.

2nd generation networks: These are networks which the TMT build in the firm's growth process. Five out of seven case companies mention that they regularly attend large international business conferences and trade fairs. In almost all cases it is clear that the CEO, often together with other members of the TMT and other employees attend international industry events to meet with new potential partners. This indicates that the companies are actively searching for new opportunities and strategic partnerships. Such international events seem to be the most common and frequently utilized networking arena.

Company D, a software development firm, and company G have actively pursued their connection to their customers through the use of online communication channels. The CEO of company A, delivering interactive 3D-models for simulating geological processes to the oil and gas industry, was the only one who mentioned an episode where the phone had been picked up to initiate a new relationship. Usually contact is established beforehand in these high-tech sectors.

Strong and weak ties: There appears to be a significant amount of weak ties amongst the current international networks. The distinction between friends and acquaintances is commonly used to provide a simple but clear example of differences in tie strength. A high account of weak ties is natural given the predominance of 2nd generation networks, when a tie is not inherited at inception it usually takes time to build a strong relationship. It appears to be an industry effect on how network strength is described, within oil, gas and biotech the companies seem to focus on fewer connections. The time frames are longer and there is a clear focus towards building strong relationships. For example for company A it is preferential to acquire new internation-

al relationships through international companies that are present in Norway with whom a strong local relationship has already been established. And company E also in the oil and gas industry have developed a very strong relationship with an American partner. The CEO says “we have a very close co-operation with that firm now ... this regards specifically the product qualification- and commercialization part, where they have a large team that helps us to do our job and learn”. For these companies ties seem to have shifted character over time to become more direct and stronger.

For the software providers in company D and the advanced sports equipment developers in company G

the initial focus was to accomplish and agree on international deals right from the start. They had their first international sales after 1 year, and when analysing their network pattern, size included, it indicates that Granovetter’s (1973) focus on weak ties is of relevance. These companies actively acquired new information and ideas through ties that laid outside their immediate cluster of contacts. The same goes for Burt’s (1992) structural holes argument, where the data indicates a substantial focus on indirect ties established through a common third-party “bridge”. Case company D and G built networks rapidly through online communication and trade shows, but even though they did not mention the need to build strong ties some of the ties did seem to become stronger over time.

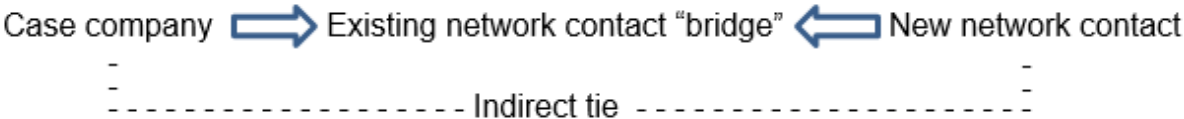


Figure 3 - Indirect ties conceptual model

Indirect ties: A common way to build new networks is to leverage the international network contacts already established. Referrals that come from an existing tie is mentioned in most cases. For company D in ICT a series of events started with them being contacted directly by an international actor that wanted to integrate the case company's software in their solution. They came to agreement and a while later the CEO found himself for a one month stay at their premises in Silicon Valley. Here he got in touch with other software companies in the same situation, and from one of them talks with a potential investor was initiated. The first impression is therefore that

the size of the international network is essential for continued relationship building, because there will most likely be more options opening up as the company evolves.

For the companies within the oil and gas industry such referrals are quite common, it is considered a closed industry when it comes to newcomers, and as the CEO of company E says a recent contact in Brazil was attained from a company in the USA that they already worked with. Company B, working with natural gas, has been acquired by a US company, but continues to run as a separate limited company (AS), now new contacts are acquired through their parent company. Finally the CEO of the telecom case says: "... it's a bit strange, through some contacts in Russia our name has become known, and then a Russian company acquires something in Belgium, then this firm needs some of the products we sell, and then this contact visits a local distributor in Belgium that in the end contacts us".

Network structure thus consists of initial fundamental and generated networks in international ASOs, where a number of generated networks occur through third-party referrals. Whereas fundamental networks are those brought by a founder, 2nd generation networks are those developed by TMT member in later stages of the firm development. These findings spur reflection on the entrepreneurship literature suggesting that pre-existing ties is important for early internationalization (McDougall, Shane et al. 1994), and supports the theoretical foundation suggesting that dynamic capabilities is important to build new networks in search of acquiring limited resources.

Proposition 1: The TMT will most likely build new international networks and extend them over time.

Proposition 2 a): In the initial development stages weak ties will most likely dominate ASO's international networks, and be a source for providing new indirect ties.

Proposition 2 b): Weak ties will most likely shift character over time to become more direct and stronger.

4.1.2 Network content

All of the CEOs in my sample identified network building as critical to their firm's success. The CEO of company A said that “It is an existential question in this industry. Without networks / contacts and people who know you, you are a nothing. It is very difficult to reach out to partners for someone who is completely unknown”, which suggests that ASOs need networks to reach legitimacy in the market. The network building approach though seems to differ between those that analyze and strategically plan, and others that are more opportunistic to begin with and turn more calculative only after opportunities arise.

The CEOs were asked to indicate to what extent the TMT at their firm had utilized different ties, networks and connections during the past three year. Table 3 below shows the importance the case companies put in developing networks to different kinds of actors. Building relations to customers and research relations is highlighted the most followed by suppliers. Few places importance in using trade organizations and government officials at any level. Half of the sample have still leveraged from government support organizations, notably Innovation Norway was mentioned in a couple of the interviews, with economic support schemes that support companies with international potential and ambitions.

Table 3 - TMT use of network ties

	Company A	Company B	Company C	Company D	Company E	Company F	Company G
	Oil/gas	Natural gas	Biotech	ICT	Oil/gas	Telecom	Sporting goods
Customers	High	Low	High	High	High	High	Medium
Suppliers	Medium	High	Medium	High	Medium	Low	Medium
Competitors	Low	Low	Medium	Medium	Medium	Medium	Low
Distributors	Low	Low	Low	Medium	Medium	Medium	High
Trade associations	Low	Low	Low	Medium	Medium	Low	Medium
Governmental support organization	Low	Low	Low	Medium	Medium/high	Medium	Low
Universities	Low	High	High	Medium	High	Medium/high	Low

Interviewing the CEOs provided valuable insight into the reasons and strategies these ASOs have when it comes to securing international strategic alliances and sales. The reasoning is commonly rooted in constraints and the business environment of the firm, and with high uncertainty networks provide both resources and legitimacy. It is also mentioned by most companies that a small domestic market with few potential sales requires international sales deals. The number of potential sales in the domestic market is too small for five out of seven companies in Norway. The notable exception is company A and E working in the oil/gas sector which is a substantial sector at home. Company A's reasoning for building international relations is learning and growth potential. Even though they attend international conferences, their main intention is to build global relations through international companies that have established subsidiary companies in Norway and they already do business with at home. For the biotech case company it is the complete opposite with almost no focus on the industry in their home country.

A difference is observed when it comes to the amount of planning the firms put into analyzing and obtaining information about potential partners, and how opportunistic and broad the cases search for international network contacts. Varying reasons are provided explaining why they have chosen their current partnerships. The most strategic companies search for and headhunt named potential partners. On the other side I observe a more open minded search for given types of relationships, a “see what we can get” type of approach to begin with, and then a more calculative approach to find out whether the relation is a match or not.

Strategic fit: As described in section 4.1.1 international conferences are a common arena for meeting network contacts. The degree of planning before attending events vary. In some cases meetings with especially interesting firms are planned up front. Research is done in advance of the event to find interesting actors to meet. Then the parties know that there is fit and a common ground before sitting down to talk. These are commonly called partnering events, and the organizer of the fair may offer some sort of pre-schedule planning system where the companies can sign up to and agree on a meeting time. The meetings are usually short, but it is possible to get an initial understanding of the technological match and other factors. The CEO of company C, a biotech firm, says: “it’s a bit like speed-dating, you can sit down to talk with the firms that you’ve already wanted and agreed to meet”.

The most direct strategic choice is still that most of the companies continue their relationship with universities and research institutes. Quite naturally the focus is often towards their parent organization, but as the CEO of company B points out the importance of researcher's international networks within other universities and research institutes, as well as with business relations, can make significant contributions to their projects. Research connections, both externally and as board members have contributed to valuable contacts, like in company B's acquisition example.

On an overall basis the companies seem to emphasize the strategic fit approach rather than the more open minded approach, though a combination is most accurate in several of the cases.

Strategic stretch: The CEO of company A said that they attend events with no particular sales goals, and that it is more like “throwing out the fishing line, you never know if any fish will bite”. The CEO of company F indicate that they plan up front, but that they in general follow up on every lead and have tried to be very opportunistic. This is also shown in that the company now has sales partners in Western Europe (Belgium, Switzerland, and the UK), Russia, the Middle-East and Japan. By permitting their foreign partners to carry out activities in *their* markets, it has allowed the company to remain in its home market (Cavusgil, Knight et al. 2012).

The CEO of company D talked about their experience in building international networks. The freemium³ software as a service provider started promoting their service through an online catalogue for web-services. At first sight this was a great way to both market the service and get direct feedback from customers (which in the current business model were also their end users). They got customers from all over the world and instant feedback through comment fields, emails and a feedback community on their website. Scholars have indicated that the Internet in many ways has become a symbol of the ultimate customer relationship for both business-to-consumer and b-to-b marketers (Jones and Silverstein 2009). It is common to hear success stories about companies building their own customer base before being acquired by larger companies, Skype as an example. But it proved difficult to follow up on all the

³ **Freemium** is a pricing strategy by which a product or service (typically a digital offering such as software, media, games or web services) is provided free of charge, but money (premium) is charged for proprietary features, functionality, or virtual goods.

feedback and leads, thus when an international actor contacted them and wanted to integrate their software in their own solution, they quickly turned and went in a new direction. Though in the end this did not turn out to be a great success either, and they are now trying out new approaches.

It is beyond the scope of this study to address whether strategic planning or experimental network building provides the highest success rate, but this would be interesting to follow up in future studies.

Proposition 3 a) ASOs will most likely focus the most on building relationships with customers and suppliers, and in addition continue their relationships with their university origin.

Proposition 3 b) Some ASOs will also build networks to competitors, distributors, trade associations and governmental support organizations, but most likely these network connections will be used less intensively than the forementioned networks.

Proposition 4 a) Networks will most likely be used to find partners that fit to the company's strategy, but also to explore new opportunities.

Proposition 4 b) Networks are also likely to be used to attain a positive reputation and hence increased legitimacy among potential partners.

4.1.3 Network governance

Entrepreneurial activities involves uncertainty and for all parties in a relationship it is difficult to predict what the future holds. In most cases relationship building has a long time-frame and building trust is a requirement. The example shows that for appliers of new high-technology the technical and economic implications can be enormous and they need to feel safe about both the technology and organization behind it. While the ASOs providing the new products have worries about information asymmetry, difficulties in mapping their potential partner's capabilities, and the possibility of enforcing contracts across borders. Two notable exceptions from the long time frame can be found among the sample, these were the student spin-offs who achieved international sales 1 year after founding, a telling difference from the other five case companies.

Long time frames: The sample shows that it is not uncommon that networking activities go on between one to five years before international partnerships or sales agreements are signed. Some relations even end before an agreement is signed, and some continue and become important for accelerated internationalization. The CEO of company A met a potential client at an international conference and it took three to four years before signing a sales agreement. While for company C, a biotechnology firm, the process towards reaching a licensing agreement with a major international player is now in the making five years after their first meeting. It is a story of strategically pursuing a major international actor, a few “ifs”, “buts” and coincidences. The CEO elaborates on the process:

In his first year as CEO he went abroad to visit an international conference, he merely planned on observing the technological scene, and was not aware of the partnering events taking place. But he got in touch with a business developer in the organization to which they are now going to license their technology to. Licensing is a common way to internationalize, allowing rapid expansion while remaining in the home market (Cavusgil, Knight et al. 2012). She gave him a few tips, amongst other things information about other conferences with partnering events, and he got the opportunity to present their technology. She was interested and agreed to bring it up in one of her team meetings. This company had 50 000 employees, and processes towards reaching an agreement were complex. Based on this introduction he got to talk to 4-5 other people within the company who were eager to take a look at their technology, but they were not so interested in the end, and nothing happened for quite a while.

Company C continued to develop their technology to make it even more attractive. At the same time the CEO had become acquainted with another person who worked in a different firm. They had met 4-5 times at different conferences. This person quit her job to start working for the company that had already looked at their technology. Because they had a personal relationship she helped him getting in touch with decision makers within the company that could really decide to run tests with their technology. So he got in touch with the major actor again, this time also with the latest test results based on new technological developments.

Of course, the CEO says, internal issues taking place over the last two years might have been a reason for changes in their priorities and focus. But, as the CEO points out, the new acquaintance got him in touch with the decision makers, people he believe he had not talked to in the previous round. At this stage they were very interested, and they conducted a joint project for over a year where they tested the company's technology for their application areas.

The test project was successful and led to negotiations on conditions for the licensing agreement currently being negotiated. The analysis suggests that NC evolves over a long period of time. The case above has taken five years, and in five out of seven cases it has taken one to five years from initiation to contractual agreements.

Trust: The time it takes to develop- and gain market acceptance for a new product is a recurring issue. The case companies are all new and small actors and the management teams experience the liability of newness and smallness first-hand when working on international partnerships and sales. The case companies often look for partnerships with actors that are large and complex to deal with. The CEO of company C explains that networking is essential when talking about high technology and large amounts of moneys. Even though their technology showed promising results, personal relations have been a fundamental requirement:

“Clearly we wish that we could sell the technology on the basis of the technology's merits. That the technology in itself was good enough. But it is not that simple”.

Trustworthiness: Trustworthiness is crucial, and case company B is special in this regard; while the company continues to operate as an independent company in Norway their owner is a large US corporation that is one of the market leaders in their particular sector. Potential customers usually contact the market leaders, thus being on that list is said to be a hallmark in itself, and trustworthiness is signaled through their relation with this important industry actor.

The CEO of company A in the oil industry says that when they look for a cooperation with a new partner they usually begin by setting up an introduction meeting to get to know each other. In almost all cases they have been in contact beforehand, either through customer relationships, industry meetings or conferences. And further the CEO of company C also mentions that a licensing agreement is partnership for

the future. Trust is seen as an important factor and it is mentioned that the entire organization must seem trustworthy.

Flexibility: The governing of relationships requires a high amount of flexibility as talks and negotiations may take years. And then not forget to mention the plans that fail and requires new relations. For example company D, the software development company, failed in their attempt to reach out directly to their end users, shifting from direct online communication to joining a larger actor. This new relation created an application store prior to the known solutions today; Apple's app store and Google Play. A variety of applications were selected to be featured in the store before the content was sold to major international telecom companies. After a short while the CEO went from Norway to Silicon Valley and got office space a month on their premises where they could learn from each other.

Trust and long term intentions appear to be the most important network governance mechanisms in building international networks in ASOs. The TMT must develop NCs that allows them to be flexible and cope with the uncertainty that comes with long time frames.

Proposition 5: The TMT will most likely be flexible and build trust with potential partners over a long period of time before an agreement is signed.

Proposition 6: *The strongest* networks are built in order to acquire strategic resources and reduce uncertainty.

4.2 TMT and board

This section tries to answer RQ2: What role does the TMT and board have in network building? The data shows that the CEOs play an important part in international network building, and that their effort is important for the internationalization speed. Further the findings indicate that the other members of the small TMTs vary in the tasks they carry out, but in the cases where the TMT and board members have played a crucial part in internationalization activities this has been important for increasing the firm's international network range. Thus a broad involvement in international processes seems more important than TMT- and board size. In table 4 below basic TMT and board sizes are presented.

Table 4 – TMT and board sizes

	Company A	Company B	Company C	Company D	Company E	Company F	Company G
	Oil/gas	Natural gas	Biotech	ICT	Oil/gas	Telecom	Sporting goods
TMT size in 2013	1*	2	1 (2)	4	2	2	3
Board size in 2013	3	4	4	4	4	5	5

4.2.1 Chief executive officer

CEO as a leader of international network building: Network building appears to be nurtured personally by the CEO to fulfil the goal of reaching international markets. All of the CEOs in the sample have had this position in their firm since foundation and they are also board members. In six out of seven cases the CEOs have played an important role in securing international strategic relationships and/or international sales deals. In the last case the CEO in company B, working within the natural gas industry, stated that it is not they as entrepreneurs who have built networks as such – a board member provided contact with the firm who acquired them, and now the parent company provides them with network contacts to a large extent. Still the CEO has played an important part in facilitating this communication.

In four out of seven cases the CEO have almost had the sole responsibility for international network building, which is somewhat surprising as it is considered important that all team members participate in these processes (Ireland, Hitt et al. 2001). A CEO's go ahead spirit appears to be important for early internationalization. In the two cases that reached international agreements within the first year, the CEOs had a clear vision for early internationalization and were proactive to build relationships. For case G this has been successful in terms of speed and range, but for case D the early internationalization did only result in a temporary network growth which has declined over time, and the international focus has somewhat declined. A notable difference is company G's active involvement of the TMT and board in international activities.

CEO's entrepreneurial mindset: In building international relations the CEO appears to be prominent, and there are many answers as to how NCs are used and developed, as the content exchanged in relationships appears to vary much depending on the industry and development stage. But as shown in Mort and Weerawardena's (2006) NC model and other studies I suggest that the ability to build new international networks is based on the managers' entrepreneurial mind sets, with risk taking, innovativeness and proactiveness being characteristics suitable for describing the capabilities of top management in INVs (Freeman and Cavusgil 2007). Most of the CEOs were active in initiating international relationships from founding even though it took years in most cases before final agreements were made.

Like Knight (1921) argues it can be the entrepreneur's ability and willingness to deal with uncertainty that leads to profits. For example the CEO of company A mentioned a specific "cold call"⁴ to an interesting actor. This led to a meeting where they got positive feedback, but it was not until a year later, somewhat surprisingly, that this company got in touch again to resume talks for a future partnership. Here developing capabilities is important for management to be able to quickly respond to upcoming opportunities, as earlier suggested by Jarvenpaa and Leidner (1998). The sample indicates that NC is important in contemporary competitive environments with uncertain and changing circumstances. Given the serious effort it takes to develop well-functioning international networks I would consider adding determination along with risk-willing, innovative and proactive as a characteristic describing entrepreneurs.

4.2.2 Top management team

The company with the largest TMT only consists of 4 members, while the average size is 2. When talking about specific international relationship building tasks for other TMT members there appears to be little focus on this, except in a few cases and this appears to broaden their international networks.

Company F working in telecom have an active TMT and people in sales that leverage from their existing network contacts to broaden their international network. As mentioned above this company now has sales partners in Western Europe (Belgium, Switzerland, and the UK), Russia, the Middle-East and Japan. In case G working with

⁴ **Cold calling** is the sales process of approaching prospective customers or clients—typically via telephone, by email or through making a connection on a social network—who were not expecting such an interaction.

sporting goods for the retail market all TMT members have taken active part in building international relations, and participated in trade fairs, which has led to sales agreements in more than 20 countries. The CEO finds this very important as international relations varies from production partners, shipping partners, distributors, retail stores, marketing actors and communication with consumers which would be impossible to follow up for one person.

In general the case companies rely heavily on the CEO to solely manage international relations, but it is worth mentioning that the two companies that seem to have involved the TMT the most also have the most widespread international network.

Proposition 7 a) An entrepreneurially oriented CEO will most likely play a dominant role in an ASO's international network building.

Proposition 7 b) Including the whole TMT in international activities will most likely increase the firm's international network range.

4.2.3 Board

Overall the findings indicate that the advisory and strategic tasks, networking tasks and behavioural control tasks are equally important among the boards. But the two companies that have highlighted the board's network provider role have achieved important agreements and sales, and now seem to have the broadest network range.

In three of the cases board members have used their social network to attract external resources, and in two of these cases board members have also been a critical resource provider noticeably reducing the firm's external dependencies. The board members seem to play an important role in bridging between the CEO and external actors within their network, but not take as much responsibility for the day-to-day follow up of the network leads they provide.

In case company G one of the board members, a famous athlete, has been able to attract network partners in several areas, particularly in marketing, and he is said to have contributed greatly to the company's market credibility. The CEO also says that "all of the board members have contributed in one way or another in internationalization" A board member in company F provided a sales lead in Japan. In company B one of the board members, a professor from their university of origin, initiated contact

with a personal US relation that were going to visit Norway. The CEO elaborates on how this professor and the venture capitalists in their board made it come about:

“It was the professor who knew that they were in Norway for different reasons. It was I who invited to breakfast, with my chairman of the board at that time, so we had breakfast at XX's place⁵. I organized it, but the network actually comes through the professor. And the implementation force in being able to get to present the company was much because of him. In regards to the initiation of the relationship the board was important, the professor and investors”.

After the acquisition board changes took place and now the parent company have several board seats. Being associated with this company have heightened company B's legitimacy and they get access to a broad range of network ties. To summarize the companies that actively involve the TMT and board in networking activities seem to have the broadest network range.

Proposition 8: Companies that make use of their board member's international network connections will most likely increase the firm's international network range.

The model below is applied to summarize the findings (see figure 4). It highlights the content within each of the network constructs, and patterns in TMT and board roles.

⁵ Mentioning of the board member's name – made anonymous.

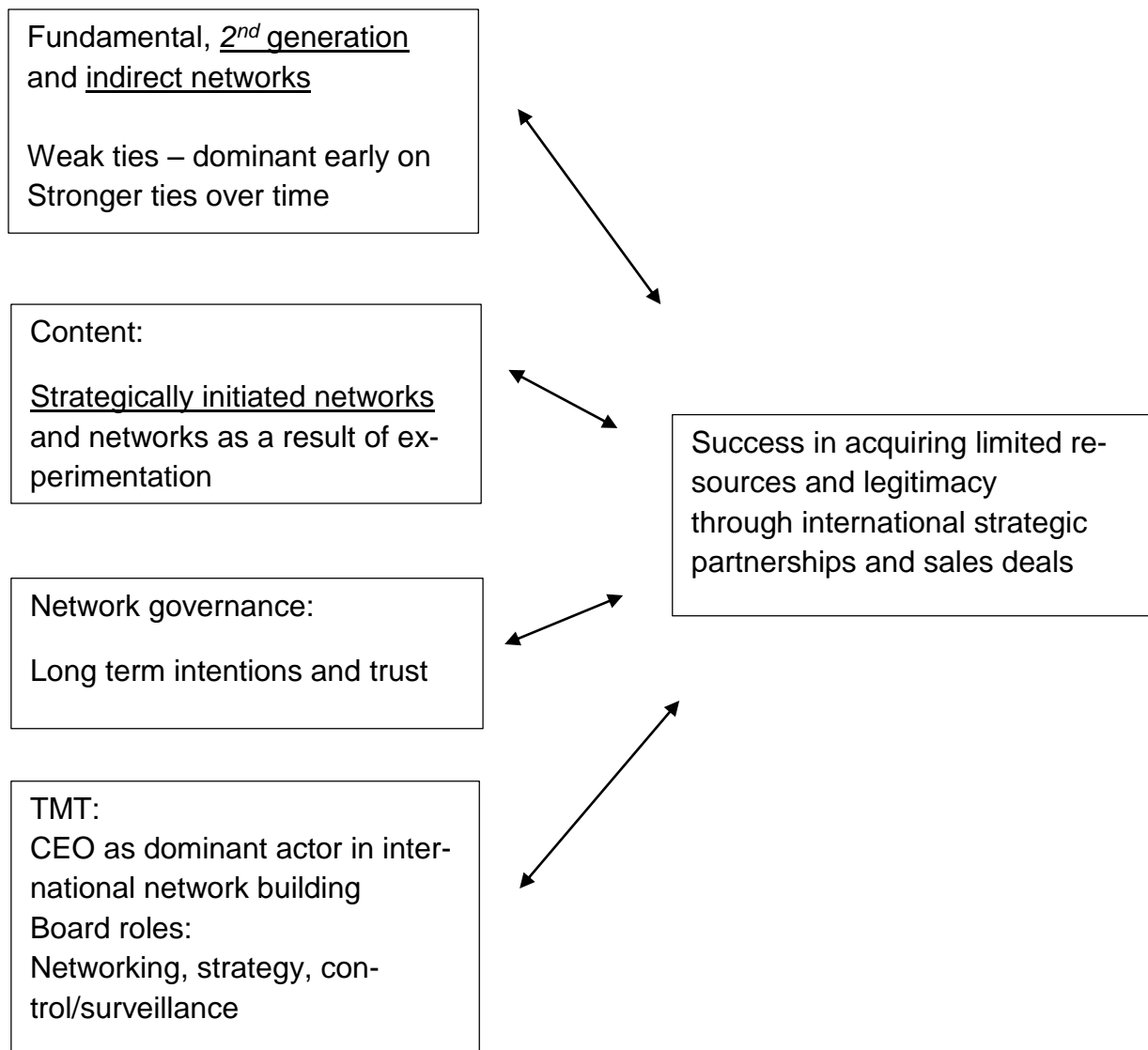


Figure 4 - Summary of the findings

5. Conclusion, implications and limitations

Many challenges need to be addressed in the process leading to the successful internationalization of ASOs. This multiple-case study attempts to reveal characteristics of ASO's international networks and what the roles of the TMT and board have been in successful international network building processes.

Thus the research questions guiding this study have been:

RQ1) What are the distinctive characteristics of the international networks of born global ASOs?

(RQ2) What role does the TMT and board play in international network building?

By looking back at figure 2, a summary of the literature and theoretical foundation, I observe that these born global ASOs build international strategic partnerships and work to achieve international sales deals. Analyzing the network structure shows that some of the companies make use of pre-founding network ties, but most of the ASOs have had to establish new international strategic alliances and sales deals. This contradicts earlier studies that highlight the importance of the entrepreneur's international experience and pre-founding networks (McDougall, Shane et al. 1994). The findings indicate that in the initial development stages weak ties dominate ASO's international networks, and these ties are a sources for providing new indirect ties, thus networks extend over time. Over time the networks seem to shift character and become more direct and stronger.

As of content, the case companies focus mostly on building relationships with customers and suppliers, and in addition continue their relationships with their university origin. The ties are most often selected because of a strategic fit, but also at times to discover new opportunities. When studying the network governance mechanisms it appears that there are often long time frames involved before an agreement is signed, and to achieve such agreements the TMT will most likely be flexible and build trust with potential partners. Building trust between partners is often cited as a critical element of network exchange that in turn enhances the quality of resource flows (Lavie 2006, Freeman and Cavusgil 2007, Evers and Knight 2008).

The findings support the view that dynamic networking capabilities play an important role in rapid internationalization. The CEOs play a crucial role in building international networks, which is consistent with earlier findings by Mort and Weerawardena (2006), and the earlier managerial capabilities of innovativeness, proactiveness and risk-willingness (Lumpkin and Dess 1996), can be extended with capabilities like trustworthiness, flexibility and determination.

International strategic alliances and international sales deals help to reduce resource scarcity (Pfeffer and Salancik 1978) and increase legitimacy, hence uncertainty and liabilities decrease, thus the findings also support the view that obtaining resources through (a) international network relationships and (b) TMT and board members is crucial for ASO's internationalization. In Norway, the domestic market is also too small in most industries to secure enough revenue to support a firm's survival.

I have tried to address how different roles in the organization (CEO, TMT, board) influence ASO's internationalization. The time it takes for a firm to establish international strategic alliances and securing international sales (internationalization speed), and in addition network range (number of ties to other actors), have been used as indicators of successful internationalization.

Perhaps the most interesting findings are related to the various roles of these actors in building international networks. While the CEO acts as a leader in international network building and largely determines internationalization speed, an emerging pattern highlights the importance of including the whole TMT and board to secure both rapid internationalization and longer term network growth. It is somewhat surprising that the CEOs have this much responsibility, even though relationship building is considered important for all members of an entrepreneurial founding team (Ireland, Hitt et al. 2001).

5.1 Contributions to research and future research suggestions

This study contributes by broadening the agenda of research into born global high-technology ASOs. There are few prior studies on how the TMT and board affects academic spin-off companies, particularly not in a context of early internationalization, and it is anticipated that the developed propositions could contribute to the progression of literature on international entrepreneurship, academic entrepreneurship and corporate governance. In this section I will discuss possibilities for future research directions. Overall suggestions are to take on comparative studies that could help uncover differences and similarities between high- and low-tech sectors, specific industry differences, and differences between surviving firms and those who no longer exist. Though time consuming, longitudinal studies would help us better understand entrepreneurial dynamics and how these new ventures move between different development stages.

Future research can also be built on the empirically based propositions. Testable hypothesis can be incorporated, where fundamental constructs have been defined and an underlying theoretical and empirical foundation has already been presented. Further insights are to be gained into the distinctive characteristics of the international networks of born global ASOs, and the varying roles of the CEO, TMT and board. It is of particular interest to investigate to a further extent how the relationship between these actors influence internationalization success, and new performance measures such as employment growth and revenue stream should be incorporated.

5.2 Contributions to business

Overall this study contributes by providing insight into the distinctive characteristics of the international networks of born global ASOs. Based on the findings a number of implications for managerial policies can also be highlighted. First, ASOs that target rapid internationalization should have a CEO with a mind-set of innovativeness, proactiveness and risk-willingness from founding. As resource needs change from relation to relation, and relationship building often is time consuming in high-tech industries, trustworthiness, flexibility and determination also seem to be important characteristics required for a CEO. Second, to utilize network benefits the CEO needs to know how to develop NCs, and how to use these capabilities to maximize the potential for allocating resources and legitimacy. Third, the results also indicate the importance of progressing from individual-level NC building to firm-level NC building, as

companies should seek to actively involve the whole TMT and board in international activities to maintain and broaden their international network range. Implicitly this would also mean to leverage initial firm level NCs that already lies as a resource within the organization.

5.3 Limitations

As with all research, there are limitations to this study, and I have made every effort to minimize these limitations. A number of methodological limitations have been assessed in section 3.1 validity, reliability and limitations, and some remain to be addressed. The sample contains 7 spin-offs from three different universities and a broad range of industries, two of them being student spin-offs. With a limited number of cases it is necessary to treat conclusions and implications with care.

Geographical and context limitation: The case companies in this study are all Norwegian high-technology born global ASOs. This population has several characteristics that makes it particularly suitable for the study of networking capabilities and resource dependence (knowledge intensive, early internationalization, homogenous and non-commercial background). One have to be precautious in generalizing the findings beyond this context, but several measures as presented below have been taken to increase the external validity.

Statistical generalizability of the results: Case studies face criticisms for the limited external validity in terms of statistical generalization. Where statistical research considers whether the findings can be generalized from the sample to the universe, Yin (2009) proposes viewing a case as an experiment, and suggested that we should look for analytical generalization by matching the cases against a theory rather than statistical generalization to a population. By discussing the data in relation to an established theoretical framework, as done in this thesis, this can increase generalizability. Also a replication logic (Ibid.) have been applied to increase the changes of predicting similar results in later studies.

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Acronyms

ASO – Academic spin-off company

CEO – Chief Executive Officer

DCV- Dynamic capability view

ICT - Information and communications technology

IB – International business

IE – International entrepreneurship

NC - Networking capability

NTNU - Norwegian University of Science and Technology

RBV - Resource-based view

RDV - Resource dependence view

TMT – Top management team

Appendix A – development stages

The need to be dynamic in network building is apparent as firms go through different stages of development (Kazanijan 1988, Vohora, Wright et al. 2004, Vanaelst, Clarysse et al. 2006, Clarysse, Knockaert et al. 2007). Networking capabilities need to be developed for firms to pass a previous stage and to enter the next one, but each stage is an iterative and nonlinear process. Sometimes the decisions makers have to take a step back and look at previous choices in light of recent development. Companies face different challenges that dominate during different stages, and critical junctures arise requiring new resource combinations, capabilities and networks (Vohora, Wright et al. 2004). The framework below tries to grasp different definitions in the life-cycle (stage-nased) literature and suggests the following stages: (1) early stage, (2) development stage, (3) start-up-/introduction stage, (4) growth stage, and (5) maturity stage. The content of each stage is adapted from stage-based studies (Vohora et al. 2004; Kazanijan, 1988) and can be found in Table 5 in Appendix. Later researchers should apply a longitudinal study following companies along their development stages. This could further improve our understanding of when and how networks exert their effects on new venture performance and survival.

Table 5 - Conceptual model of firm's development stages

Early stage	We evaluate commercial opportunity and strengthen our intellectual rights. We apply for a patent or try to protect technology that forms the basis for future product/service.
Development stage	We are developing product/service, which is introduced in the market to a limited extent. Revenues are very low.
Start-up- /introduction stage	Our product/service is gradually being introduced in the market. Our firm is characterized by creativity and project management.
Growth stage	Our firm grows fast and investments may be necessary for further development. Our product/service can be introduced in several markets, and the sales are increasing.
Maturity stage	The sales are flattening out. Our firm has reached all potential customers in the aimed markets. Administrative routines and procedures are well-developed.