

Risk in the Internationalization Process of Norwegian SMEs

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Industrial Economics and Technology Management

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The master agreements for both students can be found in the appendices.

"Behold the turtle, it only makes progress when it sticks its head out"

- James B. Conant

Preface

This paper is our master thesis at the Norwegian University of Science and Technology, written in the spring semester of 2012. The master thesis is part of a master-level specialization in Strategy and International Business Development at the Department of Industrial Economics and Technology Management. Working with the master thesis has been both time-consuming and demanding, but has given us valuable experience and motivation for international assignments in our future careers.

The purpose of this paper is to study risk management in the internationalization process of Norwegian SMEs. International business is inherently risky due to the uncertainties involved with operations in unknown environments, and the potentially negative effects of these uncertainties on firm performance. Internationalizing SMEs with limited resources and international experience face unique challenges in the internationalization process, and the lack of consensus in international business research concerning how this process unfolds makes this a particularly interesting topic to study.

We would like to thank the representatives of our four case firms – Cybernetica, Norske Ventiler, SafeClean and Sperre – for taking time off to do interviews in a hectic period to share knowledge and experiences. We would also like to thank Inventure Management, K. Lund Offshore and Aker Solutions for sharing with us how it is to do business in Brazil. Lastly, we would like to thank our academic supervisor, Associate Professor Arild Aspelund, for important guidance, motivation and support during the work with the master thesis.

Trondheim, June 7	
Andreas Bø Karlsen	Knut Einar Dahl

Abstract

By studying the internationalization process of four Norwegian SMEs involved in a governmental-backed internationalization support program, this case study aims at uncovering how SMEs identify, evaluate and mitigate risks in the internationalization process. This is a topic of high relevance for managers, policy-makers and researches. Each group will be addressed in this abstract.

The risk assessments made during the course of the internationalization process is found be of a muddling-through nature, with no real separation between risk identification and risk evaluation processes, and both processes are found to be interlinked and cyclical. Resource scarcity is found to be a highly influential factor, making the firms consider only a subset of what is perceived to be feasible entry modes in the risk identification phase. Further, only a subset of risk factors - identified as key risk factors - are thoroughly evaluated. When evaluating the overall risk level, risk is assessed in terms of potential loss associated with a market entry failure and evaluated against a risk tolerance frontier – determined by the firm's ability to handle a financial loss. The risk mitigation efforts are dominated by a trade-off between the perceived necessary commitment for successful entry, and the desire to commit minimal resources.

For managers, the most important contribution of this study is how small firms can handle the significant resource demands of an internationalization process, and how small firm internationalization is vastly different from large firm internationalization. The reductionist approach pursued by the case firms limits the complexity and resource demands of the internationalization process, and this is further reduced by third-parties which provide relevant information, experience and decision-making support. The case study also illustrates the applicability of muddling-through processes in risk assessment—yielding an alternative to larger firms' more formal and structured processes.

For policy makers, the case study accentuates the vital role of government-backed internationalization programs for small firm internationalization. The internationalization programs are found to both motivate and facilitate the internationalization process of the case firms. In the function as facilitator, the programs reduce both resource- and psychological barriers by providing information, network referrals and financial support. The role as motivator is directly linked to the program's ability to reduce internationalization barriers, by allowing firms that are initially reluctant to engage in international activities to discover that international expansion is an achievable goal. The fact that two out of four case firms never would have considered their current foreign market expansion unless contacted by the internationalization program, should give an incentive for continuation of these programs.

For researchers, the case study illustrates how research on risk in the internationalization process has been neglected. The current research streams focus on pattern explanation of small firm internationalization following successful entry, rather than how small firms actually identify, evaluate and mitigate risk during this process. This indicates a need for internationalization process models to more accurately describe the risk assessment process conducted by practitioners in small, internationalizing firms. In order to understand the role of risk in the internationalization process, the models should be developed based on empirical research on how uncertainty affects resource commitment at market entry and managerial decision-making.

Sammendrag

Målet med dette casestudiet er å avdekke hvordan fire små norske bedrifter som deltar i et statlig støtteprogram for internasjonalisering identifiserer, evaluerer og forsøker å redusere risiko i internasjonaliseringsprosessen. Dette er et emne som er høyst relevant for både bedriftsledere, forskere og myndigheter, og hver målgruppe blir adressert i sammendraget.

Risikovurderingene som gjøres i internasjonaliseringsprosessen er av en mindre strukturert art. Det skilles ikke mellom prosesser for risikoidentifisering og risikoevaluering, og disse framstår som tett sammenbundet og sykliske av natur. Videre påvirker ressursknapphet selskapenes risikovurdering ved at kun en delmengde av mulige inngangsmetoder vurderes. Kun et utvalg av risikofaktorer blir vurdert, nærmere bestemt faktorene som blir ansett å ha størst påvirkningskraft på selskapenes operasjoner. Risiko måles i form av potensielt tap ved mislykket markedsinngang og vurderes mot en risikogrense som bestemmes av bedriftens evne til å tåle økonomisk tap. Forsøk på å redusere risiko i internasjonaliseringsprosessen blir sterkt påvirket av en avveining mellom det som vurderes som påkrevd ressursallokering for vellykket markedsinngang, og et ønske om å redusere ressursallokering så mye som mulig.

For bedriftsledere er det viktigste bidraget fra denne oppgaven hvordan små selskaper kan håndtere betydelige ressurskrav i internasjonaliseringsprosessen, og hvordan små selskapers internasjonaliseringsprosess er tydelig annerledes enn større selskapers prosesser. Fokus på kun et utvalg av mulige inngangsstrategier og risikofaktorer reduserer kompleksitet og påkrevd ressursallokering, det samme gjør støtte fra tredjeparter i form av relevant informasjon, erfaringsdeling og beslutningsstøtte. Studien gir dermed støtte til at en mindre strukturert risikovurderingsprosess kan være hensiktsmessig for små selskaper.

Studien er relevant for myndigheter fordi den illustrerer hvordan myndighetsorganer kan ha en viktig rolle i internasjonaliseringsprosessen til små selskaper. Myndighetsledede internasjonaliseringsprogrammer motiverer og fasiliterer internasjonal satsing. Programmene fasiliterer internasjonaliseringsprosessen ved å redusere ressurs- og psykologiske barrierer til internasjonal satsing ved å bidra med informasjon, kontakter og finansiell støtte til bedriftene. Rollen som motivator for internasjonal aktivitet er direkte knyttet til positive effekten programmene har på selskapenes internasjonale satsing, ved at bedrifter som i utgangspunktet ikke vurderer internasjonal satsing gjennom fasilitering fra internasjonaliseringsprogrammet finner at dette er oppnåelig. At to av selskapene i casestudiet ikke ville vurdert internasjonalisering hvis de ikke ble kontaktet av myndighetsprogrammet, indikerer en støtte til at tilsvarende programmer bør videreføres.

Oppgaven er relevant for forskere ved at den avdekker at det i for liten grad er forsket på risiko i internasjonaliseringsprosessen. Det har vært mer fokus på å forklare gjennomførte internasjonaliseringsprosesser enn å vurdere hvordan små selskaper faktisk identifiserer, evaluerer og forsøker å redusere risiko underveis i prosessen. Dette vitner om et behov for å utvikle internajonaliseringsmodeller som mer nøyaktig beskriver risikovurderingsprosessen i små selskaper. For å bedre forstå hvordan risiko påvirker internasjonaliseringsprosessen bør slike modeller utvikles basert på empiriske studier av hvordan opplevd usikkerhet påvirker ressursallokering ved markedsinngang og beslutningstaking i prosessen.

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1 Introduction

1.1 Background

European small and medium sized enterprises¹ (SMEs) are increasingly involved in international trade. The European Commission (2010) finds that more than 40 % of European SMEs are involved in an international relationship – ranging from exporting, importing and foreign direct investment (FDI) to subcontracting activities. The trend of increased cross-border activity of SMEs (European Commission 2010) is important to the Norwegian economy, where 99.5 % of the companies have fewer than 100 employees (NHD 2011) and 65 % the value creation originates from companies with fewer than 250 employees (NHD 2011). Further, export activities² – independent of firm size – constituted nearly a quarter of the Norwegian gross domestic product (GDP) in 2010 (SSB 2011). Successful internationalization of small firms is therefore an important part of a sustainable Norwegian economy.

This master thesis follows four Norwegian SMEs in the Norwegian oil and gas (O&G) industry in their attempt to enter the Brazilian petroleum sector. Following a global trend of increased cross-border activity (Ghemawat 2011), Norwegian suppliers are active in O&G fields all over the world - including Southeast Asia, Western Africa, and the Americas – and increasingly so. The turnover from Norwegian suppliers' international sales increased with nearly 25 % from 2007 to 2009, reaching a total of NOK 118 billion in 2009 (Fjose, Jakobsen & Espelien 2010). Sales from operators and suppliers³ in the O&G sector account for 15 % of the aggregated Norwegian exports, after discounting for direct O&G sales (Sasson & Blomgren 2011), making the O&G sector important to the Norwegian economy and an intereresting context for studying small firm internationalization.

Brazil is currently the world's 11th largest oil producer, but is expected to be among the top five in 2020. This is largely due to the discovery of the pre-salt oil fields in 2007 (The Economist 2011b) and the state controlled Brazilian oil firm Petrobras' ambitious investment plans. Conservative estimates put the size of the pre-salt oil fields a little below the size of all oil fields in the North Sea, and Petrobras has announced investments of USD 224 billion in the period from 2011 to 2015 (Petrobras 2011), mostly in E&P activities⁴. As a majority of products and services exported by Norwegian O&G suppliers are related to these early phase activities (Fjose, Jakobsen & Espelien 2010), the Brazilian petroleum sector is a particularly attractive market. Reflecting this, there are currently more than 120 Norwegians companies engaged in O&G related activities in Brazil – of which a majority entered the Brazilian market after 2007 (oilinfo.no 2011).

Risk in the Internationalization Process

International business is inherently risky because of the uncertainties related to operating in unknown markets, and the fact that such uncertainties may affect firm performance (Miller 1993; Oviatt, Shrader & McDougall 2004). As several researchers have pointed out, political, economic,

1

¹ Enterprises that have up to 250 employees (European Commission 2009)

² Excluding the value of the oil and gas export

³ We follow Sasson and Blomgren's (2011) division of actors in the oil and gas industry into *operators* (holding production licences) and *suppliers* (providing oil and gas specific services).

⁴ Exploration and production (E&P) involves searching for petroleum resources and development and building of infrastructure for oil and gas production

legal and social uncertainties in the environment increase the risk of losing profits or firm assets (Boyacigiller 1990; Ghoshal 1987; Miller & Bromiley 1990; Wiseman & Bromiley 1996). Researchers further argue that a firm's strategic objective is to align the organization to such an uncertain environment (Figueira-de-Lemos, Johanson & Vahlne 2011; Miller 1992), an alignment that will ultimately decide the firm's risk exposure (Miller 1992). Consequently, the process of identifying, evaluating and mitigating risk is a vital part of the strategy process of Norwegian SMEs trying to enter the Brazilian petroleum market.

Several of the proposed sources of uncertainty are present in the Brazilian business environment. In general market assessments, Ruchir Sharma (2012) – head of Emerging Markets and Global Macro at Morgan Stanley Investment Management - and *The Economist* (2009b) describe the Brazilian business environment as an environment with significant government interventions, bureaucracy and underdeveloped market supporting institutions. Reflecting this, Brazil is currently ranked 126th on the World Bank's *Ease of Doing Business* index (World Bank 2012).

The fact that Aker Solutions reported a NOK 500 million loss in relation to their Brazilian business operations in the third quarter of 2011 (Aker Solutions 2011), provides an example of how challenging the Brazilian business environment can be. The loss has been attributed to the attempt of running their operations from their Norwegian headquarters, failure to consider experiential data in tenders, the challenge of meeting local content regulations and overly ambitious project plans (TU.no 2011, 2012). When asked how the situation unfolded, the company admitted it 'had been sleeping in class' (TU.no 2012). None of Aker Solutions mistakes discriminates on company size; further stressing how a thorough risk assessment is a vital component of any entry strategy.

1.2 Research Questions

This thesis is a case study of risk management in the internationalization process of SMEs participating in an Innovasjon Norge-led Navigator project (Appendix 11.1). Based on empirical data collected through interviews with employees directly involved in the respective firms' internationalization process, the study searches to answer the following research questions:

- 1) How do managers of Norwegian SMEs identify risk factors?
- 2) How are the identified risks evaluated and sought mitigated?

The appropriate unit of analysis is guided by the scope of the Navigator project and the time limitations of a master thesis. The scope of the study is therefore the SMEs from the time an idea of a possible international venture is considered until the idea is concretized, market research has been performed, different business models have been evaluated, and visits have been made to the target country. The study does not aim to develop a model, but aims at describing important factors in the risk identification, evaluation and mitigation processes of the selected case firms.

1.3 Relevance to Managers, Researchers and Policy Makers

For managers, risk assessment is only one of the considerations that need to be made when considering foreign expansion. This is illustrated by Cavusgil *et al.* (2008), who identified six variables in need for managerial attention prior to international expansion; firm *goals and objectives*,

resources and capabilities available to the firm, unique conditions in the target country, risks inherent in the foreign venture, the nature and extent of the competition and characteristics of the product and service offering. The idiosyncratic nature of risk (Baird & Thomas 1985; Oviatt, Shrader & McDougall 2004; Shrader et al. 2000) makes risk assessment a highly complex endeavor, requiring significant resources of an often time-constrained management team. However, given the myriad of tasks the management team is engaged in during an internationalization process, the amount of resources contributed to risk assessment must necessarily be a trade-off. In order to weight the trade-off between risk assessment and other vital tasks, knowledge of how the internationalization process unfolds in comparable firms can provide important inputs.

For researchers, the topic of risk in the internationalization process seems to have received little attention during the last decade. Despite the fact that several holistic frameworks have been developed for identifying, evaluating and mitigating risk in the internationalization process - e.g. by Oviatt, Shrader and McDougall (2004) - no such frameworks has been thoroughly tested or accepted by the research community or practitioners. While we do not aim at developing a new model, we seek to address the suitability of the proposed risk models in the context of SMEs entering an unknown market. The nature of the target market and firm size might affect both the sources of risk and the mitigation strategies used to manage the risk of market entry. Both aspects are areas of interest for researchers, as the risk management models are generic in nature and few researchers have sought to understand risk assessments in SMEs' entry evaluations and later pursued entry strategies.

For policy makers, there is an obvious interest in facilitating the internationalization efforts of Norwegian firms. O&G related services are one of Norway's most important exports, and the number of international sales is an indication of the international competitiveness of Norwegian O&G suppliers. According to Fjose, Jakobsen and Espelien (2010), and Sasson and Blomgren (2011), Norwegian O&G suppliers are already highly competitive – possessing unique knowledge and competences gained from experience on the Norwegian Continental Shelf. In order for the O&G suppliers to remain internationally competitive, and secure the future of an important Norwegian industry, Norwegian policy must facilitate the internationalization efforts of Norwegian firms. This in turn creates a need for knowledge concerning the internationalization process of such firms, and how they identify, evaluate and mitigate risk.

1.4 Structure of Study

The thesis is structured to best answer the above outlined research questions, and largely follows the sequence of a traditional research process. An introductory part outlines the background of the study, research questions and objectives, before a theoretical background presents relevant theory and key concepts for studying risk in the internationalization process. The theoretical background is followed by an outline and evaluation of the study's methodological approach. The following empirical background section is divided in to two parts – (1) important characteristics of the Brazilian petroleum market, and (2) case firm presentations. The subsequent empirical data analysis identifies cross-case patterns, before a discussion links the findings from the empirical data analysis with the theoretical background. After presenting implications for managers and policy makers, the study's limitations as well as implications for further research are outlined. A final conclusion summarizes the findings from the discussion and provides a clear answer to the research questions.

2 Theoretical Background

The theoretical background is centered around the topic of risk, and starts with a definition of the word risk used in this paper. Following the risk definition, two contrasting explanatory models of the internationalization process are compared to provide a background for the topic of risk within the international business literature. From a focus on internationalization theories, focus is shifted to risk models presented in the international business literature, and the uncertainties which determine the level of risk a firm is exposed to in its business environment. The last sections of the theoretical background are focused directly on the research questions, treating risk identification, evaluation and mitigation. Propositions for expected case firm behavior are presented in each section, and revisited in the discussion of the empirical findings.

2.1 Risk Definition

The Oxford dictionary (Soanes, Hawker & Elliott 2006) defines the word 'risk' (Figure 1)

risk •n. 1 a situation that could be dangerous or have a bad outcome. 2 the possibility that something unpleasant will happen. 3 a person or thing causing a risk: gloss paint can pose a fire risk. •v. 1 expose to danger or loss. 2 act in such a way that something bad could happen. 3 take a risk by engaging in a particular activity.

according to a downside perspective (Miller 1992), meaning that the focus is put on potentially negative effects on an entity in a particular situation. However, studying the definitions of risk in different dictionaries will illustrate that there is a wide range of definitions. The same is also true within different research streams treating the topic of

Figure 1 - Risk definition in the Oxford dictionary

risk, and there is no single agreed definition of risk - a point emphasized by several researchers (Aven & Renn 2010; Fischhoff, Watson & Hope 1984; Miller & Reuer 1996).

The definition of risk chosen in this study aims to be close to how real life managers, the practitioners of international business, view risk. In a study of managerial perspectives on risk, March and Shapira (1987) argue that managers "see risk in ways that are both less precise and different from risk as it appears in decision theory" (March & Shapira 1987, p. 1407). In decision theory, uncertainty and risk have been defined in terms of probabilities of decision outcomes and probability distributions (Bromiley, Miller & Rau 2005). In particular, March and Shapira found three deviations from decision theory that also differ from a wider range of risk definitions. First, managers associate risk with negative outcomes and do not treat uncertainty of positive outcomes as an important aspect of risk. Second, managers recognize the uncertainty aspect of risk but prefer to define risk in terms of amount to lose rather than a probability distribution. Third, there is little desire to reduce risk to a single quantifiable construct, although quantities are used in discussing risk and precision is sought in estimating risk. These findings support a downside perspective of risk, which several researchers (Baird & Thomas 1985; March & Shapira 1987; Miller & Reuer 1996) find more managerial relevant than variance and probability distribution concepts. Grounded in the discussion above, we choose a downside perspective on risk, applying the following definition of risk throughout the study:

"Risk reflects the degree of uncertainty and potential loss associated with the outcomes that may follow from a given behavior or set of behaviors" (Forlani & Mullins 2000, p. 309)

Following Forlani and Mullin's (2000) definition of risk, a change in the level of uncertainty or the potential for loss alters a firm's risk exposure. An important implication of Forlani and Mullin's definition is that the level of risk can be altered by firm behavior. Thus, managers operating in an uncertain business environment have the opportunity to alter the degree to which firms are exposed to risk, by employing risk mitigation strategies. Hence, coping with uncertainty is a key managerial activity (Thompson 1967).

2.2 Two Contrasting Views on the Internationalization Process

In order to set the topic of risk into an internationalization context, two prominent models for explaining firm behavior in the internationalization process are compared. The stages models represent the gradual internationalization viewpoint, while the born global and international new venture perspectives represent the early internationalization viewpoint. Comparing two models of the internationalization process contributes to creative tension (Autio 2005), and is an acknowledgement of the inability of any existing theory to fully explain firm internationalization (Crick & Spence 2005; Rialp, Rialp & Knight 2005). The comparison is done with focus on how the internationalization process is explained, and the role of risk in this process.



Figure 2 - Gradual vs. Early Internationals

To represent the stages models, we have chosen to focus solely on the Uppsala model (Johanson & Vahlne 1977). This model holds a dominant position in the field of international business (Aspelund & Moen 2010), and the differences between the different stages models are semantic rather than substantive concerning the nature of the internationalization process (Andersen 1993; Bell 1995).

The field of early internationalization is newer and more fragmented than that of the stages models, reflected in the lack of consensus on a term describing firms internationalizing soon after inception. Among other terms, the firms have been classified as *born globals* (Knight 1997; Rennie 1993), *international new ventures* (McDougall, Shane & Oviatt 1994), *early internationalizing firms* (Rialp, Rialp & Knight 2005) and *instant exporters* (McAuley 1999). The definitions of the various firm types are nevertheless similar, all emphasizing early international sales to multiple foreign countries. We follow Rialp *et al.*'s (2005) example of referring to such firms as early internationalizing firms, or 'early internationals' for brevity sake, as the definitions are so similar. Due to the newness of the field, and lack of a generally accepted model, focus will be on similarities in the early internationals literature rather than one specific model.

We acknowledge the debate concerning whether the early international internationalization process can be explained by the Uppsala model (Bell 1995; Madsen & Servais 1997; Oviatt & McDougall 1994). However, this discussion is outside the scope of this study and we rather seek to exploit the contrasting views on the internationalization process as both models fit the case

firms; SMEs, some quite young, with resource limitations and various levels of international experience.

2.2.1 Gradual Internationals

The Uppsala model of the internationalization process was developed as a response to empirical observations that contradicted the idea of firms choosing to enter markets by an optimal mode determined by cost and risk analyses of market characteristics and firm resources (Johanson & Vahlne 2009). The empirical observations of the export behavior of Swedish firms by Johansson, Vahlne and colleagues at the Uppsala University indicated that firms did not find optimal entry modes through rigid analysis (Johanson & Vahlne 2009). Rather, the firms began internationalization by ad hoc exporting and internationalization was seen as a product of a series of incremental decisions – often following an establishment chain (Johanson & Vahlne 1977). This establishment chain predicted that the ad hoc exporting would be followed by more formalized market entries through agents, sales subsidiaries and in some cases production. From these empirical observations, a model of the internationalization process was built.



Figure 3 - Uppsala Model's Internationalization Mechanism (adapted from Johanson & Vahlne (1977))

Johanson and Vahlne's (1977) Uppsala model suggests an internationalization process consisting of state and change variables mutually affecting each other in a causal cycle (see Figure 3). It is assumed that the slow and incremental internationalization pattern is a result of a lack of market knowledge and a propensity for uncertainty avoidance (Johanson & Wiedersheim-Paul 1975), with foreign operations being the best source of foreign market knowledge (Johanson & Vahlne 1977). The two researchers argue that the state variables of current market commitment and market knowledge will be an important influence on the change variables of current business activities and new commitment decisions (and the latter two will in turn influence market commitment and market knowledge). The internationalization process of firms is therefore closely tied to the firm's risk perception, which is reduced through "incremental decision-making and learning about foreign markets and operations" (Johanson & Vahlne 1977, p. 306).

Johansson and Vahlne (1977) define risk (R) as the product of market commitment (C) and market uncertainty (U). From this definition, it is evident that the risk level is elevated by an increase in commitment and/or an increase in the level of uncertainty. In relation to the risk definition, Johansson and Vahlne (1977) introduce the concept of a maximum tolerable market risk deciding the outcome of commitment decisions. In their view, scale-increasing commitments will be made as long as the current market risk is below the maximum, while uncertainty-reducing commitments are made when the threshold is breached. This is illustrated in Figure 4 (next page) where a firm might start with a risk exposure of R_0 , and increases commitment with ΔR until the firm reaches the maximum tolerable risk frontier. As the state-change relationship indicates, the increased commitment will lead to increased market knowledge – lowering the uncertainty at the given commitment level and eventually leading the firm to increase their commitment until the risk frontier is reached again. In a later paper, Figueira-de-Lemos, Johanson and Vahlne (2011)

revisit the risk model and separate between contingent uncertainty (can be reduced) and pure uncertainty (unchangeable) – implying that there will always be a level of uncertainty and therefore also risk in the internationalization process.

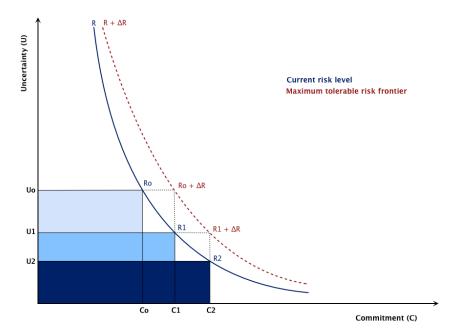


Figure 4 - Risk mediating the gradual internationalization process. Adapted from Figueira-de-Lemos et al. (2011)

While the model originally focused only on the focal firm, Johansson and Vahlne have since recognized that "markets are networks of relationships (...) [and that] relationships offer potential for learning, and for building trust and commitment" (Johanson & Vahlne 2009, pp. 1411-2). In relation to this, they introduce the concept of 'liability of outsidership' (Johanson & Vahlne 2009, p. 1411) to describe the liability of not being a member of industry firm networks in a given market. It is also important to note that Johansson and Vahlne (1977) introduced three exceptions from their model of the internationalization process; (1) firms with very large resources, (2) stable and homogenous market conditions, and (3) firms with much experience from other markets with similar conditions.

2.2.2 Early Internationals

Despite the stature of the Uppsala model, several studies have questioned the model's fit to a certain group of firms internationalizing soon after establishment (Bell 1995; Moen & Servais 2002; Oviatt & McDougall 1994). These firms seem to contradict the gradual internationalization efforts depicted in the Uppsala model by internationalizing soon after inception (Bell 1995; Oviatt & McDougall 1994) - following internationalization as an intended strategy from inception rather than ad hoc exporting (Crick & Jones 2000; Oviatt, Shrader & McDougall 2005).

While Oviatt and McDougall (2005) argue that early internationals have existed for centuries, using the British East India Company as an example, other researchers have pointed towards a trend of an increasing number of early internationals in the latest decades (Knight & Cavusgil 2004). Researchers have attempted to identify facilitating factors of early internationalization among small, young firms (Autio 2005; Knight & Cavusgil 2004; Madsen & Servais 1997; Zahra 2005), and the results can be summarized by two factors; globalization of markets and technological advances. The globalization of markets have led to opportunities of global

sourcing, production and marketing, as well as a homogenization of buyer preferences across countries (Knight & Cavusgil 2004; Madsen & Servais 1997). Technological advances have enabled small scale economics, lowered the cost of transportation and communication, and improved access to market information (Knight & Cavusgil 2004; Madsen & Servais 1997). As Knight and Cavusgil (2004) emphasize, these external trends facilitate early internationalization, but are insufficient to explain the influence of internal firm factors.

In relation to the firms' internal environment, Crick and Spence (2005) emphasize the importance of the manager or management team in smaller sized firms. They recognize that management characteristics drive organizational strategy and that management enthusiasm and desire for foreign expansion results in increased international activity. Typical management characteristics in early internationals include earlier international experience (Rialp, Rialp & Knight 2005), a global vision (McDougall, Shane & Oviatt 1994) and a higher risk-taking propensity (McDougall, Shane & Oviatt 1994). While acknowledging that third party involvement can substitute for managerial experience, Crick and Jones (2000) find that the managerial background affects the speed of internationalization in addition to the desire to internationalize - where international business experience enhances speed, a technical background is likely to reduce it.

Although the managerial background affects both the motivation for and speed of firm internationalization, some early internationals also seem to have a *need perspective* on internationalization. The reason for regarding internationalization as a necessity can be threefold. First, internationalization can be a prerequisite for competing in some industries, due to small domestic markets (Aspelund, Madsen & Moen 2007; Crick & Jones 2000; Moen & Servais 2002) and high costs of operation and/or R&D (McDougall & Oviatt 1996). Second, the need for internationalization might arise as a response to short time windows of opportunity in technology intensive industries, where rapid and/or broad market penetration is necessary to capitalize on investments (Aspelund, Madsen & Moen 2007). Oviatt and McDougall (2005) support this view in recognizing that as competitors in knowledge-intensive industries try to uncover or produce equifinal alternative knowledge, new ventures must be international from inception or face a disadvantage compared to already international organizations. Third, a fear of inertia due to path-dependence on domestic operations might lead to early internationalization (McDougall, Shane & Oviatt 1994), as it might be difficult to change strategic direction when international expansion becomes necessary.

Early internationals can, as most new businesses, generally experience resource scarcity (Aspelund, Madsen & Moen 2007; Knight & Cavusgil 2004; McDougall, Shane & Oviatt 1994). This resource scarcity has several effects on the internationalization pattern of early internationals. First, early internationals tend to internalize fewer resources essential to their survival and thus rely on hybrid structures for controlling vital assets - introducing the risk of possible partner opportunism (McDougall, Shane & Oviatt 1994). Second, early internationals tend to choose lower commitment entry modes when possible to overcome resource scarcity and handle risk (Aspelund, Madsen & Moen 2007), although high commitment entry modes such as FDI is found to improve new venture performance in the long term (Zahra, Ireland & Hitt 2000). Citing Burgel and Murray (2000) and Crick and Jones (2000), Aspelund *et al.* (2007) point out that demands for customization and support will influence INVs' entry mode, for example requiring firms to commit resources to establish customer support programs. Thirdly, Aspelund

et al. (2007) emphasize that resource scarcity makes early internationals vulnerable to competition from large players and demands of global physical presence - leading to a focus on market niches where competition from global players is less intense, but with significant profit potentials.

The research on early internationals has not treated the term of risk as thoroughly as Johansson and Vahlne's (1977) commitment decision model. However, several sources of risk have been identified. The risk of opportunism from partners in hybrid structures has been introduced earlier, but Zahra (2005) presents three usual types of liabilities in a review of the last ten years of INV research. The first is newness and inexperience, introducing a limited access to resources and existing networks. The second is size, which limits the resource slack and thus the ability to withstand income disruptions. Lastly, the liability of foreignness increases barriers to entry, as lacking customer and supplier links makes it difficult for firms to gain customer acceptance. Oviatt and McDougall (2005) also recognize this last liability, stating that "(...) a firm conducting transactions in a foreign country has certain disadvantages vis-à-vis indigenous firms, such as governmentally instituted barriers to trade and an incomplete understanding of laws, language, and business practices in foreign countries" (Oviatt & McDougall 2005, p. 35).

2.3 Risk Models

Decisions regarding risk acceptance, for example in an internationalization process, are normally made by weighing risks against benefits (Vlek & Stallen 1980). However, the difficulty of defining and measuring the environment's influence on the firm is likely to complicate the evaluation of prospective risks and rewards (Palmer & Wiseman 1999). An analytical approach to the risk factors that the firms face – for example by using *risk models* - might reduce the risk of inability to align the organization to a changing environment (Milliken 1987). Several researchers (Baird & Thomas 1985; Miller 1992, 1998) argue that categorization of risk sources will highlight eventual links between factors of uncertainty and firm performance, making the firm able to outline and implement strategies that address specific risk factors. Risk models can therefore be analytical tools used to take a more rational approach to internationalization decisions, by identifying risk sources as well as the impact these uncertain variables may have on firm performance.

Risk models presented by researchers of international business (e.g. Baird & Thomas (1985) Miller (1992); Shrader et al. (2004), Cavusgil et al. (2008)) are mainly categorizations of variables possibly affecting a firm in an international business environment. While all of the mentioned models are related to risk and uncertain factors in an international business environment, the models vary in content and to some extent in terms of intended use (central risk models are presented in Appendix 11.2). Baird and Thomas (1985), Miller (1992), Shrader et al. (2000), and Cavusgil et al. (2008) all categorize and list a number of factors relevant to risk, while Oviatt et al. (2004) extend the list of risk factors to be a process model, with venture performance and iterative learning effects as part of the model. The discrepancies between risk models, particularly in terms of which factors to include in the risk assessment, indicate that risk models need to be tailored to their intended use. Thus, a generic risk model cannot be directly used to model risk in a specific context. This view is supported by Shrader et al. (2000), who list managerial, firm- and industry conditions that will have a case-specific effect that can both reduce and increase perceived risk. We are not aware of empirical evidence suggesting that risk models are used or

help managers handle risk. In support of this, Bromiley, Miller and Rau (2005) point out that there is a lack of research on how managers actually take strategic decisions involving risk.

2.4 Risk determinants

The idiosyncratic nature of risk makes it useful to consider elements from some of the mentioned models and more specific research on certain aspects of international business. In order to group the risk determinants in a natural order, the high-level categories found in the mentioned risk models are considered useful. We therefore adopt Oviatt *et al.'s* (2004) main categories of factors affecting the level of risk in the internationalization process (Figure 5).

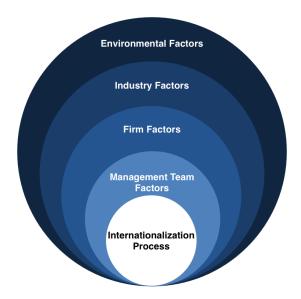


Figure 5 - Risk factors influencing the internationalization process. Adapted from Oviatt et al. (2004)

Bromiley, Miller and Rau (2005) indicate that uncertainty is a result of both *internal* factors originating from the firm and management team, and *external* factors originating from the firm's environment. Hence, environmental- and industry factors are external risk factors, while the firm- and management team factors are internal risk factors. Both Oviatt *et al.* (2004) and Baird and Thomas (1985) suggest that the risk factors will have a cascading effect. Thus, environmental factors influence industry factors, which in turn affects firm factors, the management team and lastly the strategic problem - the internationalization process.

The following sections outline the most relevant risk factors for a firm considering foreign market entry. Within each risk category, we propose several sources of uncertainty that will affect the overall level of uncertainty in the internationalization process.

2.4.1 Environmental Factors

The environmental factors affecting risk are mainly related to *political* and *policy uncertainties*, *macroeconomic uncertainties*, *cross-cultural factors, social uncertainties*, and *natural uncertainties* (Cavusgil Knight & Riesenberger 2008; Miller 1992). Figueira-de-Lemos *et al.'s* (2011) previously presented classification of uncertainties provide a useful separation of environmental uncertainties. Of the environmental factors, social uncertainties (e.g. social unrest and demonstrations) and natural uncertainties (e.g. earthquakes and extreme weather) can have disastrous effects on business operations, but are all pure uncertainties. Although the risks relevant to these uncertainties must be identified and measures put in place to limit damage, this study will focus on contingent

uncertainties. Political and policy uncertainties, macroeconomic uncertainties and uncertainties related to cultural differences are all examples of this (Figure 6) – uncertainties that can be reduced by knowledge and skill.

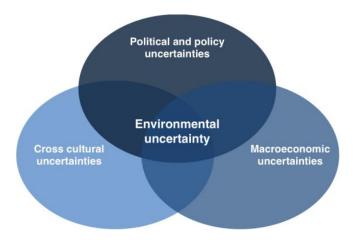


Figure 6 - Sources of environmental uncertainty

Although this study is focused on internationalization in a single country, we find it useful to look at environmental risk factors rather than country risk factors as the most peripheral risk category. Environmental factors encompass both country level risk factors as well as effects of global trends. This view is supported by Miller (1992), who points out that environmental uncertainties may spill across country borders.

Political and policy uncertainties

Several authors distinguish between political and policy uncertainties (Mascarenhas 1982; Miller 1992; Oviatt, Shrader & McDougall 2004; Ting 1988). While political uncertainty is associated with "the threats and opportunities associated with potential or actual changes in the political system" (Miller 1992, p. 313), policy uncertainty is associated with changes in government policies that have an impact on firms (Miller 1992; Ting 1988). Following this tradition, we find it useful to separate the terms political risk and policy risk, as they are distinct risk factors in terms of their effect and appropriate responses. Extreme events resulting in high political uncertainty, such as revolutions, wars, and violent democratic changes in government (Miller 1992) will have an adverse, and in many cases, prohibitive effect on business operations, but are less likely to occur than changes in government policy.

Government policies should and need to change to reflect a changing environment, but unpredictable changes will increase the level of risk. This is reflected in Henisz and Zelner's definition of policy risk: "the risk that a government will discriminatorily change the laws, regulations, or contracts governing an investment – or fail to enforce them – in a way that reduces an investor's financial return" (Henisz & Zelner 2010, p. 90). Miller (1992) states that fiscal and monetary reforms, price controls, trade barriers and general changes in government regulation are the most relevant policy uncertainties for international firms.

Macroeconomic uncertainties

Ghoshal (1987) states that macroeconomic events are fully out of a firm's control, and certainly takes a holistic approach as he includes wars and natural disasters as macroeconomic risks. While macroeconomic uncertainty is a broad term, Miller (1992) and Oxelheim & Wihlborg (1987)

argue that it is more appropriately used to describe changes in economic activity and prices. Baird and Thomas (1985), Miller (1992), Oviatt et al. (2004) and Cavusgil et al. (2008) all include economic conditions as potential sources of uncertainty. Specifically, changes in foreign exchange rates, inflation rates, and fluctuations in relative prices of commodities, such as oil, will affect firms' financial performance in the short term. Real and expected economic growth in a region or industry will often be influential on long term investment plans, and is therefore important to the long term prospects of an internationalizing firm. Oviatt et al. (2004) state that new ventures are particularly fragile in weak economies, but the authors add that as environmental effects are mediated by industry conditions, as some sectors will prosper even in economic downturns.

Cross-Cultural Uncertainties

Culture comprises human population's beliefs, rules, techniques and artifacts (Rugman, Hodgetts & Collinson 2009). Cavusgil *et al.* (2008) emphasize that international business involves crosscultural risk, which is a result of cultural miscommunication. In order to reduce this risk, they emphasize that it is possible to learn appropriate rules and behavioral patterns through a socialization process termed acculturation. Ghemawat (2011) takes a more holistic approach in an investigation of cross-border differences as barriers to globalization by introducing four dimensions of distance (Figure 7).

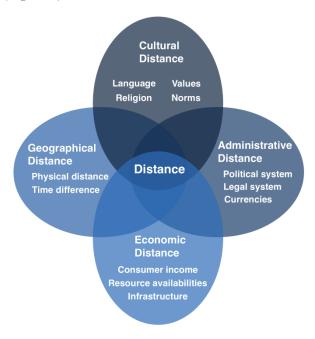


Figure 7 - The CAGE framework. Adapted from Ghemawat (2011)

In the CAGE framework, two countries can be compared to each other according to the determinants of each dimension – a multidimensional approach that will give a more precise understanding of cross-border differences than consideration of a single dimension only (Ghemawat 2011). Through empirical studies, Ghemawat (2011) finds that CAGE-differences translate into trade barriers, and similar countries are found to have significantly higher cross-country trade levels than countries with larger differences. While culture is hard to identify and analyze (Cavusgil, Knight & Riesenberger 2008), awareness of cultural differences is essential to building a relationship of trust to foreign partners (Ghemawat 2011) – making this same awareness an essential aspect when identifying risk in the internationalization process. We

acknowledge that Ghemawat's (2011) framework spans several of the discussed environmental factors. However, the framework is comparing a static view of current differences in the CAGE-dimensions – not the uncertainty tied to these factors – in order to give an indication towards potential challenges related to cross-border trade between two countries.

2.4.2 Industry Factors

While environmental uncertainty factors set a general basis for operations in a country or region, industry conditions will mediate the effects of environmental uncertainty (Baird & Thomas 1985; Miller 1992, 1993; Oviatt, Shrader & McDougall 2004). In line with this, Porter (2008) argues that government policies will have an effect through industry forces —making the competitive climate and profit potential industry-specific although the industries share the same macro-level environment. In this discussion of how industry factors affect the level of uncertainty faced by a firm, a model first presented by Miller (1992, 1993) and later adopted by Oviatt *et al.* (2004) — see Figure 8 - will be compared to Porter's *five forces* framework (Porter 1980, 2008).



Figure 8 - Industry factors affecting risk and return (adapted from Miller, 1992)

The factors presented by Miller (1992, 1993) and Oviatt et al. (2004) have much in common with the five forces that according to Porter (1980, 2008) determine industry structure and profitability (Table 1). Competitive intensity arises from rivalry among existing customers as well as firms entering an industry (Miller 1992; Porter 1980). A high level of competitive intensity, in which a large number of firms target a limited number of customers, can have an eroding effect on the profitability in an industry (Porter 2008). To counter low profitability, Porter (2008) argues that a clear understanding of the competitive environment might allow participants to target less populated, more profitable market segments. However, Ghoshal (1987) states that an international competitive environment is more complex than a competitive environment with national actors only, and this indicates that identifying a profitable market segment might be a significant challenge in international markets.

	Miller (1992, 1993) and Oviatt et al. (2004)	Porter (1980, 2008)
Force	Competitive intensity	Threat of new entrants Rivalry among existing competitors Substitutes
	Input uncertainties Product market uncertainties	Bargaining power of suppliers Bargaining power of buyers

Table 1 - Comparison of forces

Input uncertainty is caused by disruptions in the delivery of a product or service, and the likelihood of such disruptions increases in situation where there is only a few available suppliers of specialized product or service (Miller 1992). In such situations, and particularly when the costs associated with changing the supplier are high, suppliers may use their bargaining power to capture profits at the expense of other industry participants (Porter 2008). Ghoshal's (1987) concept of resource risk is particularly relevant to firms offering services or a combination of products and services: the risk that a "strategy will require resources that the firm does not have, cannot acquire, or cannot spare" (Ghoshal 1987, p. 430). Ghoshal (1987) specifically mentions lack of managerial talent, appropriate technology, and financial resources as relevant resource risk factors for multinational enterprises (MNEs), but these risks are highly relevant to SMEs as well.

Technological uncertainty is related to not knowing when rivals may introduce new technology that disrupts market dynamics. According to Miller (1992) and Ghoshal (1987), this is a dimension of competitive uncertainty, as process or product innovation only can have an effect on an industry when it actually is adopted by a firm. According to Porter (2008), industry growth and technological change are factors that will have an effect *through* the competitive forces. Porter (2008) denies the assumption that fast-growing industries always are attractive, as industry growth can alter the five competitive forces and thereby profit opportunities - for example as a result of a shift in the power balance of suppliers and customers or a pressure from a high number of entrants in an industry with low entry barriers. Miller's (1993) concept of product market uncertainty – unexpected changes in product demand - complements this view. Demand for a particular product or service is not only determined by industry growth, but also other factors such as client preferences and availability of substitute and complementary products (Miller 1993).

Despite the similarities, there is a major difference between Porter's (1980, 2008) view on how industry structure and turbulence affects organizational outcomes, and the view of Baird and Thomas (1985), and Oviatt *et al.* (2004). Porter (2008), along with Aldrich (1979), argue that environmental factors directly influence organizational outcomes, while Baird and Thomas and Oviatt *et al.* suggest that managerial actions will mediate environmental and industry factors. The latter view is supported by empirical research on managerial risk taking by Palmer and Wiseman (1999) based on a broad sample of 235 U. S. firms from 64 industries, where the authors "failed to detect a direct influence of environmental characteristics on organizational risk that was independent on managerial risk taking" (Palmer & Wiseman 1999, p. 1054).

2.4.3 Firm Factors



Figure 9 - Influencing forces on firm factors

Several factors related to the firm are highly influential to a firm's overall risk exposure (Figure 9). While political, policy, and macroeconomic uncertainties often offer useful insight, they need to be supplemented by firm-specific and sometimes investment-specific information for accurate risk assessment (Miller 1993). Firm risk can be defined as *income stream uncertainty* (Palmer & Wiseman 1999), and the effect of this uncertainty is influenced by firm *age, size,* and *organizational slack* (Oviatt, Shrader & McDougall 2004). Organizational slack is related to financial strength, and defined as a "cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy, as well as to initiate changes in strategy with respect to the external environment" (Bourgeois 1981, p. 30).

Smaller, young firms are often resource constrained (Aspelund, Madsen & Moen 2007), resulting in a low level of organizational slack that reduces the firms' capacity to handle unexpected changes in its environment, such as economic shocks (Palmer & Wiseman 1999). In addition, Zahra (2005) points to several common INV liabilities; newness, inexperience, size, and foreignness, which help explain that newly founded, small firms are more likely to fail than larger established firms (Laitenen 1992). Thus, small firms might be particularly prone to experience high income stream uncertainty caused by resource limitations, and liabilities related to lack of experience and foreignness. In their study of managerial risk taking, Palmer and Wiseman (1999) find that managers experiencing a high level of income stream uncertainty seek to reduce uncertainty by pursuing strategies that reduce income variability.

Network relationships can be an effective mechanism to manage risks of internationalization (Oviatt, Shrader & McDougall 2004). First, networks allow firms to tap into resources that they do not own (Oviatt, Shrader & McDougall 2004). Second, network relationships can reduce uncertainty in an unfamiliar business environment as foreign market knowledge can be acquired from a local network partner (Johanson & Vahlne 2009). Third, network relationships can increase the firms' strategic flexibility in entering a market, as well as facilitate exit from particular markets (Miles, Preece & Baetz 1999; Shrader 2001). Nevertheless, network reliance is also associated with risk, as sharing knowledge and technology with a partner involves dissemination risk - the risk that valuable know-how will be expropriated by a partner (Shrader 2001). Shrader (2001) argues that an uncertain business environment increases the chances of such opportunism,

and that a manager's bounded rationality (March, Simon & Guetzkow 1958) complicates evaluation of the benefits of a partnership –increasing the risk of selecting a less-than-ideal partner.

2.4.4 Management Team Factors



Figure 10 - Influencing forces on management team factors

Several scholars argue that managerial choices mediate the influences of environment conditions (Baird & Thomas 1985; Oviatt, Shrader & McDougall 2004). Palmer and Wiseman (1999) argue that managers choose strategies – and thereby influence the firm's risk exposure – in their effort to align the organization to its environment. Oviatt *et al.* (2004) point out that a small group of managers often holds a more dominant position regarding decision-making in smaller firms. Thus, *personal characteristics* (e.g. experience, education and age) and *psychological traits* (e.g. risk-taking propensity and overconfidence) of managers are important influences to how risk factors are managed in the internationalization process (Figure 10).

Relevant managerial experience might reduce complexity, ambiguity and the likelihood of loss in a given situation (Oviatt, Shrader & McDougall 2004), and the lack thereof might therefore increase perceived the risk. Oviatt *et al.* point to two important types of relevant experience which have been found to have positive effects: Previous international experience, and relevant industry experience. The former has been found to reduce the uncertainty of doing business internationally (Sambharya 1996), while the latter has been found to increase alertness to business opportunities (Ronstadt 1988). Oviatt *et al.* argue that education is positively related to higher tolerance of ambiguity, referring to research by Wiersema and Bantel (1992), and may contribute to lower risk perception in the internationalization context, as found by Simpson and Kujawa (1974). Baird and Thomas (1985) suggest that age is negatively related to risk-taking, and this is supported by MacCrimmon and Wehrung's (1990) study of 500 U.S. and Canadian business executives where mature executives were found to be more risk averse than younger managers.

While experience, education and age are acquired characteristics, psychological traits are innate in nature (Oviatt, Shrader & McDougall 2004). In Shapira's (1995) study of managerial decision-making, based on 50 in depth-interviews with 50 top executives and a following survey of 650 managers, managers were found to believe that they could alter or manage uncertainties inherent in business operations. Managers who strongly believe that they can manage business uncertainties may overestimate their risk management abilities and take unacceptable risks. Higher risk-taking propensity is believed to result in greater risk-taking (Forlani & Mullins 2000;

Oviatt, Shrader & McDougall 2004), and Forlani and Mullins suggest that this is because greater entrepreneurial risk propensity is associated with lower perceived risk in a given situation. Further, risk-taking seems to be associated with perceived firm performance level, as performance below a preset objective is found to increase risk-taking (Bromiley, Miller & Rau 2005).

2.5 Identifying, Evaluating and Mitigating Risk



Figure 11 - Phases of the risk assessment process. Adapted from Rowe (1977)

The next sections will provide a background for answering the study's two research questions, following a three step analytical approach to risk inspired by Rowe (1977). Rowe's three phases have been adopted by researchers of international business and risk professionals; some keeping the original phases (Baird & Thomas 1985; Milliken 1987; HBR Analytic Services 2011), others using it is a base for adding more steps (COSO 2004; Mascarenhas 1982). Although Rowe's (1977) three step process has been used, researchers have often relabeled Rowe's initial labels of *risk identification, risk estimation*, and *risk evaluation*. We adopt Rowe's three-step approach, but choose to label the second step *risk evaluation*, and the final step *risk mitigation*. In accordance with the study's research questions, the first topic treated is risk identification, followed by risk evaluation and risk mitigation.

2.5.1 Risk Identification

The objective of the risk identification phase is to reduce the *state uncertainty* (Milliken 1987, p. 136) – the unpredictability of the

organization's environment. This can be achieved by identifying sources of uncertainty that the firm faces (Aven & Renn 2011), and the nature and controllability of these uncertainties (Baird & Thomas 1985). The risk identification phase is critical in any risk management effort, as it determines which risk factors to evaluate in the second phase, and which factors sought mitigated in the third phase.

A systematic approach to risk identification involves assessing a large number of actors and firm relationships, including suppliers, customers and network partners (HBR Analytic Services 2011), and mapping of events – both internal and external to the firm– that may affect the achievement of firm goals (COSO 2004). Despite the obvious interest to identify all relevant risk factors, the risk identification phase is likely to be constrained by firm resources and managers' cognitive abilities, increasing the chance of overlooking relevant risk factors (March & Shapira 1987). In order to limit the risk of overlooking important risk factors, the generic overview of risk factors provided by the previously mentioned risk models (Baird & Thomas 1985; Cavusgil Knight & Riesenberger 2008; Miller 1992; Oviatt & McDougall 2005) might be helpful – especially for smaller firms with limited international experience.

Milliken (1987) argues that an external environment perceived to be unpredictable will affect both the risk identification process and the surrounding strategic planning process. First, Milliken argues that state uncertainty will increase the amount of time and resources used on environmental scanning. Secondly, Milliken recognizes that a high degree of state uncertainty will

make a *muddling through* (Lindblom 1959) approach more suitable for managers than linear strategy formulation activities:

"If one is uncertain about the nature of environmental changes (...) it will be extremely difficult to identify threats and opportunities with any degree of confidence. Nevertheless, because of the value attached to the idea of strategic planning, administrators may proceed with their strategic planning endeavors, but the strategic planning is likely to resemble more closely a 'muddling through' mode of strategic thinking than the linear mode recommended in strategy books' (Milliken 1987, p. 139).

Although a high state uncertainty will increase the amount of resources allocated to the risk identification process, Milliken emphasizes that the time and resources allocated are only a function of how managers perceive the state uncertainty – not a function of objective environmental characteristics. The role of perception is also recognized by Cooper, Who and Dunkelberg (1988) who based on a large quantitative survey argue that entrepreneurs are not more risk seeking than other managers, but instead "perceive their prospect for success as substantially better than those for similar businesses" (Cooper, Woo & Dunkelberg 1988, p. 106). Tversky and Kahneman (1986) also recognize the importance of perception in explaining how problem framing influences managerial decisions. Although Tversky and Kahneman relate framing to managerial decision-making, the definition of framing shows its relevance to the risk identification process:

"The first phase consists of a preliminary analysis of the decision problem, which frames the effective acts, contingencies, and outcomes. Framing is controlled by the manner in which the choice problem is presented as well as by norms, habits, and expectancies of the decision-maker" (Tversky & Khaneman 1986, p. 257).

The risk identification process is concerned with identifying contingencies of environmental events, and influenced by the management team's expectancies through an effect called *priming* (Kahneman 2011, p. 52). This effect is recognized when "exposure to a word causes immediate and measurable changes in the ease with which many related words can be evoked" (Kahneman 2011, p. 52). As priming is not limited to words (Kahneman 2011), this implies that previous experiences and attitudes towards risk can prime the outcome of a risk identification analysis. Hence, the attitude towards the word risk, or experiences with a certain kind of risk, might influence the perception of risk and the thoroughness of the risk identification process.

Impact for Case Study

Based on the above discussion of the risk identification phase, the following proposals can be made. The proposals will be addressed in the discussion section of the paper.

- Firm resources will influence the risk identification phase, making resource-strapped firms perform a constrained risk identification process.
- The use of a risk factor framework will help a firm identify relevant risks in an internationalization process.
- The perceived level of uncertainty will be a function of firm and managerial experience, and a high level of uncertainty will increase the amount of resources spent on risk identification
- The perceived level of uncertainty in the internationalization process will affect the formality of the risk identification process, making it less systematic under high uncertainty.

2.5.2 Risk Evaluation

The objective of the risk evaluation phase is to reduce the *effect uncertainty* (Milliken 1987, p. 137) – related to how future changes in the environment will affect the organization. In this phase, the possible impacts of the uncertainties identified in the first phase are evaluated (Mascarenhas 1982), in an effort to reduce the effect uncertainty. By weighting the identified risks against the prospective gains of going through with the process in question, a decision to go through with the process or not can ultimately be taken (Tanzi & Textoris 2012).

Miller states that "optimal risk management practices involve simultaneous consideration of the full spectrum of corporate exposures to environmental uncertainties" (Miller 1993, p. 708). However, bounded rationality makes it necessary to develop decision procedures that reflect cognitive constraints (March 1978), implying that managers are more likely to follow Simon's (1956) satisficing principle of searching through fewer alternatives until a satisfactory outcome is found (Shapira 1995). In the context of risk evaluation, this means that focus is put on selected factors in the risk evaluation phase (March & Shapira 1987). If only a select number of risk factors are evaluated, it is critically important that the risk factors considered to be most important by managers during the risk assessment phase actually are relevant to the risk exposure of the firm.

There are multiple approaches to evaluating risk, ranging from the use of systematic evaluation methods such as standard deviation⁵ measures (Taleb, Goldstein & Spitznagel 2009), internally developed frameworks and industry benchmarks (HBR Analytic Services 2011) to unsystematic, muddling through approaches (Milliken 1987). However, the inherent complexity of the international business environment (Palmer & Wiseman 1999) and the multidimensional nature of risk (Bromiley, Miller & Rau 2005) make the risk evaluation process challenging.

First, although one can expect a firm to strive for increased profit and growth (Oviatt et al. 2004), risk evaluations are based on a wider range of dimensions and criteria than a financial net present value calculation. Shapira (1995) found that managers have little interest in quantifying risk factors into a single construct. A possible explanation is that reducing risk to a number does not make complex strategic decisions any easier, particularly because of the complex linkages between risk factors (Miller 1992). Referring to risk management in general, Taleb et al. (2009) warn against using standard deviation measures in risk evaluation, stating that "anyone looking for a single number to represent risk is inviting disaster" (Taleb, Goldstein & Spitznagel 2009, p. 80). As firmlevel risk has multiple dimensions (Bromiley, Miller & Rau 2005), reducing risk to a single construct increases the chance of omitting important risk dimensions.

Second, assessing risk caused by environmental uncertainties is further complicated by the lack of effective measurement instruments of such uncertainties (Miller 1993). Multiple researchers (Di Gregorio 2005; Henisz & Zelner 2010; Oetzel, Bettis & Zenner 2001; Taleb, Goldstein & Spitznagel 2009) have dismissed country level measurements of environmental risk available through commercially available country ratings as ineffective. The country risk ratings are based on macroeconomic indicators and the risk perception of a group of investors (Henisz 2002), and therefore not necessarily a valid for extrapolation of risk levels. Furthermore, country risk ratings have been criticized for having a poor track record (Di Gregorio 2005; Henisz & Zelner 2010),

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⁵ The square root of average squared variations in a dataset (Taleb, Goldstein & Spitznagel 2009)

being too generic (Henisz & Zelner 2010) and in some cases giving the users a false sense of security by obstructing the true level of uncertainty that a firm faces (Oetzel, Bettis & Zenner 2001).

Third, a combination of risk factors can have a greater impact on a firm when acting together than they would have individually (HBR Analytic Services 2011), due to interaction effects between different risk categories (Baird & Thomas 1985) leading to a multiplying effect from *sequential risks*. The impact from sequential risks is also highly context sensitive, for example with regard to the timing of different risk events. As consequence, proposed measures of different risk factors may not be relevant to firms in a given setting.

According to Milliken (1987), uncertainty stems from lack of information for accurate prediction of a phenomena, or an ability to evaluate the relevance of available information. Thus, when a sufficient level of information is available, the critical and most relevant insight will be how environmental changes affect the particular organization (Milliken 1987). Accordingly, the essence of the risk evaluation process is to separate irrelevant risk factors from factors that actually will have an effect on firm performance. This is particularly important with regard to effect uncertainty:

"The experience of effect uncertainty, on the other hand, does not necessarily involve a lack of information about environmental conditions (in fact, the administrator may have all he/she can handle); rather, the shortage of critical information is in knowledge of how environmental events, changes, or sets of changes will affect the particular organization, if at all" (Milliken 1987, p. 138).

Regarding the evaluation of the various risk factors, Tversky and Khaneman's (1986) prospect theory provides an interesting perspective. The theory was developed as a response to a large practitioner deviation from the normative, rational decision-making model:

"(...) The deviation from the normative model are too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system" (Tversky & Khaneman 1986, p. 252).

In the prospect theory, two distinct phases are separated. First, a preliminary analysis frames contingencies and outcomes of environmental changes. All outcomes are expressed according to their positive (gain) or negative (loss) deviation from a neutral reference outcome. Second, the framed 'prospects' are evaluated, and the prospect with the highest perceived value is chosen. Thus, the framing – dependent on the decision maker's norms, habits and expectancies – will have a large impact on the later evaluation of the prospects, or in this case environmental variables. The value function used to evaluate gains and losses has a concave curvature for gains, but a steeper convex curvature for losses in order to account for loss aversion –a more extreme response to losses than gains (see Figure 12). Thus, it is clear that an investment representing a potential loss of x million, will need to be offset by a gain of $x + \Delta x$, where Δx is firm dependent.

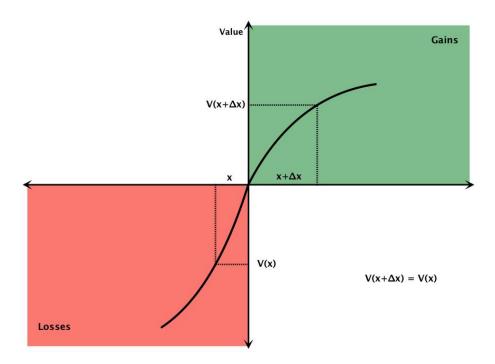


Figure 12 - Prospect theory value function. Adapted from Tversky & Khaneman (1986)

Impact for Case Study

We propose that the challenges of effectively measuring identified risk factors will be reflected in the case companies' behavior as follows:

- Firm context and managerial characteristics will influence the risk evaluation process by shifting the neutral reference point used to evaluate gains and losses.
- The risks and benefits of internationalization are not likely to be reduced to a single construct
- The firm's risk exposure will be determined by an overall evaluation of distinct risk components, resulting in a focus on a few, key risk factors
- Evaluating the relevance of available information is a challenge in the risk evaluation phase, rather than lack of information

2.5.3 Risk Mitigation

The objective of the risk mitigation process is to develop strategies for effective risk mitigation, allowing firms to strike the optimal balance between growth, return goals and related risks (COSO 2004). In order to achieve this, it is necessary to reduce the *response uncertainty* (Milliken 1987, p. 137) – the lack of knowledge of response options and/or inability to predict the consequences of a response choice.

Following the chosen risk definition, the level of risk is determined by two components; the level of uncertainty and potential loss (Forlani & Mullins 2000). Thus, risk can be reduced by lowering the level of uncertainty and/or the potential loss. This is the basis for choosing a risk mitigation strategy - a decision complicated in cases of high response uncertainty. In order to reduce response uncertainty, researchers have suggested activities ranging from boundary spanning and information acquisition activities (Milliken 1987) to emulation and deferral activities (Miller 1992). The three first activities are focused towards how other organizations – partners,

competitors or others – have responded to similar situations and the consequences of the responses (Miller 1992; Milliken 1987). If these activities are pursued, it is important to keep two aspects in mind. First, there must be an organization to emulate, and a misfit between the organizational resources and capabilities of the focal firm and the emulated firm might have unwanted consequences (Etemad 2004). Second, risk management strategies are not directly transferable given the previously discussed context sensitivity and cascading effect of the various risk factors (Baird & Thomas 1985; Oviatt, Shrader & McDougall 2004). The last activity, deferral, is to delay strategy implementation until further strategy alternatives are evaluated, which Milliken (1987) argues is especially relevant when the stakes are perceived as high and an inappropriate risk response is seen as very costly.

Ultimately, the strategic risk response is intended to align the firm's risk appetite and strategy (COSO 2004), and the chosen risk mitigation strategy must therefore reflect the firms' risk tolerance (Johanson & Vahlne 1977). Some risk factors will be accepted, some will be sought reduced or shared, and some risk factors will be found to be of such magnitude that they are rejected. In Figure 13, four risk mitigation strategies are seen as a result of choices made in the strategic risk analysis, where risk and gains are evaluated against each other before a response is chosen. Possible risk mitigation responses are outlined in the following sections.



Figure 13 – Selection of risk mitigation strategy

Risk Rejection

The strategy of risk rejection is simply to refuse to accept the risks involved in a specific activity and choose not go through with the activity. The choice of risk management strategy is an outcome of the risk evaluation phase, and a decision to reject risk means that the perceived uncertainty is too high compared to the expected return of the activity (Mascarenhas 1982). Risk rejection implies that firms that have not entered a market where they find the risk of the product or geographic market to be unacceptable will postpone entry until uncertainty is at an acceptable level (Miller 1992). Milliken's (1987) deferral strategy of delaying process execution until a satisfactory strategy alternative is found, is a variant of the risk rejection strategy.

Risk Sharing

Risk sharing involves entering into multilateral agreements as a means of reducing uncertainty (Miller 1992). According to Miller (1992) some of the most commonly used cooperative risk

management strategies are long term partnerships with suppliers and customers, alliances and joint ventures, and technology licensing agreements. Risk sharing strategies are considered to be appropriate risk management tools when "the nature of the risk is more ambiguous and when information asymmetries persist" (Di Gregorio 2005, p. 219), suggesting that local firms are likely to have an advantage from relevant experience. While the benefits of collaboration, such as lower resource commitments and market exit barriers imply actual risk reduction, this must be balanced against increased dissemination risk and the need for an effective governance structure of the risk partnership still apply. Still, Di Gregorio (2005) argues that risk transfer is a particularly relevant risk reduction strategy to SMEs due to resource constraints and limited capability to reduce risk by other means. This is in line with Boisot and Child's (1999) recommendation of an absorption strategy for small firms facing environmental complexity. In this strategy, the firm should try to gain access to relevant information, advice and support from relationship and alliances with local actors. This is better suited for small firms than a complexity reduction strategy (imposing familiar routines and standards on foreign subsidiaries), as SMEs may not have developed organizational routines suited to be applied on other entities (Boisot & Child 1999). In addition, the complexity reduction strategy requires complete control over another organizational entity, which would not be the case in cooperative arrangements (e.g. joint ventures) (Boisot & Child 1999).

Risk Reduction and Control

Risk reduction strategies are likely to be employed when the perceived level of risk is near or above the maximum tolerable risk the firm is willing to take (Johanson & Vahlne 1977). A possible risk reduction strategy is to reduce the firm's commitment to the foreign market commitment. In the pre-entry phase, this usually means allocating less financial and human resources to the internationalization effort. At the point of international entry, risk can be reduced by making a minimal resource commitment, keeping the potential financial loss of an entry failure to a minimum. An important potential effect of the resource commitment is increased market knowledge, which according to Johanson and Vahlne (1977) can reduce the perceived uncertainty and prepare the firm for a greater market commitment.

Further, firms may try to reduce uncertainty by attempting to affect environmental contingencies through *control strategies* (Miller 1992). The control strategies, such as lobbying or using market power to make aggressive moves toward competitors, are implemented to shift industry dynamics to deter entry and control competitors (Porter 1980). Although Miller (1992) makes a distinction between financial and strategic risk responses, we consider financial risk management as part of the overall risk reduction effort. *Financial hedging* instruments (e.g. forward contracts and options) are widely used to manage currency commodity price fluctuations, as they "insulate the firm from potentially detrimental events in exchange for a premium that reflects the nature of the risk and the company's stake" (Di Gregorio 2005, p. 218). However, hedging instruments are mostly relevant to managing currency risk (Miller 1992), and are not offered in the full spectrum of risk factors that a firm might be exposed to. As a consequence, firms generally use changes in strategies to reduce risk (Miller 1993).

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⁶ "Making offsetting commitments in order to minimize the impact of unfavourable potential outcomes" (Clark & Marois 1996, p. 361), as cited by Di Gregorio (2005)

Last, Miller (1992) found that risk handling strategies are likely to involve situations where reduction of exposure to one risk factor increases the exposure to another risk factor – risk trade-offs. These findings were also supported by Shrader *et al.* (2000) who, through empirical tests on a sample of 87 US international new ventures, found interdependency of risk factors and risk trade-offs suggested by Miller (1992). The findings revealed that risk was managed by determining trade-offs in the political and economic risk of the country of entry, the degree of market commitment in terms of entry mode and foreign revenue exposure in the specified country. This implies that the risk of operations in a high-risk country – due to political and economic risk – might need to be offset by a decreased market commitment and foreign revenue exposure to keep the overall risk level below a risk exposure threshold.

Risk Acceptance

Given that all uncertainty cannot be eliminated (Figueira-de-Lemos, Johanson & Vahlne 2011), some of the decisions taken in an internationalization process must necessarily involve risk acceptance – an indication that the expected gains are considered to be greater than the associated risk. According to Di Gregorio (2005), small, flexible firms may actually thrive in a business environment of high uncertainty, as they adapt the changing environment more quickly than their larger counterparts. Figueira-de-Lemos *et al.*'s (2011) concept of contingent uncertainty, that can be reduced through knowledge and skills, indicates that the degree to which risks are accepted depends on the firm's capability to acquire and process relevant information, thus making information acquisition and processing a possible success factor of internationalization.

Figueira-de-Lemos *et al.* (2011) argue that risk acceptance and subsequent market entry will lead to increased market knowledge and therefore reduce the perceived risk of operating in the foreign market. Following this line of thought, one could expect a steadily increasing market commitment after initial entry. However, as Johansson and Vahlne also acknowledge, experience from other markets with similar conditions can decrease the need for market knowledge when entering a new market - as international experience can be an important contributor to a lower perceived risk level and a higher inclination to accept risk.

Impact for Case Study

The above discussion of risk mitigation strategies suggests several implications that will be addressed in the case company discussion:

- Firms will employ several of the presented risk mitigation strategies to mitigate the identified risk factors
- Response uncertainty will lead to information acquisition and boundary spanning activities, in search of relevant experience from firms that have faced a similar situation
- Risk aversion implies that resource commitments are inversely related to the managers' perceived risk in the internationalization process

3 Research Method

This case study of Norwegian SMEs in the process of entering the Brazilian petroleum sector largely follows Eisenhardt's (1989) proposed case study phases (Figure 14). Although the study has followed the sequence of activities suggested by Eisenhardt, it is presented according to the master thesis structure.

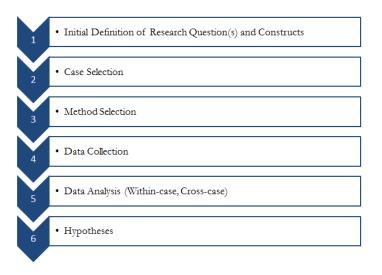


Figure 14 - Phases of the case study. Adapted from Eisenhardt (1989)

The research questions and necessary constructs were presented in the introduction. The next sections will explain the processes of method selection, as well as data collection and analysis. Data collection and -analysis is presented in two separate parts; one focused the literature study, and one focused on the empirical study. The case company selection is presented under the empirical study. Lastly, hypotheses are presented in the theoretical background where they are called propositions, before they are revisited in the case study analysis. The conclusions in the end of the case study analysis ties the propositions presented in the theoretical background to case study findings – eventually resulting in implications for practitioners, policy makers and future researchers.

3.1 Selection of a Qualitative Research Design

The research methodology of a study needs to fit the research objectives (Birkinshaw, Brannen & Tung 2011; Yin 2009) - in our case to understand how Norwegian SMEs identify, evaluate and mitigate risk factors in a foreign market expansion. These research objectives can be achieved through both qualitative and quantitative research methods, but the current state of the risk research area favors a qualitative approach. Most of the risk research is old, and few researchers have focused on the risk assessment process of SMEs prior to actual foreign market entry. Newer contributions - like the risk framework of Oviatt, Shrader and McDougall (2004) - have not been tested empirically, and therefore lack general validity.

A quantitative research method will require variables to be defined, operationalized, measured and coded prior to data collection (Doz 2011) – an activity that is complicated by a lack of recent, quantitative risk research. Secondly, the reductionist and standard methods of quantitative research may fail to acknowledge individual variability or the influence of context (Dixon-Woods et al. 2006). Furthermore, Birkinshaw et al. (2011, p. 573) argue that "it is often inappropriate to engage

in large-scale, cross-sectional studies or reductionists methods in the absence of well-developed theory" in order to understand emergent and evolving phenomena scattered over distance and differentiated in context.

We therefore argue that a qualitative approach is preferable, as the approach is well suited to comprehend both the internal and external climate in which the internationalization process unfolds, thus "opening the black box of organizational processes, the 'how', 'who' and 'why' of individual and collective organized actions as it unfolds over time in context" (Doz 2011, p. 70). Such an approach "allows us to build and test new theories, illustrate and exemplify new phenomena and surface contextual differences (...)" (Birkinshaw, Brannen & Tung 2011, p. 576). These are all important traits in absence of theory applied to the particular context of our research objectives.

3.2 Selection of a Case Study Research Design

"Case studies can (...) be defined as a research method that involves investigating one or a small number of social entities or situations about which data are collected using multiple sources of data and developing a holistic description through an iterative research process." (Easton, 2010)

In a summary of qualitative research methods, Yin (2009) emphasizes that it is not the purpose of the study - whether the study is exploratory, descriptive or explanatory - that matters. It is rather the form of the research question, the investigator's control over events and the temporal focus of the research that is important to the method selection.

This study asks how the case companies identify, evaluate and mitigate risk – and thus implicitly why they make choices of specific entry strategies and commitments in the internationalization process. For a study of a "how" and "why" nature, in which the investigators have no control over the events unfolding, and where the focus is contemporary, the case study is the preferred research method (Yin 2009).

Furthermore, Bradshaw and Wallace (1991) find case studies useful for studying phenomena with partial support or deviation from existing theory. This situation is likely to arise in our case due to the unconventional focus on risk assessments prior to the foreign market entry. In support of Bradshaw and Wallace, Dubois and Gillbert (2010) argue that case studies provide an opportunity to "confront theory with empirical data in an evolving fashion in which the aim is to capture relevant features of a case through a particular framework" (p. 131). Lastly, as the case study deals with real management situations it has the potential to create knowledge that practitioners will consider useful (Bradshaw & Wallace 1991).

3.3 Literature Study

The literature study began with a search of relevant articles within the research areas of international business and risk management. A dual search strategy was applied, before the resulting literature was evaluated against selection criteria – eventually leading to a subset of articles which formed the basis of the theoretical background (Figure 15).

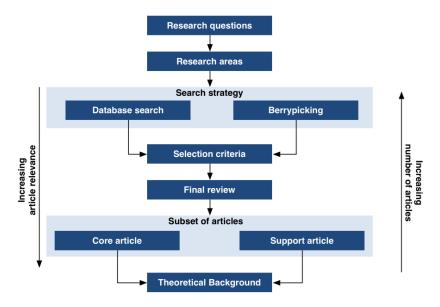


Figure 15 - Literature search structure

A literature study is performed prior to the data collection phase in order to construct an intertextual coherence (Bryman & Bell 2003, p. 98) - researching existing knowledge and organizing it in order to show how different research relate to each other and our case. Yin (2009) argues that:

"(...) for case studies, theory development as a part of the design phase is essential, whether the ensuing study's purpose is to develop or test theory" (Yin 2009, p. 35).

He further states that this is a point of difference between case studies and related methods, and a point often skipped by students encouraged to make early field contacts. From the case study in our specialization project, we learned the benefits of such an approach. It enables the researcher to specify theoretical propositions that can be challenged by the following data collection and analysis. Having clarified both research questions and theoretical propositions is of great help in constructing the interview guide, and reduces the number of follow-up interviews needed.

In addition to offering a 'sufficient blueprint' (Yin 2009) for what data to collect in the data collection phase, the literature search is of high importance for the data analysis phase. A fallacy of case studies is to assume that results are generalizable through statistical generalization (Yin 2009). The literature study allows us to do analytic generalization (Yin 2009) - by comparing theory with the case study's empirical results - thus enabling us to identify both support towards existing theories and new rival theories.

3.3.1 Search Strategy

Bryman and Bell (2003) recommend carrying out a comprehensive, unbiased search that is described in terms facilitating replication. The use of a systematic review process ensures a reliable foundation for the research, which is especially important considering the widely questioned empirical validity of case studies (Bryman & Bell 2003).

Also Walsh and Downe (2005) recommend researchers of literature reviews to undertake robust searches in the early stages of a systematic review. However, the authors also acknowledge that a robust search might be inadequate for identifying all relevant literature, as databases commonly

used for meta-analytic searches tend to be concentrated on journal articles. Important studies might be of a form to lengthy for a journal article and might rather be in the form of books, book chapters, reports and non-published theses (Walsh & Downe, 2005). Hence, we have chosen an augmented search strategy incorporating both a standard database search in the Scopus database (Appendix 11.3) and *berrypicking* (Bates 1989) - an iterative review process based on the reference lists of articles from the literature search. In the latter approach the reference list of key articles were searched for references to important articles not discovered in the ordinary database search. This is in line with suggestions from Bryman and Bell, who suggest to "*identify the major ones [articles] and work outward from there*" (Bryman & Bell 2003, p. 113). The field of risk management research was new to the authors, which mean that the literature search criteria had to be adjusted incrementally in order to find the most relevant articles. The berrypicking method proved to be a valuable contribution to the database search by allowing relevant articles to point in direction of other relevant literature.

3.3.2 Selection Criteria

The first literature search, where the first column of keywords was included, yielded 187 articles. When removing the SME criteria, however, the search yielded 7,731 articles – a clear indication of little literature focusing on risk evaluations in SMEs. The articles found in the database search and the articles found in the iterative reference list search were all evaluated according to the criteria outlined in Table 2.

Criteria	Explanation
Applicability	An abstract elimination performed based on the keywords used in the database and the
	article abstract. Applicability evaluated both according to the research questions, and
	towards more general descriptions of the internationalization, decision-making or the
	risk-identification, evaluation and mitigation process.
Journal	Articles published in top journals ⁷ were considered to be of higher quality than articles
	published in other journals. Hence, articles not published in top journals needed to
	have a very good link towards the research questions in order to be included.
Citations	Articles with a high number of citations considered being of higher quality. Articles
	with a lower number only included if they were of recently published or offered
	important alternative perspectives to the already included literature.
Authors	Authors like Cavusgil, Coviello, Eisenhardt, Johanson, Knight, McDougall, Oviatt,
	Shrader and Vahlne were recognized as important due to their recognition within the
	IB field. The criterion was closely linked to the number of citations, and for authors
	unknown to us the number of citations was considered.

Table 2 – Criteria for literature search

3.3.3 Review Procedure

In the first phase of the literature search, one of the authors read each article that passed the selection criteria. After reading each article that could be useful within the scope of the research questions, the article was classified within an article review framework (Appendix 10.12). When all articles were read, the worksheet containing the completed review framework was evaluated by both authors using a meta-ethnographic approach (Bryman & Bell 2003, p. 102). The different studies were compared – looking for a shared understanding of a problem, or opposing views – before a synthesis was made explaining how the articles related to each other. This ensured that

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⁷ These include Journal of International Business Studies (JIBS), European Journal of Marketing, The Academy of Management Review, Journal of International Marketing, International Business Review, Strategic Management Journal, Management Science, all ranked as top journals within the fields of international business (Dubois, F. L. & Reeb 2000) and management studies (Yuyenyongwatana & Carraher 2008)

patterns were identified, and facilitated the process of evaluating which articles to bring into the theoretical background of the case study.

Based on the evaluation outlined above, a subset of articles were chosen to be either core articles of the theoretical background or support articles. Both authors read the core articles before they were included in the theoretical background, in order to ensure that both authors agreed on the articles' key takeaways, and the intended use.

3.4 Empirical Study

The empirical study is mainly focused towards the case firms' risk assessments in their preparation for a Brazilian market entry. However, in order to put the firms' risk assessments into a proper context, we found it necessary to develop a contextual background on the Brazilian petroleum market and business culture. In preparation of both the case study and the Brazilian background, both interviews and written sources have been important.

In the following sections, the focus is put on how the case firm empirical data is treated in relation to other background material; both theoretical and contextual. An overview of this process is shown in Figure 16. Although the development of the Brazilian background context is not explicitly treated, it followed the same outline as the case firm study.

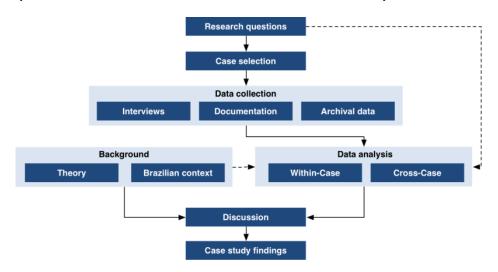


Figure 16 - Empirical study structure

3.4.1 Case Selection and Representativeness

The authors were given the opportunity to follow a group of ten Norwegian O&G SMEs - in the first steps of a Brazilian market entry – participating in the Innovasjon Norge-led Navigator program. A sub-sample consisting of four of the firms participating in the project was chosen, a number consistent with a desire to generate empirically grounded theory (Eisenhardt 1989).

The final four case firms were chosen on the basis of theoretical sampling; a focus on finding useful samples that can form a solid foundation to the theory-building (Eisenhardt 1989). This is in line with recommendations from Eisenhardt (1989), who argues that random selection is neither necessary nor preferable, and suggests to use the limited number of cases to replicate or extend emergent theory.

Company	Sampling argument
Cybernetica	Considered cooperation with a local supplier
Norske Ventiler	Considerable international experience
SafeClean	Had made significant progress in the internationalization process
Sperre	Has made their first Brazilian sale, without being established in the Brazilian market

Figure 17 - Case firms and sampling arguments

As all of our case firms operate in the Norwegian O&G industry, and the case firms were selected with the intention of being as diversified as possible. Consequently, firms have been selected based on their products being different from other case firms, and differences with regard to international experience and current phase of the Brazilian expansion. The case firms, and the theoretical sampling argument used, are shown in Table 2. It is important to notice that the sampling arguments are based on a presentation given by the firm at a Navigator project meeting, and the authors' investigation of publically available sources. Although the actual phase in the internationalization process, and the number of firms considering cooperation with a local supplier might turned out to be different than first anticipated, the initial sampling still corresponds to a desire of studying a diversified sample of Navigator firms.

3.4.2 Data Collection

The data collection process was designed to follow Yin's (2009) three principles of data collection, enabling appropriate use of the collected case data:

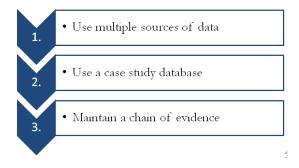


Figure 18 - Principles of data collection. Adapted from Yin (2009)

First, the use of multiple sources - including interviews with case firm representatives involved in the internationalization process, as well as documentation and archival data from both case firms and external sources – results in a more accurate and convincing case than relying only on single sources of data (Yin 2009). Secondly, a chain of evidence was maintained through both through a rigorous explanation of the methodology used, and by the classification of interview citations into A- and B-categories (making it easy to follow the chain of arguments). Lastly, case study database was developed for internal use by the authors. Although Yin (2009) emphasizes the importance of creating a case study database to increase case study reliability by enabling independent inspection, such an approach is not attuned to studies where sensitive information is bound by confidentially agreements with case firms. We therefore focus on maintaining a chain of evidence and a high degree of transparency throughout the case study.

Data collection ended when a when we reached a level of saturation where additional information to the data did no longer provide new, substantial insight (Glaser & Strauss 1967). The following sub sections details the process of data collection from interviews and written sources.

Non written Sources - Interviews

Interviews were the main source of empirical data on the case firms' internationalization and risk assessment processes. The interviewees were all managers involved in the Brazilian expansion process of the firm, and participating in the Navigator project meetings conducted by Innovasjon Norge. Hence, all interviewees had intimate knowledge of their firm's background, internationalization process and risk assessment process. Gathering the knowledge in an ongoing risk assessment process, from persons directly involved, ensures data collection close to real management situations – a trait Gibbert *et al.* (2008) emphasize as vital to attempts to create managerially relevant knowledge.

The interviews were performed using focused interviews (Merton, Fiske & Kendall 1990; Yin 2009), with a semi-structured interview technique (Bryman 2008). An interview guide (Appendix 11.4) directed the topics of the semi-structured interviews. The interview guide covered general topics (firm history, financial data, product offerings and market characteristics) in order to ensure a thorough understanding of the firm and its context. Nevertheless, the main focus in the interviews was kept on the Brazilian market entry and the pertaining risk assessments. In some of the interviews, a third student, writing another master thesis studying the choice of market entry mode among Navigator firms participated. Since the two topics were similar, the interview guide was constructed as a joint interview guide – reflecting both master theses. We consider this a strength as it increases the knowledge of the contextual background influencing their choices and risk assessment process.

The interviews were conducted via Skype, with the exception of a local firm, and typically lasted between one and two hours. The interviews were all recorded after given permission by the interviewee. The first part of the interviews focused on the general company background in order to ensure a thorough understanding of the firm's general environment, thus getting an idea of important risk factors prior to asking risk specific questions. The general background focus led to some questions already being answered when they were reached in the interview guide. For questions that were already partially answered, a summary of the given answers were included in a question asking whether the answers had been interpreted correctly. Questions with unclear answers were repeated along with the unasked questions to reduce the chance of misinterpretation. The interviews were later transcribed ad verbum from the recording.

As each interview was conducted by at least two persons investigator triangulation (Patton 2002) was naturally achieved. The transcribed interviews were read and discussed by both authors, before they were sent to the interviewee for inspection. After being able to read the transcribed interviews, each case firm was contacted for a follow-up interview with the purpose of clarifying certain issues and gaining additional information.

Written Sources - Documentation and Archival Data

Written sources in the form of annual reports, newspaper articles, company analyses and other company information – from the case firms themselves, Innovasjon Norge or other external sources - were used extensively before, during, and after conducting interviews. The multiple sources of evidence enabled *data triangulation* (Patton 2002) as information gathered in interviews were used in conjunction with documentary evidence – and vice versa.

Before the interviews, various types of documents provided a useful background to the case firm's financial results, organization, and in many cases, their competitive environment. In addition to help answer some of the interview questions prior to the interview, particularly relevant topics or incidents were identified. During interviews, information gathered before the interview was used to check and follow up topics where diverging answers were given (or interpreted). After the interviews, documents - such as news articles and the Brazilian context part of the master thesis - provided valuable insight into topics discussed in the interviews, and topics left out. This enabled the authors to critically assess opinions regarding the Brazilian culture and market, and the risks identification and evaluation processes of the case firms.

When using written accounts, the purpose and audience of the accounts were sought understood, a strategy which according to Yin (2009) reduces the chance of being misled and is likely to result in a more critical interpretation of such accounts.

3.4.3 Data Analysis

Data analysis is according to Eisenhardt "(...) both the most difficult and the least codified part of the [theory building] process" (Eisenhardt 1989, p. 539). Many of the challenges related to the process stem from the little attention normally paid by researchers to discussion of data analysis relative to research sites and data collection methods (Eisenhardt 1989). Eisenhard notes that "one cannot ordinarily follow how a researcher got from 3600 pages of field notes to the final conclusions, sprinkled with vivid quotes though they may be" (Eisenhardt 1989, p. 539).

Case study methods and theory building activities have been criticized for lack of methodological rigor and generalizability (Bryman & Bell 2003; Dubois, A. & Gibbert 2010; Yin 2009). Hence, it is important that case studies present a transparent overview of how the data analysis is carried out. In the following sub-sections the data analysis is explained in two parts; the within-case analysis and the cross-case analysis.

Within-Case Analysis

The large amount of data from the collection process often triggers a need for within-case analysis (Eisenhardt 1989). The within-case analysis started with transcription of the interview recordings, before a narrative story was written of each firm's history, sales strategy, international activities and risk assessment activities for the Brazilian expansion. The importance for such narrative descriptions is recognized by both Eisenhardt (1989) and Coviello (2006). While Eisenhardt regards them as important aids in coping with an enormous volume of data, Coviello recognizes that "biographic histories are a practical way to study the process of entrepreneurial behavior, because chronological events can be used as stepping stones in the search for patterns over time" (Coviello 2006, p. 718). In addition to facilitating pattern finding, the narratives made it easier for case firm representatives to identify misconceptions of the case companies and their histories.

Glazer and Strauss suggest researchers to follow a *grounded theory* (Glaser & Strauss 1968) approach, meaning that the theory building process should be built on data collected – in this case the case company interviews. Glaser and Strauss (1968) emphasize that theory built on data is usually too intimately linked to the data to be completely refused by more data or replaced by another theory, although the theory inevitably will be modified and reformulated. They further

emphasize that while the data underlying the theory might be short lived and susceptible to change, the theory itself will be considerably more sustainable.

In order to follow a grounded theory approach, the transcribed interviews were read and citations related to the research questions classified as A-categories (Widding 2003). The transcribed interviews and resulting A-categories where reviewed by both authors, to ensure that all relevant information had been extracted from the interviews into the A-categories. An organization of the A-categories according to each case company was considered beneficial, as the firms' A-categories are to be compared to each other in order to find cross-case patterns in the later analysis. The A-categories can be found in Appendix 11.7, and use the notation shown in Figure 19. A category labeled A11-01 would indicate an A-category related to risk identification in Cybernetica, and the first statement regarding this in the interview.

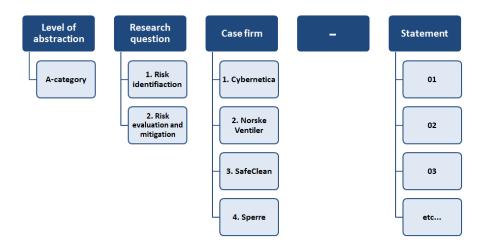


Figure 19 - Notation framework for A-categories

Cross-Case Analysis

In the cross-case analysis, the A-categories for each research question were analyzed for cross-case pattern matching (Yin 2009), allowing a cross-case hypothesis covering a subset of A-categories. The hypotheses generated from the different A-category patterns are labeled B-categories, and are at a higher abstraction level than the underlying A-categories (Widding 2003). This higher abstraction level results in a possibility to "generate properties of categories that increase the categories' generality and explanatory power" (Glaser & Strauss 1968, p. 24). The abstraction process also helps focusing on the important aspects of the material, while the other aspects either act as support or are regarded as irrelevant (Widding 2003).

Widding (2003) emphasizes that an initial understanding of the field gained through literature studies is helpful in the interpretation of case study evidence, as earlier research guides the researcher's interpretation and a higher abstraction level is associated with a higher influence of theory. As long as the observations are consistent with earlier literature, the theoretical influence increases the theoretical support of the findings (Widding 2003). In situations where the general research consensus is broken, such a support is weaker and the researcher's understanding of the research object more important (Widding 2003). Such a view is supported by Glaser and Strauss (1968) who emphasize that hypotheses are suggested, not tested, relations that are verified as

much as possible in the course of the research – adding one should not have an excessive focus on proving them:

"Generating hypotheses requires evidence only enough to establish a suggestion — not an excessive piling up of evidence to establish a proof, and the consequent hindering of the generation of new hypotheses" (Glaser & Strauss 1968, pp. 39-40).

Consequently, the B-categories in this master thesis were funded on a basis of theory where possible, while the B-categories breaking research consensus was grounded in the authors' understanding of the case firms in questions.

3.5 Evaluation of Methodology

Qualitative research and especially case studies are widely criticized for the lack of a transparent method and analysis process, and lack of generalization power of the theories developed (Bryman & Bell 2003; Yin 2009). In order to evaluate the methodology used in this case study, we will rely on four widely used tests proposed by Yin (2009) to test the validity and reliability of empirical social research.

3.5.1 Validity

Construct Validity

Construct validity encompass the concern of whether the operational measures used are representing the concepts studied (Yin 2009). Hence, it "refers to the extent to which a study investigates what it claims to investigate, that is, to the extent to which a procedure leads to an accurate observation of reality" (Gibbert & Ruigrok 2010, p. 712). A common mistake in case study research is failing to use a sufficient set of operational measures to study the researched phenomenon, and use subjective measures in collecting the data (Yin 2009).

In order to increase the construct validity of this study, triangulation and a clear chain of evidence has been sought applied throughout the study – both strategies suggested by Gibbert and Ruigrok (2008). After establishing the research questions, a triangulated literature search ensured a thorough understanding of the field. This enabled the choice of a wide risk definition, encompassing the necessary elements for what the study investigates. During and after interviews, investigator triangulation, data triangulation and response triangulation enabled a considerably more accurate observation of reality – ensuring that the interview topics, and resulting data was consistent with the research topic.

Internal Validity

The internal validity of a study is concerned with the ability to separate actual relationships from spurious relationships between two or more elements (Yin 2009). According to Yin, the concern over internal validity for case research "extends to the broader problem of making inferences. Basically, a case study involves an inference every time an event cannot be directly observed" (Yin 2009, p. 43).

Inferences naturally have to be made in the course of the study, especially due to the study's research topic and the semi-structured interview guide. The word 'risk' has many analogies in

every-day speech⁸, ranging from risk, to uncertainties, unknowns, dangers, etc. In addition, a semi-structured interview guide addresses topics, implying that questions are not always addressed in a direct manner. Inferences has therefore been made when answers to later questions are answered addressing related topics, when patterns of organizational behavior becomes apparent during the interview, and when analogies to the word risk is used for describing the Brazilian market or market entry. In order to limit the bias from such inferences, the authors emphasized the use of summarizing previous question answers when addressing a new question. Hence, new questions were asked to clarify whether the information was interpreted correctly or if rival explanations were applicable. In addition to this, both data triangulation and investigator triangulation were important in the development of the case company narratives and A-categories. Lastly, company narratives and A-categories were sent to the case companies for revision and feedback prior to follow-up interviews.

External Validity

External validity is concerned with the extent to which the study's findings are generalizable beyond the immediate study itself (Yin 2009). This has proven to be especially difficult for case studies, with researchers making comparisons to the generalizability of statistical generalization (Birkinshaw, Brannen & Tung 2011; Bradshaw & Wallace 1991; Doz 2011).

The study is not statistically generalizable, but this is not the purpose of a qualitative case study. Rather, the more appropriate analytic generalization is sought, in addition to the use of replication logic. The analytic generalization improves the external validity by comparing the case study findings with widely recognized previous research theories and findings, while the replication logic ensures that the cross-case findings are considered more important than single-case findings.

3.5.2 Reliability

A reliable study is possible to replicate by later investigators following the same procedures as described by the original investigators, thus minimizing errors and biases in a study (Bryman & Bell 2003; Yin 2009). According to Yin, "one prerequisite for allowing this other investigator to repeat an earlier case study is the need to document the procedures followed in the earlier case" (Yin 2009, p. 45).

The study has a thoroughly documented methodology, easily replicable by other researchers. The various steps taken in both the literature review and empirical study are explained in detail, and the same is the case for the steps taken from data analysis towards generalization of case study findings.

3.5.3 Conclusion

The inherent weaknesses in the chosen research design and methods have been sought identified and limited. The study's generalization efforts are based on analytical generalization and replication logic, generalization methods that are adapted to the nature of the case study. These elements should reduce the common critique surrounding the often 'less rigorous' analytic approach of case studies, while the transparency of methods applied in the study should reduce

⁸ The Oxford Thesaurus of English presents several analogies to risk: chance, uncertainty, unpredictability, instability, insecurity, gamble, probability, likelihood, danger, threat, fear (Waite 2005)

the critique of low methodological transparency. The study is therefore considered valid and reliable within a case study context.

Limitations

The most visible limitation in the study is the choice of case firms being at an early stage of the Brazilian market entry, with no actual commitments taken. At this early stage, not all entry modes, operational strategies and market characteristics have been thoroughly evaluated by the case firms. A study on firms that had completed a Brazilian market entry would yield data on actions taken by firms prior to market entry, in addition to an evaluation of the process in retrospect. Nevertheless, the nature of the research questions does not imply the need for an actual market entry as they focus on the process prior to market entry. In addition, asking firms in retrospect would not necessarily yield the same honest answers that case firms in the middle of the process can provide. These firms are not limited by cognitive recognition of past events, and have not yet made mistakes that they want to cover up or attribute to external factors.

When conducting interviews the interplay between the interviewee and the interviewers will always affect the interview process (Bryman & Bell 2003). A limitation of the research is therefore the extent to which the interviewees felt comfortable sharing information with the interviewers. However, actions taken in the cooperation agreement and resulting confidentiality agreement with Innovasjon Norge have yielded an important amount of trustworthiness to counter this effect.

The search of patterns in the cross-case analysis is another limitation to the study, as "people are notoriously poor processors of information. They leap to conclusions based on limited data, they are overly influenced by the vividness or by more elite respondents, they ignore basic statistical properties, or they sometimes inadvertently drop disconfirming evidence. The danger is that investigators reach premature and even false conclusions as a result of these information-processing biases" (Eisenhardt 1989, p. 540). The biases introduced by this limitation have been sought reduced through responder feedback on firm narratives and Acategories, and a grounded theory approach supported by the theoretical background.

Last, one can question the authors' ability to judge article quality and the criteria applied for evaluating articles. Although the criteria applied in the article selection process are supported by both research method literature (Bryman & Bell 2003) and our supervisor, there will always be subjective judgments involved in the evaluation and selection. The criteria for top journal publication and author recognition exclude certain literature. The criteria used might therefore have excluded relevant research from other disciplines from the development of the theoretical background. Nevertheless, the use of an augmented search strategy has limited this liability and the potential liability of relying on a single database (Scopus) for the database search.

What Could Have Been Done Differently

In this case study, multiple interview objects should ideally have been sought at each of the case firms. This would ensure a broader perspective on the companies' background and internationalization process. In some cases, the interview object was not the CEO of the company, but another manager involved in the company's Brazil expansion. Involving at least two persons from each company would have increased the quality of the descriptions given, as it is hard for a single person to keep track of all events in the company background and Brazilian

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expansion process. Nevertheless, occupying two persons in each of the case companies would have taken up a considerable amount of the companies' work time.

Alternative research methods could also have been chosen given the exploratory nature of the research questions. First, a longitudinal case study of one firm would have given more insight into how the risk management process changes over time. This case study design would however not have allowed for comparison of the different firms' approach to handling risk in the internationalization process. Second, a quantitative approach could have been chosen in order to increase the generalization power through the less disputed statistical generalization. Of the quantitative approaches a statistical, survey based research design would have been preferable — as an experimental research design would yield less generalizable results due to the difficulties of recreating decision-making in an experimental environment. Nevertheless, a quantitative approach would only be suitable outside the scope of the Navigator project due to the limited number of firms.

4 Empirical Background

The empirical background is separated in two parts; a Brazilian background and a case company background. The Brazilian background is included in order to give the reader an introduction to the Brazilian petroleum sector and business environment, and a basis for understanding the risk factor identified, evaluated and later sought mitigated by the case firms. The case company background gives information needed in order to understand the case firms' history, products, strategies and procedure for handling risk.

4.1 Brazilian Background

Following the discovery of the world's largest offshore oil resources⁹ (Financial Times 2011), highly ambitious growth plans have been laid out for the Brazilian petroleum and offshore sector (Inventure Management 2011)¹⁰. The effort is led by the national oil company Petrobras, which aims at being the world's largest oil producer by 2015 (Inventure Management 2011). As the controlling operator in the pre-salt fields (De Oliveira 2012), and the single largest buyer in the Brazilian petroleum sector, Petrobras' investments are considered pivotal to the activity level in the Brazilian oil sector (De Oliveira 2012; Inventure Management 2011). The short term industry growth is fueled by Petrobras' planned investments of USD 224 billion in the period from 2011-2015 (Petrobras 2011).

There is however a great deal of uncertainty attributed to whether the aggressive expansion plans can be supported by the Brazilian supplier industry, which is a critical player due to strict local content requirements in the investment projects (Gall 2011; Inventure Management 2011; The Economist 2011b). In addition to concerns over the capability of Brazilian firms to handle the planned growth, Nolan and Thurber (2010) maintain that investments in the petroleum industry are inherently risky because of the associated uncertainty and the high capital requirements of offshore projects. Nolan and Thurber argue that the level of uncertainty in petroleum projects is "a function of the maturity of the exploration and production program, with uncertainty decreasing and experience are acquired over time" (Nolan & Thurber 2010, p. 9). This indicates that exploration and production in the newly discovered pre-salt fields is associated with a high level of uncertainty.

4.1.1 Risk factors in the Brazilian petroleum sector

In this section, risk factors are evaluated according to the determinants described in the theoretical background on risk models. Three out of the four risk categories presented will be applied in the evaluation of the business environment in the Brazilian petroleum sector. The last factor, management team factors were not found to be significantly different in the Brazilian business environment, and the treatment in the theoretical background is considered to be sufficient.

Each of the three risk categories are treated separately by evaluating the most important risk determinants, and the empirical data underlying each risk factor is summarized in a discussion of how the risk factors and underlying determinants affects the case firm's internationalization process. Rather than a final summary, the main risk determinants attributed to each factor are

sector. The consultancy was founded by the former director of Innovasjon Norge in South America.

⁹ Pre-salt fields are estimated to hold up to 16 billion barrels of oil equivalent (boe) (World Oil Online 2011)
¹⁰ A consultancy specializing in facilitating market entry in Brazil for firms in the oil, offshore, and the maritime

presented in Figure 20. This is done to ease the readability of the section, and to avoid repeating the case firms implications more times than necessary.

Environmental factors

1. Political and policy uncertainty

- Production sharing regime
- Local content requirements
- Regulatory responses to accidents

2. Macroeconomic uncertainty

- Long term effect of underinvestment in infrastructure and education
- 3. Cross-cultural factors
- · Cultural distance
- Administrative distance

Industry factors

1. Competitive intensity

 High expected growth attracks competitors and does not guarantee success

2. Input uncertainty

• Limited access to skilled workers and critical equipment

3. Technological change

• Extracting pre-salt oil is a technical challenge

Firms factors

1. Income stream uncertainty

- Regulatory compliance
- Corruption risk
- Complicated tax and immigration regime

2. Firm resources

Organizational slack is critical

3. Operational Strategy

• The entry mode will decide the firms exposure towards different risk factors

Figure 20 - Identified risk factors of the Brazilian petroleum sector

Environmental Factors

Historic events (Appendix 11.5) can be seen as underlying causes for several of the uncertainties that firms face when entering the Brazilian petroleum. The local content requirements that may have an inhibiting effect on several offshore projects reflect a policy debate in the 1940s and 1950s on whether to allow international oil companies operate in Brazil or not (De Oliveira 2012). The slogan "keep the Brazilian oil for Brazilians" (De Oliveira 2012, p. 521) introduced in the 1940s, is still used today. Similarly, poor infrastructure and low productivity growth in Brazil has been attributed to underinvestment during decades of economic hardship (Sharma 2012).

1. Political and Policy Uncertainties

While the political climate in Brazil is regarded as relatively stable¹¹ (Sweig 2010), policies regarding licensing of the pre-salt blocks in the production sharing regime, local content requirements and regulatory responses to accidents has been met by skepticism and sometimes hostility by industry actors (Gall 2011; The Economist 2011b).

1.1 Production Sharing Regime

A key example of a drastic policy change was the introduction of the production sharing regime. After the discovery of the pre-salt fields, licensing was halted until the new regulatory regime was introduced in 2009¹² (Inventure Management 2011). In the new regime, Petrobras is to hold at least a 30 % stake in all pre-salt fields, and operators take the cost and risk of finding oil deposits, being reimbursed by the Brazilian government only if fields prove to be of commercial value (Inventure Management 2011). The profits from the oil production are then shared by the

¹¹ Especially compared to many other countries where oil firms operate (The Economist 2009b)

¹² Licensing to non-pre-salt fields continues under the current concession regime (Inventure Management 2011)

operators and the Brazilian government. The production sharing regime is controversial, for several reasons. First, licensing rounds to pre-salt fields have been slowed down due to disagreements between different Brazilian states on revenue distribution (The Economist 2011b). Second, international oil companies find the government's double role as a contracting party (through Petrobras) and a regulator of the pre-salt fields problematic (Gall 2011).

In contrast to the regulatory policies reigning in the North Sea basin where competitive forces ensure diversification of operating risks between several companies, Petrobras has a dominant role for the development of the pre-salt fields, and this has been seen as a gamble by some investors (Gall 2011). Petrobras' human, financial and technical resources are already said to be overstretched (Gall 2011) – Petrobras pulled out of Cuba in 2011 due to its domestic commitments (Financial Times 2011) – and lack of critical resources at Petrobras might slow down the growth of the Brazilian petroleum sector (Gall 2011).

1.2 Local Content Requirements

Brazil's president from 2003 to 2010, Luiz Inácio Lula da Silva, has argued that everything that can be done in Brazil should be done in Brazil, and he and his successor, Dilma Rousseff, have made it clear that local content requirements will be made increasingly more demanding (The Economist 2009b, 2011b) – from the current level of around 60 % to 90 % by 2020 (Inventure Management 2011). The Brazilian government hopes that local content requirement in the petroleum sector will stimulate growth of a local supplier industry, but capacity limitations among Brazilian suppliers may have a decelerating effect on pre-salt investments (Gall 2011; The Economist 2009b).

1.3 Regulatory Responses to Accidents

The Brazilian government has given harsh responses to accidents on the Brazilian continental shelf. In November 2011, oil started to leak from an oil well in the *Frade* field in the Campos Basin (The Economist 2011b). As a consequence of the relatively small leak of 3000 boe, the field operator Chevron and subcontractor Transocean have been fined USD 32 million for the leak, and face a USD 10 billion lawsuit and criminal charges against managers of the two companies (Inventure Management 2012; The Economist 2011c). Critics of the government's response argue that it was out of proportions with regard to the size of the oil spill and intended to set an example to international oil firms in Brazil (The Economist 2011c).

2. Macroeconomic Uncertainties

The crushing inflation that plagued the Brazilian economy in the last decades of the 20th century is largely under control, and the Brazilian economy can now be said to be stable and in a state of sustained fiscal disciplin (Norseng 2011). The inflation rate has not exceeded 8 % since 2004, compared to an average rate well above 100 % between 1980 and 1995 (Trading Economics 2012). A triggering factor for Brazil's economic problems was the 1973 and 1979 oil crises, where spiking oil prices slowed the country's economic growth as inflation rates and the foreign debt burden soared (The Economist 2009b). The inflation rate reached 100 % in the fall of 1980 (Trading Economics 2012), and was not brought under control until the mid-1990s (The Economist 2009b).

The hyperinflation and increasing foreign debt burden were devastating to growth and output of the Brazilian economy. Productivity grew by a mere 0.2 % from 1980 to 2000, compared to 4 % in China, as the government and the private sector were unable to invest in infrastructure, education and equipment (Sharma 2012; The Economist 2009b). The result of the chronic underinvestment is poor infrastructure and limited access to skilled workers (Sharma 2012), eroding the competitiveness of Brazilian businesses and increasing operating costs for all firms in Brazil.

3. Cross-Cultural Factors

Using Ghemawat's (2011) CAGE-framework of cross-border differences, distance between Brazil and Norway is high in all dimensions. The geographical distance between the two countries has little effect besides the cost of travel. The most significant effect of the economic distance is the low quality of Brazil's infrastructure, which increases cost and time of transporting goods and personnel (Sharma 2012). However, cultural and administrative factors are most likely to affect business operations in Brazil, and will be discussed more thoroughly.

In the cultural dimension, the language barrier is clearly evident, but also possible to reduce at the cost of a translator. Uncertainty is more likely to arise from differences in how Norwegians and Brazilians conduct business - particularly in terms of how relationships are established, and the degree of openness between business counterparts. Building a network of relevant contacts is crucial to access customers and potential partners, and effective networking is likely to reduce the time to income generation. However, building these important relationships takes time and requires a presence in Brazil – a presence that can also be seen as a sign of commitment to the Brazilian market and a way of overcoming skepticism of unknown business partners (Majors 2012). Presence is important after projects are initiated as well – Janis Majors, a director at Inventure Management describes how some Brazilian business partners are known to delay sharing bad news until it is absolutely necessary and therefore unnecessarily difficult to deal with (Majors 2012).

The administrative distance between Norway and Brazil is increased by the language barrier, as documents and information might be available only in Portuguese, for example on labor relations (Economist Intelligence Unit 2011). The language barrier only adds to the difficulties of operating in an already administratively complex country (Inventure Management 2011). Administrative distances are increased by limited availability of corporate data in Brazil. OpenCorporates, a British organization lobbying for greater distribution of company data, gave Brazil a score of zero points out of hundred on a survey on the availability of company data (OpenCorporates 2012; The Economist 2012b). According to the group, a number of risks arise: "undermining corporate governance, and providing a fertile ground for corruption, money laundering, organized crime, and tax evasion" (OpenCorporates 2012, p. 1). Further, limited availability of company data complicates market research, a necessity prior to market entry (Inventure Management 2011).

Implications for Case Firms

Several of the outlined environmental factors are likely to have a direct effect on how firms entering the Brazilian petroleum sector conduct business. The political uncertainty in Brazil is low, and therefore unlikely to affect the case firms. However, government policies are likely to

have a significant effect. First, local content requirements can affect the choice of entry mode for firms and the inherent risk level in the foreign market entry. Nevertheless, the policy uncertainty tied to local content demands is not very high; the Brazilian government has been very clear on its intentions to control the pre-salt resources. Second, the production sharing regime is likely to have an indirect effect as it makes Petrobras the controlling operator of the pre-salt fields. This makes Petrobras a very likely customer to many of the countries that enter Brazil, and smaller firms may find themselves in a weak bargaining position when dealing with Petrobras. Lastly, strict regulatory responses to accidents could have a devastating effect on a small firm with limited resources.

Macroeconomic uncertainties are not very likely to cause great difficulties to firms currently entering Brazil, as the Brazilian economy is regarded as stable. The long-term effects of historically low investments in infrastructure and education do however have an effect on the general cost level. Nevertheless, this will be a common factor for all firms operating in Brazil and might even make direct exports with importation taxes a more competitive option compared to the local competition.

The cross-cultural differences, especially cultural and administrative distance, are likely to cause the greatest difficulties for firms the Brazilian petroleum sector. Building a network of customers and partners in Brazil is likely to take time due to the cultural differences and the need to adjust to the Brazilian business culture and administrative system. Some form of presence in Brazil will be required to overcome cultural and administrative distance - either directly or through third parties – and this increases the cost and risk of entry. Nevertheless, risks associated with cross-border differences are, in contrast to the mentioned policy and macroeconomic uncertainties, possible to reduce by gaining knowledge on and experience in the Brazilian market.

Industry Factors

Brazil is currently the most attractive market to Intsok-members¹³ (Wangen 2012), reflecting a global trend of O&G operators and suppliers scrambling towards Brazil and the world's largest offshore market (Gall 2011). New market entrants compete with established players for contracts and access to critical resources, altering the competitive dynamics of the petroleum industry. Still, technological hurdles need to be cleared, largely attributed to the depth of the pre-salt fields and their distance from the Brazilian mainland.

1. Competitive Intensity

The competitive intensity in the Brazilian oil and gas industry depends the dynamics between several key actors; *operators, suppliers,* and *government agencies* (Appendix 11.6). Operators are given exploration and production rights in certain blocks by the Brazilian control organ ANP¹⁴, and buy services from large engineering, procurement and construction (EPC) actors. The large EPC firms rely on a base of subcontractors, from which they source services they do not perform inhouse (Majors 2012). A smaller supplier can therefore sell its services directly to Petrobras or

¹³ A government-supported organization facilitating internationalization of Norwegian oil and gas firms

¹⁴ The National Agency of Petroleum, Natural Gas and Biofuels

through the EPC contractors (Jørpeland 2012)¹⁵. In the end, demand for products and services is determined by the operators' activity level, and chiefly Petrobras' actions (De Oliveira 2012; Inventure Management 2011). As the projected industry growth opens up for business opportunities, it will certainly also attract new entrants to the industry. This makes the competitive intensity higher (Porter 2008), a point which further aggravates the low supplier power in an industry where Petrobras and the large EPC contractors holds a large buyer power.

2. Input Uncertainties

While Petrobras' staff is regarded as highly competent, there is concern regarding the organization's ability to handle the planned pre-salt growth (Gall 2011). Petrobras position as the controlling pre-salt operator makes its employees a finite, critical resource which might inhibit development projects. Furthermore, an organizational experience gap ¹⁶ – 40 % of Petrobras staff has less than nine years' experience while 60 % of the staff has more than 19 years of experience and is approaching retirement – will make project staffing more challenging in the long term. Inexperienced staff is often less effective and more inclined to make mistakes, and this is a challenge to firms of all sizes - Aker Solutions attributed weak results in the third quarter of 2011 to overspending due to inexperienced personnel (The Economist 2011b).

Furthermore, there is widespread concern over the ability of Brazilian firms to supply ships and equipment at the rate at which the ambitious growth objectives and local content regulations require (Azevedo Jr 2011; Gall 2011; The Economist 2011a). Even Petrobras' former president, José Sergio Gabrielli has raised concern over 'strangulation risk' - the risk of local suppliers failing to deliver ships and equipment on time and at an acceptable cost level (Gall 2011). In particular, there are concerns over the efficiency of Brazilian shipyards and their ability to deliver FPSOs¹⁷, which are a critical hub of offshore oil production (Gall 2011; Majors 2012).

The shortage of skilled technical workers and engineers in the Brazilian sector (Economist Intelligence Unit 2011), has been attributed to historic underinvestment in education by the government and lack of investment in productivity-enhancing technology by both private and state enterprises (Sharma 2012; The Economist 2012a). The shortage, as well as mandatory charges and taxes – Brazilian employees are paid 14 months of salary per year – drive labor costs up (Economist Intelligence Unit 2011; Inventure Management 2011). In general, equipment costs in the Brazilian offshore industry are 10-50 % higher than world market prices, and certain equipment is not available from local suppliers (Gall 2011; The Economist 2011a). There are records of Brazilian engineering firms using six times as many man-hours than foreign counterparts on similar projects, and Brazilian-made offshore valves costing four times as much as imported valves (Gall 2011). Brazilian suppliers attribute their cost and efficiency problems to high taxes and interest rates, lack of skilled workers and substandard infrastructure (Gall 2011).

¹⁵ K. Lund Offshore is a Norwegian supplier of compressors and lifting equipment to the O&G industry, and entered the Brazilian market in 2004 largely on their own

¹⁶ The experience gap was caused by downsizing in the 1980s and 1990s due to low oil prices (Gall 2011)

¹⁷ FPSOs, or floating production, storage and offloading units, receive, process and store hydrocarbons

3. Technological Uncertainties

The pre-salt oil is located at depths up to 7000 m, below thousands of meters of water, rock and salt – making extraction a significant technological challenge (Gall 2011). First, the unstable salt layer - up to 2000 m thick (Gall 2011) - is likely to shift during exploration, increasing the risk of well collapse (The Economist 2011a). Second, the pre-salt fields are filled with corrosive gases that cause high reservoir pressure and increases the risk of material failure (The Economist 2011a). Third, the high gas-oil ratio in the pre-salt fields (Gall 2011) means that pipelines need to be laid to transport gas from the pre-salt oil wells¹⁸ (The Economist 2011a). Fourth, the pre-salt fields are not only located at great depths, they are more than 250 km from the Brazilian coast, exceeding the range of helicopters transporting personnel to the drilling platforms. Personnel need to be transported by a combination of boats, floating logistical hubs and helicopters (The Economist 2009b), increasing the logistical complexity of pre-salt operations. Finally, responding to an accident at the pre-salt platforms will be slowed by the distance (The Economist 2011a).

Implications for Case Firms

The prospect for large growth in the Brazilian petroleum sector attracts many new entrants, a situation that in a long-term perspective is likely to reduce suppliers bargaining power versus the large buyers represented by Petrobras and multinational MNCs. The fact that Brazil is already the world's largest offshore market, and hundreds of billions of dollars will be invested here over the next few years, does not imply that all firms will succeed. The entering firms should therefore invest resources in mapping the competitive environment before entering, and a solution faced with a highly competitive environment may be to seek market niches – as is often done by early internationals.

Smaller firms may be particularly exposed to the input uncertainties present in the Brazilian petroleum sector, which drive operation- and hiring costs up - raising barriers of entry to levels that may prohibit some firms from entering the Brazilian market. Furthermore, dealing with resource risk is likely to be particularly challenging to small firms with little market experience, as they often lack resources and contacts to overcome resource bottlenecks. Because of already established relationships to customers, suppliers and other market actors, firms already present in Brazil are likely to have an advantage over entering firms. However, a Brazilian supplier industry incapable of delivering ships and equipment when needed, opens up opportunities for international suppliers especially from partnerships that satisfy local content requirements.

Technological uncertainty is primarily related to extracting oil from subsea reservoirs—not to surface treatment. Consequently, the impact of these factors on the case firms depends on the nature of the firms' service offerings. Whereas subsea equipment must be able to handle the ocean depths, surface equipment will likely be subject to more familiar operational challenges. Lastly, the risk of technological changes on an industry level is ever present for firms in the petroleum industry, and not subject to changes with regard to Brazilian operations. Lastly, the technological challenges related to extracting pre-salt oil mean that innovative firms with

¹⁸ While gas is sometimes pumped back into wells to increase the reservoir pressure, there is likely to be so much gas from the pre-salt fields that gas pipelines are necessary (Gall 2011)

capabilities that will increase the speed or reduce the cost of oil extraction have promising prospects in the years to come.

Firm Factors

Small Norwegian firms that have not yet entered the Brazilian market possess several of the INV liabilities proposed by Zahra (2005); newness, inexperience, size and foreignness. Newness and inexperience is likely to make it necessary to spend resources on gain knowledge on the Brazilian market, while foreignness makes it difficult to evaluate both customers and eventual partners in a joint venture or other cooperative agreement. Further, a small firm's resources might make it difficult to dedicate a substantial amount of time and resources to overcome these liabilities.

1. Firm Resources

Inventure Management offers the following advice to firms entering the Brazilian market: "A crucial success factor is the willingness and ability to dedicate sufficient resources to the Brazil entry, in terms of both money and personnel" (Inventure Management 2011, p. 10). They further emphasize that an internationalization attempt is likely to come at a high relative cost to SMEs compared to larger firms, but that an allocation of sufficient financial and human resources to the process is important in the pre-entry phase as well as post-entry.

Extensive market research is necessary prior to market entry (Majors 2012), as it allows firms to gain an understanding of their competitive environment and is likely to help firms target their efforts effectively. Allocation of financial and human resources to market research is therefore a necessary mean in order to reduce income stream uncertainty. However, it is not sufficient to ensure success, as underestimating the complexity of running operations in Brazil is very likely have an adverse effect on the firm's core activity of generating sales (Jørpeland 2012; Majors 2012).

2. Income Stream Uncertainty

A market in growth is no guarantee for sales of a specific product, and the Brazilian petroleum market is in some areas significantly different from the Norwegian market. There are different regulations and competitors (Majors 2012), in addition to the fact that high demand services from the North Sea may not be in demand in Brazil. An example of such a service, is the quantitative risk analysis required prior to operations in the North sea basin. This is not compulsory in the Brazilian petroleum sector, and firms that use them in the North Sea do not necessarily use them in Brazil (Majors 2012).

In addition to the question of Brazilian market demand for a firm's products, the income from the Brazilian market operations will come at a later stage than the investments needs to be made. Inventure Management emphasizes the need for patience and continuous presence in order to generate sales in the market (Majors 2012). The consultancy also points towards the administrative challenges of establishing a legal entity in Brazil - a requirement for sales directly to Petrobras - or a Brazilian subsidiary (Majors 2012). While Inventure Management promises to be able to have a Brazilian subsidiary running within six months (Majors 2012), and K. Lund Offshore, a Norwegian SME unfamiliar with the Brazilian petroleum sector, spent a year on establishing their Brazilian subsidiary (Jørpeland 2012). Although K. Lund experienced significant

demand for their products in Brazil, mainly from Petrobras, it took seven years before the Brazilian subsidiary made profits (Jørpeland 2012).

3. Operational Strategy

Selection of a strategy for handling the challenges firms face when operating in Brazil is a key issue for successful entry. The entry mode determines how firms target their customers and therefore greatly influences its chances of generating sales quickly, as well as the overall risk level of the internationalization process. Entry strategies are highly dependent on the firm's product or service offering; while firms offering relatively simple products may successfully export or sell through a Brazilian agent, firms with more complicated products often will benefit from a greater presence in Brazil (Majors 2012). Three of the most used entry modes are serving the market form Norway, selling through a Brazilian agent, and establishing a Brazilian legal entity (Inventure Management 2011).

Serving the Brazilian market from Norway, is the entry mode requiring the smallest resource commitment, but it may be difficult to make sales in Brazil without physical presence. Goods invoiced from outside Brazil are subject to an import tax of at least 25 % (Inventure Management 2011), thus raising the price on the product or service offered. Furthermore, Petrobras requires its suppliers to have a legal presence in Brazil, although some suppliers that offer products that are considered unique or of strategic importance may be exempted from the rule (Inventure Management 2011).

Selling through a Brazilian agent, represents a low resource commitment entry option while yielding benefits of a physical market presence. A Norwegian manager with extensive experience from Brazil explains: "Effective agents are 100 % committed to the sale, and have relevant contacts.

Experience from a relevant sector is therefore a major advantage" (Wold 2012). This entry mode is greatly dependent on the capabilities of the chosen representative, and the benefit of a low commitment physical presence must be balanced against the risk of misrepresentation, agent coordination issues and the taxes incurred due to foreign invoicing (Inventure Management 2011).

Firms that establish a Brazilian subsidiary, are often motivated to do so by local content requirements. The most used option for establishment in Brazil is creating a fully owned subsidiary (Inventure Management 2011), but firms may also create a joint venture with a Brazilian partner or acquire an existing Brazilian company. All of the above options for establishment in Brazil involve a greater resource commitment, and therefore a greater risk, than exporting or selling through an agent. The process of establishing a Brazilian company is bureaucratic and time consuming (Economist Intelligence Unit 2012). Furthermore, compared to a fully owned subsidiary, additional risk is associated with joint ventures and acquisitions. First, significant resources must be allocated to finding a joint venture partner in accordance with the capabilities that the firm seeks, or an attractive acquisition target. Second, joint ventures and acquisitions require effective governance process - discrepancies in firm objectives might have serious consequences to join ventures and prolong acquisition processes. Third, letting third parties in on sensitive technology increases dissemination risk.

Implications for Case Firms

Allocation of both human and financial resources is necessary to both pre- and post-entry processes in the Brazilian market. For a small, resource-constrained firm, the costs will be relatively high and hold up a high proportion of the firms' resources. However, allocation of resources to the Brazilian entry is identified as a key success factor, making the resource allocation a necessary priority for firms entering the case firms.

One of the areas requiring a considerable amount of resources prior to entry, is the extensive market research that should be performed in order verify demand for the case companies' services in the Brazilian petroleum sector - as demand in some segments vary from the demand in the Norwegian petroleum sector. The situation is further complicated for the case firms, as the income stream is both uncertain and occurs at a later point in time than the need to allocate resources to the market entry. A certain amount of organizational slack – to allow resources to be held up in the Brazilian market expansion without negatively affecting the firm's regular operations - seems like a key component in a successful Brazilian market entry. This is obviously important in any market entry, but the time-consuming process of establishing a legal entity or representation in Brail, and the cultural and administrative distance between Brazil and Norway, might make organizational slack even more important.

The operational strategy, or choice of entry mode, is a key influence both on the ability to generate sales and the amount of time before income generation. While direct exports from Norway will require the smallest resource commitment prior to a sale and thus require less organizational slack, it might also limit the ability to generate sales due to low market visibility, import fees and Petrobras' requirement for Brazilian presence. Sales through an agent seems to have many of the same upsides that option of direct exports has, but the higher market visibility comes at a price; agent fees must be paid, and the firm risks partner exploitation. The option of establishing a subsidiary is the most resource intensive option, and might therefore be out of the scope for some of the case firms - as they do not possess the organizational slack required to support this. In order to overcome this challenge, the use of a Brazilian partner might necessary although it also introduces costs and risks that a fully-owned subsidiary does not.

4.2 Case Company Background

The case firms vary in age and size, but all companies are characterized by resource scarcity and the limited number of persons involved in the internationalization process (Table 3). In the case of Cybernetica two people were originally involved in the firm's Navigator project, but one of the employees left the company before finishing the project without being replaced by another employee. In the case of Norske Ventiler the original project leader manager is on sick leave, and he has been replaced by the managing director.

Company	Product/service offering	# Employees	# Involved in Navigator project	Turnover (NOK/year) ¹⁹	Funded (year)
Cybernetica	Process control and optimization	12	2 (1)	12.9 million	2000
Norske Ventiler	Process valves	23	1 (2)	34.5 million	1987
SafeClean	Chemical cleaning of process equipment	30	2	30.5 million	2002
Sperre	ROV and related subsea equipment	13	1	46.0 million	1993

Table 3 - Key information on the case companies

The case company presentations are similarly structured. The companies are introduced with a brief history, leading up to the current operations and service offering of the firm in question. Following the introduction, the firms' sales strategy is outlined, before past and current international activities are presented. The last topic treated is the firms approach to the risk assessment process, and the main risks identified by the firm in question.

4.2.1 Cybernetica

Year	Activity
-> 2000	The three founders work with model predictive control systems for SINTEF, including research
	assignments for industrial clients.
2000	Cybernetica is founded. The first customers originated from SINTEF research assignments in the
	polymer industry.
2002	The company expands its business into the metallurgical plant industry after hiring an employee with
	experience from this industry.
2008	The company decided to enter the oil and gas industry to offer control models for offshore processing
	plants.
2010	First contact with Petrobras officials visiting the Integrated Operations center at NTNU, Trondheim
2011	Petrobras indicates interest for a research project

Table 4 – Key events in Cybernetica's history

Cybernetica was founded in 2000, when three colleagues at the SINTEF research center in Trondheim decided the predictive process models they had been developing in research projects for the polymer industry were commercially exploitable. The company's first customers were contacts originating from the SINTEF research projects within the polymer industry. Realizing that process control models were applicable in the metallurgical industry as well, the company hired an employee with relevant experience and successfully entered the metallurgical industry. The company eventually gained customers from the onshore processing industry, including Statoil, and this experience led the company to discover the potential for using process control technology in offshore process systems.

¹⁹ Average over the last the years from 2008-2010 to discount for industry cycle effects

Today, Cybernetica develops, implements and maintains process control models for supervision and optimization of industrial processes within the polymer industry and metallurgical plants, and is still searching for their first customer within the offshore oil and gas industry. The process control models are tailor made for each client, and the control systems are based on non-linear, physical models²⁰. The use of more complex models allows Cybernetica to operate within a niche market of more complicated industrial processes, where standard solutions of larger competitors like Hannibal and ABB cannot be applied. While the company considers itself a leader within its niche of non-linear, physical process control models, it struggles with limited visibility outside selected market segments.

Sales Strategy

Cybernetica has deliberately searched for Norwegian clients with international operations or connections, as it is much easier for the company to maintain a relationship in Norway than having to rely on international marketing activities. In accordance with this strategy, the company emphasizes the importance of keeping clients (the company has only lost two clients to this date). The company traditionally relies on network-based sales, but has recently started cold-calling potential clients in order to expand the client base.

A new client relationship usually starts with study of benefits or research cooperation in order to prove the potential of the technology for the client. The benefit study and/or research cooperation usually includes the development of a process model, which in turn is often implemented as a pilot project. A contact in the client company can then use this pilot project as leverage to convince management to expand the project. The grooming process leading up to a benefit study is considered key to the company's sales strategy, but can be very time consuming (even when involving professors to increase credibility of projects):

"The potential is often hard to see, and the technology relatively unknown to the customer before a benefit study has identified it. This makes it very hard to enter new client relations. However, when you have established a relation, the clients often stay — expanding it to a new factory, making a process modification, or something similar."

The company has not yet made any sales within the oil and gas industry, and explains the lack of sales by referring to two complicating factors. First, Cybernetica's products require a certain level of technological competence to be understood. Second, the company offers a margin improving service in an industry where this has not been a key focus, particularly when oil prices are high. Of these factors, especially the technological competence demand has shaped Cybernetica's sales strategy:

"Statoil is first priority, followed by other firms on the Norwegian continental shelf, and then firms around the wider North Sea Basin. This is a result of the technological competence needed to understand our product; something we know Statoil possesses, but we have seen less of in other companies on the Norwegian continental shelf."

Although Statoil remains the company's main priority, selling to Statoil has been complicated by the fact that Cybernetica provides consultancy services to Statoil's process environment, and the

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²⁰ Physical control models are based on a physical representation of the process in question, rather than the alternative experimental representation. This enables more robust control models that run for a longer period without maintenance

fact that Statoil develops a process model of their own. In relation to other clients, the company struggles with low visibility - as larger oil companies are preferred in the prime speech slots as conferences - and a need to rely on third parties in the client company for the business proposal to reach higher level management. A letter of intent was signed with ABB in 2007 allowing Cybernetica to exploit ABB's marketing channels and join ABB projects, without yielding any results as of today.

International Activity

Cybernetica currently has customers in Norway, the United States, New Zealand and Germany. Most client relationships are a result of the company's strategy of client followership, but there are also international clients that were unknown to the company at onset. All international projects are evaluated based on the condition that the company should be run from Trondheim for as long as possible – as more offices would involve both increased costs and risk.

While the company aims at continued growth in all three industries, only the oil and gas industry is targeted in their Brazilian expansion efforts. The Brazilian expansion effort was initiated by visits from Petrobras to the IO center²¹ at NTNU, where a board member of Cybernetica has facilitated meetings between the two companies. The Brazilian market expansion is regarded as an exception to the company's sales strategy, as it is believed that Petrobras is much more technology driven than the company's potential clients around the North Sea Basin (Statoil being an exception). This belief is based on the impression that a large number of Petrobras managers are recruited from CENPES²², and a long-term technology strategy requiring process control models.

Cybernetica has faced several challenges related to their Brazilian market entry. First, the local content demands are challenging due to the company's size and strategy of being able to run operations from Trondheim. The complex regulations have also made it hard for the company to separate actual regulations from what a customer prefers. Furthermore, Petrobras initially asked Cybernetica to contact TriSolutions – a Brazilian company delivering process optimization services – to evaluate the possibilities for cooperation. As TriSolutions did not answer Cybernetica's contact request, and Cybernetica does not find cooperation particularly interesting, it has been decided not to pursue this issue any further.

As of today, Petrobras has indicated a willingness to enter to cooperate on a research project with Cybernetica, and the two parties have agreed on the content of a research project. This research project is seen as a stepping stone for a follow-up project, and Cybernetica aims at sorting out the remaining pieces by September 2012. Financing of the project has been a challenge, due to conflict of interest between the parties. While financing can come from several sources (e.g. Petrobras, Innovasjon Norge or The Research Council of Norway) Petrobras has not been interested in committing resources, making it necessary for Cybernetica to contribute with own funding. Although skeptical to the idea of part-financing a research project for a client, Cybernetica has decided to go along with Petrobras' preferred choice:

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²¹ IO Center – Center for Integrated Operations in the Petroleum Industry

²² CENPES – Petrobras' research center in Rio de Janeiro

"We were skeptical towards an IRD agreement, but this eventually became the solution. I felt that Innovasjon Norge marketed the IRD solution in a way that blocked any chance of getting a real project in place. I still think so, but have learnt that an IRD agreement can be a natural first step due to Petrobras' circumstantial bureaucracy—with an IRD agreement we choose a path with much less bureaucracy."

The company's employees have a technical background, and the company's international experience is based on experience gained through Cybernetica's international operations. The company had performed some studies of the Brazilian market prior to the Navigator project, but regarded the project participation as a way to get much of the needed market information – for an amount of money that would either way have to be spent in order to get this outside the project.

Company size puts some restrictions on the number of risk factors evaluated in the internationalization process, a point illustrated when the former project manager of the company's Navigator commitment left the company:

"Steinar had time to work with these issues, but without him the pot of available resources is smaller. Consequently we have to peel away aspects that could be interesting to evaluate, and focus on one thing; getting a project with Petrobras. I think the outcome would have been the same anyway, but at least this is the way we do it after he quit."

Risk Management Activities

The Brazilian expansion and participation in the Navigator project where evaluated based on Cybernetica's overall strategy plan, as well as more detailed business plans for each business area. The company evaluated both how an expansion would influence their current strategy, and how the large the cost related to an expansion and the participation in the Navigator program could be. A budget for the activities related to the Brazil project was constructed, and the cost compared to the firm's overall budget, before a decision to go forward was made:

"We evaluated that we could handle the loss if we did not succeed, and saw a large potential; the downside is limited, and the upside is large. We have only decided to go through with the Navigator project under the condition that we will not establish any subsidiary in Brazil. If we want to take out our full potential in Brazil, the risk will naturally rise, and we will have to take a new evaluation — probably considering many more aspects than what we currently do. However, there will be a lot of incremental decisions along that road; because you chose A, you do not have to choose B."

The company does not use any formal frameworks in the process of identifying and evaluating risk, but evaluates the costs of each project against a company criterion of always budgeting with a surplus – a criterion naturally limiting the number of new projects the company can undertake. The fact that no formal risk frameworks are used can be explained by what the company considers a risk reducing organizational structures:

"We do not feel a need for using formal fault-tree analysis or statistical tools for evaluating the risk. We have built organizational structures for risk reduction including a quality system, contract templates that have been developed with lawyers, a strict employment process and a business culture of responsibility and accountability."

Cybernetica is aware of the risks related to entering a market with an unproven technology and low general visibility, but feels that the Brazilian market might be easier to penetrate than other markets with less technology-driven companies. The risk factors considered most important with

regards to the company's Brazilian strategy includes the risk of a monetary loss, and consequences faced if a later pilot implementation goes wrong:

"We ask ourselves: If we do not get anything out of this, what is the cost? The risk relied to a financial loss. The other big risk factor is the consequences, losses and law suits if we could face if we get a later implementation and fail — the liability for damages. We did not evaluate this last risk in any detail, but would we traditionally use lawyers and insurance agents to make sure we are covered if anything goes wrong."

4.2.2 Norske Ventiler

Year	Activity
1987	Two entrepreneurs establish Norske Ventiler, and the firm initially focused on maintenance of valves used in the North Sea.
Mid 1990s	Investments made in machines such as lathes and milling units, and an engineer with drawing competence, enabling Norske Ventiler to design and produce own valves
2005	An unsolicited demand from US and Canadian customers triggers the company's first international sales
2010	The company establishes itself in the subsea segment by the introduction of ball valves, connectors and valves. Internal discussions and evaluations of the possibilities for entering Brazil
2010	The company made its first sale to Brazil through the Norwegian branch of Aker Solutions Subsea
2011	The company joins the Navigator project

Table 5 – Key events in Norske Ventiler's history

Founded in 1987 by two local entrepreneurs, Norske Ventiler originally offered maintenance of valves used in the North Sea. The company later decided to backward integrate to valve manufacture by acquiring needed machines and personnel. Starting with producing low pressure valves in basic materials, Norske Ventiler later started producing valves in higher pressure classes and exotic materials. Norske Ventiler today specializes in delivering smaller, exotic material²³ valves with short delivery times to process systems in the oil industry. The exotic materials increase the valve price, but short lead times enable the company to charge a premium price. Although the company has traditionally focused on delivering top-side valves, sale of self-developed subsea valves is budgeted to reach 40 % of total revenues in 2012.

Sales Strategy

The next five years, the company aims at continued growth in the top-side niche segment, combined with product development and growth in the subsea segment. In the top-side segment, the company targets maintenance projects performed by EPC²⁴ firms on behalf of operators. In this segment, the new valves are likely to substitute old valves on a piping or line, implying a lower number of valves and a need for delivery within a specific time slot – e.g. a planned maintenance stop. Consequently, delivery time is an important buying criterion, making Norske Ventiler a preferred supplier. In the subsea segment, the company targets larger new projects as well as maintenance projects. The planning horizon in the new construction projects are longer than in the maintenance projects, but frequent specification changes makes flexibility a key competitive element.

²³ Any metal that does not fit within the major materials categories commonly used in manufacturing. Here it refers to metal or metal alloys such as titan, Inconel, Duplex, Super Duplex and stainless steel (6MO) (ToolingU.com 2012) ²⁴ EPC – Engineering, Procurement and Construction

In the top-side segment, Norske Ventiler's customers are either EPC firms or large valve traders²⁵, while the company sells directly to subsea companies within the subsea segment. This difference implies that subsea companies do not always know of Norske Ventiler. This was the case with Aker Solutions Subsea, although Norske Ventiler had a long relationship with Aker Solutions EPC department. In order to increase customer awareness, the company relies on word of mouth and relations in both segments, in addition to regular advertisements in relevant international journals and presence at large conventions (e.g. the ONS in Stavanger).

The choice of producing valves in exotic materials is a result of an inability to compete with large-scale valve manufacturers on purchase prices of less exotic raw materials. While stainless and carbon steel are the most common valve materials in the North Sea, the company has identified a trend of EPC companies increasingly use more exotic material qualities in their valve specifications:

"If one focus purely on purchasing price, less exotic materials can represent large cost savings. However, considering life cycle costs it is less expensive to purchase materials that are more expensive and get reduced maintenance costs over a 20-year period. In the Gulf of Mexico, there is a trend of EPC companies beginning to specify more exotic materials as a result of longer planning horizons on oil rigs and subsea systems. The same trend can be seen in the North Sea, were oil installations are re-certified for a new 10-20 years period — implying that much of the maintenance operations actually replace low quality materials with higher quality materials."

There are several direct competitors in the international market using the same production technique and/or possessing similar capacity of short delivery times. Norske Ventiler has identified direct competitors based in the Netherlands, Belgium, and England. While some of the competitors have a larger product assortment, none can match Norske Ventiler's lead-time. The short delivery times and flexible production process is a result of a choice to use steel bars in order to machine, rather than cast, valves:

"The cast process requires a larger number of valves to be economically efficient and casts one valve size and material at a time. Our machining process is able to handle 10-12 different orders simultaneously — with different delivery times and material quality."

International Activity

Norske Ventiler's first international sales were a result of unsolicited orders from US and Canadian customers, eventually leading the company to identify a potential for international sales. The company currently serves customers from Norway, Scotland, England, Denmark, Belgium, the Netherlands, the Middle East, Singapore, Australia, Brazil, Canada and the United States. Customer references from the North Sea basin is a vital facilitator of international sales, as the customers are usually the same large EPC firms that operates in the North Sea. In fact, a large share of international sales are delivered through the end customers' Norwegian representatives:

"A large share of our deliveries are delivered and invoiced in Norway. The customer then installs the valves on different skids and X-mas trees before exporting it as one unit. We have delivered equipment to FMC's Kongsberg office and to Aker Solutions Subsea this way, with final delivery addresses in Russia and Angola. For us this set-up is risk free, and preferable to the alternative of sending the bill and delivery to an address in Angola."

²⁵ The valve traders often operate on behalf of EPC firms, ordering single valves or building a valve package from different suppliers.

Using publicly available information from Innovasjon Norge and Intsok, the company evaluated the market potential for valves in the Australian petroleum sector eventually deciding to serve the market with an agent due to the geographical distance. An identical approach was used for evaluating the Brazilian petroleum sector before the company was contacted regarding the Navigator project. The company had at this time decided to enter the Brazilian petroleum sector, but uncertainties regarding how to enter the Brazilian market made the Navigator project an attractive option. The main motivation for entering the Brazilian O&G industry is the large market potential, combined with the presence of EPC companies familiar with Norske Ventiler:

"The real trigger is the potential; Brazil will become the world's largest oil nation within a 10-year period. The salt layer field found outside Rio is likely to be the world's largest, regardless of what you compare it to. There is an enormous demand for almost everything in the Brazilian oil sector, and what is going to happen in the next ten years is so big that you have to position yourself now if you want a piece of the cake. As the EPC business is inherently global, the customers will be the same — so in principle it is exactly the same customer, and you can say we are simply following customers that have an international attitude."

In earlier market entries to countries on other continents, the company has used sales representatives. External representation was originally also thought of as the optimal entry strategy in the Brazilian market, as large distances makes it tiresome and resource demanding to visit the country frequently. However, Norske Ventiler has now settled on a strategy of selling to Brazilian subsidiaries via their Norwegian EPC customers. This choice is seen as less risky, resource demanding and costly than the alternatives:

"When we chose to focus on the Norwegian customers' entities in Brazil, which after all covers 60-70 % of the market, the whole strategy became significantly easier. We did not have to consider distributors, agents, or an eventual establishment, making the strategy less resource and cost demanding than the original alternatives."

With a hesitation to establish an own subsidiary, the largest challenge the company faces when entering the Brazilian market is the demand for local content. This has consequences for the segment targeted in the Brazilian expansion. Rather than focusing on both top-side and subsea valves, Norske Ventiler has decided to focus primarily on the subsea segment in Brazil – as this seems to represent least difficulties:

"In meetings with Petrobras and other large oil companies we were given a lecture on local content requirements. However, in meetings with subsea actors like Subsea7, Oceaneering and Aker Solutions Subsea this was not on the agenda. When I asked directly, they told me that they had no choice but to purchase our equipment — regardless on importation costs or restrictions — as the products are unavailable in South-America and they have to have it."

Risk Management Activities

The top management of Norske Ventiler has considerable international experience. Both the VP of sales and marketing (no longer involved in the project due to a long-term sick leave) and the managing director has experience from international business activities. This experience is an important asset in the risk assessment process, as the firm use what they label common sense rather than formal risk assessment models:

"We do not have any formal models — other than what you might call common sense. You can use common sense in quantifying the costs, and then you have to be certain that you can secure a sales volume that will cover those costs. You can analyze yourself to death considering costs and possible scenarios, but in the end, it balances on whether

you really believe in it. It is clear that a large order will demand more effort into this. If something relevant turns up we will put more money into it — but we do it in that order."

Experiential and institutional knowledge from members in the NCE Subsea maritime cluster, Innovasjon Norge and Intsok provide important support in both the market evaluation and risk assessment process. The maritime cluster has been used to meet managers with experience from establishment in similar markets, to confirm that the company is heading in the right direction. Innovasjon Norge and Intsok have been used in order to get publically available market data, and have to some degree been directly contacted to get help evaluating the market.

The largest risk identified by the company is the risk of losing money, and this aspect makes the establishment of a subsidiary in Brazil unrealistic unless very certain estimates on future sales volumes can reduce the risk. Neither intellectual property theft, nor cultural differences are seen as large challenges. Intellectual property theft is ruled out due to a time consuming, resource demanding process of imitation and low prospects of gaining returns. Cultural differences are not considered important based on the managing director's experience:

"I have travelled the world, and have a very relaxed attitude towards cultural differences. There are cultural differences, but then again; smile to the world and the world will smile back. There is a lot of literature out there, but I have a very relaxed attitude towards it.

Concerning resources, the company emphasizes that limited organizational resources constrain how thoroughly the Brazilian market can be evaluated. The chosen strategy for entering the Brazilian market is a result of these constraints:

"We do not really see any risk factors related to the Brazilian market entry as long as we stick to the known customer constellations. These are customers we have served for a number of years, and we assume that their Brazilian subsidiaries have the same internal procedures as their Norwegian offices."

4.2.3 SafeClean

Year	Activity
2002	Overflateteknikk is established on the estate of a bankrupt supplier of industrial paint cleaning services
2002-	Overflateteknikk delivers onshore services for chemical cleaning of paint and offshore services for offshore cleaning of process systems and components
2007	Overflateteknikk leaves the onshore paint-cleaning segment, and rebuilds the plant in Høyanger to be
2007	able to clean pipes and other removable offshore process system components. A sister company, Industrial Chemicals, is established with the purpose of becoming self-reliant on chemicals.
2007	Overflateteknikk is encouraged by Statoil to develop a method for handling the waste generated in the chemical cleaning process. Avfallsteknikk is founded in order to separate the wash water components and handle them according to individual waste handling specifications.
2008	Overflateteknikk is self-reliant on chemicals (from Industrial Chemicals)
2010	Avfallsteknikk and Overflateteknikk merge, and the company name is changed to SafeClean

Table 6 – Key events in SafeClean's history

SafeClean, formerly Overflateteknikk, was built on the estate of a chemical paint cleaner and initially offering paint cleaning services for the industry in the vicinity of Høyanger. As one of the founders had experience from maintenance work in the offshore industry, the company also started to deliver chemical cleaning services for offshore process systems. Discovering that the offshore cleaning services provided a significantly higher income stream, the land-based paint cleaning services were abandoned in 2007. The company rebuilt its plant in Høyanger to handle equipment and pipes sent onshore for cleaning purposes, and established two sister companies.

The first company, Industrial Chemicals is established in order to become self-reliant on cleaning chemicals, while Avfallsteknikk was established in order to handle waste handling demands for wash water components. After the merger of Overflateteknikk and Avfallsteknikk in 2010, the new company was named SafeClean.

Today, SafeClean provides chemical cleaning services for process equipment in offshore installations - offering on-site cleaning for fixed or unmovable equipment, and onshore cleaning for pipes and other movable equipment. The equipment brought onshore is sent to the company's location in Høyanger, where fouling²⁶ materials are removed before the equipment is sent either back offshore or to a third party for remelting. The offshore cleaning can be done as a shutdown operation on a cold platform where the whole process system is cleaned in one operation, or component-wise as a non-shutdown operation. When working offshore the company brings both pumping equipment, chemicals and own personnel offshore.

Sales Strategy

Safeclean's customers of chemical cleaning services are operators in the Norwegian section of the North Sea (Statoil, Conoco-Phillips, BP). SafeClean's marketing and sales efforts are directed toward the operations and maintenance divisions of the operators. These divisions are targeted in a two-fold approach; onshore employees contact managers within operations, maintenance and production with responsibility for daily operations offshore, while offshore personnel give presentations to the operation and maintenance divisions when they get the chance. The main challenge of the sales process is to get into a position to present their cleaning serivces to relevant client company representatives:

"It might sound wild, but the times where we get into position with the right persons, and get sufficient time to explain our concept, it most often results in a test assignment. After a test assignment, we have a high resale factor through repeated assignments. If you break it down, the key to the whole sales process is getting in position to explain the effects of the concept."

SafeClean's chemical cleaning services represent large cost savings and divisional savings compared to a mechanical cleaning process, which would require more time and more personnel exposure to hazardous waste (e.g. low-level radioactive waste). What separates SafeClean from competitors within the chemical cleaning segment, is an ability to separate the fouling materials, hydrocarbons and chemical liquids from the water solutions – allowing each component to be handled according to its waste handling specifications. SafeClean's most significant advantage compared to its competitors, in addition to the inherent advantages in chemical cleaning, is full control over the cleaning components used. The detailed knowledge of chemical components enables the company to separate the resulting wash water and handle each component individually.

International Activities

SafeClean did not have any plans of internationalization before being contacted by Innovasjon Norge regarding the Navigator project. Feeling that the company still had unproven potential in the Norwegian offshore segment – Safeclean is currently in a bid process for a general agreement with Statoil, their largest customer – the Navigator project was regarded only as a non-binding

²⁶Build-up of unwanted material on the inside surface of process equipment

opportunity to get insight into an unknown market. However, the motivation for internationalization has increased:

"During the course of the [Navigator] project, we have received a lot of information and mental barriers have been broken. In this regard it is really the process that has made us sure that there is a market there — that we have a potential worth allocating time and resources to."

Safeclean is targeting the same customer segment in Brazil as in Norway - with Petrobras as the primary target due to their size. The company has visited Brazil also outside the arranged trips in the Navigator project in order to pinpoint the attractiveness of their solution to Brazilian clients. As in their home market, the sales and marketing efforts are targeted towards representatives from different operations and maintenance divisions inside Petrobras. The necessary meetings have been arranged by the local Innovasjon Norge office. The company follows a similar strategy as in the Norwegian market:

"What we have chosen of strategies is solely based on success stories from the home market. Our goal, within the first year, is to perform a pilot assignment. This pilot ought to be possible to perform without establishing a legal entity in Brazil, but rather through import of all input factors from Norway before doing the work offshore. We then hope that the results will create interest among customers to such an extent that they will help us in a future establishment— and possibly be a contributor to forming our Brazilian strategy."

While SafeClean has mapped its competitive environment in Norway, it has not done substantial research on the Brazilian market besides asking Petrobras employees if any other firm currently offers similar services. The company has not yet decided which form of entry that will be sought after a successful pilot project. In different workshops, Osterwalder and Pigneur's (2010) business model canvas has been used to evaluate three entry forms – joint franchise, agent representation and a fully owned subsidiary. Each entry form has been simulated, without yielding any clear preferences:

"We have simulated the three business models based on the situation possessed today. Based on this we see clear advantages and disadvantages with the different models, but do not have enough knowledge of the Brazilian market to take a definite decision. We have evaluated some scenarios based on the current information, and then we will have to adjust them as new information is available before finally reaching a point where we can say 'this is the business model' worth pursuing'

Although SafeClean has not made any decision with regards to their final entry mode, some sort of local presence is viewed as highly probable:

"When it comes to establishment, we do not regard local content as an obstacle as many others do. We rather regard it as a possible competitive edge, and when we have decided to establish we want to do it all the way; by increasing the local content as much as possible. An establishment will therefore most likely involve some kind of cooperation with a Brazilian company. A company that can complement our products, have access to an offshore base along the coast, or want to expand a product line within maintenance."

Risk Management Activities

In the risk assessment process, SafeClean draws on both internal and external sources of knowledge. Without any international experience among the managers involved in the Brazil project, Innovasjon Norge and Intsok are regarded as vital partners in the knowledge gathering process. No systematic framework is used in the risk assessment process, but there is a focus on

continuous evaluation of individual risk factors identified during the course of the internationalization process. The company believes a more formal process is needed as the internationalization process unfolds. Although the process is not formalized today, it is still quite thorough:

"Risk assessments mean that you have to draw the complete risk canvas; getting it up on the board and evaluating each individual element is vital. You can always estimate that you have a large potential to succeed, and you can be interested in doing things a certain way—but we cannot afford to fail, we have to do things right. Considering the size of our wallets, we are not in a position to jeopardize the company by risking a [NOK] 5-10 million loss without knowing that you have a certain payback. We have to be careful, and eventually you will get to a point where you have to make a strategic decision—but the foundation for such a decision is not there yet."

The largest challenge faced by the company is the Brazilian import regime, potentially hindering vital material shipments from Norway. In order to solve this problem, the company is following a two-fold strategy. In Brazil, Innovasjon Norge is used to get in touch with agents and companies that can facilitate logistical operations. In Norway SafeClean seeks to use companies with an extensive experience on transport and logistics in the offshore business – actors that are established in Brazil and know the system from the inside. The company also plans to gather necessary information and simulate a delivery, thus expecting to discover barriers that have not yet been identified. The waste disposal regime is expected to differ from the Norwegian market, but these differences are not expected to yield any significant problems to the company.

Other challenges that have been identified by SafeClean include the possibility partner opportunism, in the form of intellectual property (IP) theft, corruption and cultural differences. The collaborator opportunism reflects the possibility for the company to be sidelined by an eventual partner. IP theft is another concern, and the company has chosen not to patent their products in a bid to not make their technology publically available – thus preventing competitors from making small adjustments to circumvent a patent. Lastly, challenges related to corruption and cultural differences are sought mitigated through internal competence building in the company. With regard to cultural differences, especially the apparent positivity of Brazilian market actors (masking an eventual negative message) and questions regarding the loyalty of Brazilian workers have been stressed as important to be aware of.

4.2.4 Sperre

Year	Activity
1993	Sperre is founded, a company focusing on building of ROVs and offering ROV inspection services
2001	The company sells its first ROV outside Norway
2006	The company makes its first sale to the O&G industry
2009	Sperre enters a sales agreement with MacArtney Underwater Technology Group
2012	The company makes its first sale to the Brazilian market – a ROV unit for use on a navy vessel being
	designed by a Norwegian friend of Sperre's CEO.

Table 7 - Key events in Sperre's history

Tor Olav Sperre founded Sperre in 1993 and is still the owner and CEO of the company. With a background as a diver, he started making his own ROVs before starting the company, which focused on selling ROVs and ROV inspection services. The firm initially focused on offering ROV inspection services, but has gradually shifted focus towards direct sales of ROVs in order not to dip into their client's markets. Sperre today builds electrical remotely operated vehicles (ROVs) for the offshore, fish farming and hydropower industry. The ROVs are often used for

inspection purposes, and each ROV is customized to fit the customers' specific purposes and needs. The company has a large service portfolio, and offers direct sales and rental of ROVs, sales of ROV related equipment (e.g. cameras and lights) and diving equipment, and maintenance services for ROVs and hyperbaric chambers. Sales of ROVs generate the largest revenue share, and the main revenue drivers are the contracts in the oil industry.

Sales Strategy

Sperre's clients represent a number of industries, ranging from the offshore industry to the fish farming and hydropower industry. In the two latter industries, deliveries are usually small, often only consisting of the ROV itself and a smaller winch as the ROV is operated in shallow waters inspecting fishing nets or hydropower inlets. In the offshore industry, a typical delivery often includes larger winches, A-frames and a control container for the ROV operation.

A typical sales process often starts with a request for quotation from a company, followed by a tendering process. In this process price is a typical competitive element, although Sperre is offering a more customizable design than large scale competitors. When a ROV is sold, the client is invited to Sperre's facilities at Notodden in order to learn the basic build-up of the equipment and how to do self-service of the ROV. Sperre also encourages clients to bring their ROVs to Notodden for a yearly maintenance service, although the ROVs are designed to be maintained by the clients themselves. Several clients buy additional ROVs after the first purchase – making resale an important factor in the sales strategy. Sperre has not made a detailed business plan, but is present at selected industry conventions and advertises in some industry magazines in order to increase their market visibility:

"We have been quite spoiled in our home market, always having a lot to do, so we do not have a specific business plan — although we subconsciously market ourselves at industry conventions and rely much on the word of mouth."

International Activities

Although 80 % of sales are to Norwegian customers, Sperre has sold ROVs to all the Nordic countries, Russia, the US and Brazil. The company has only made on sale to Brazil, and the sale was a result of a recommendation from the Norwegian ship designer, who is a business partner of Sperre's CEO. Sperre serves the international market with a twofold strategy; the MacArtney Underwater Technology Group acts as a sales agent in countries where they are present, while Sperre handles sales to remaining countries.

The agreement with MacArtney Underwater Technology Group was made in order to strengthen Sperre's international presence, as the MacArtney group can leverage size, extensive market experience and a solid reputation. The MacArtney Group has been a supplier to Sperre for 20 years, and will now handle sales in most countries where MacArtney has an office. Sperre will help the group drafting bids, but will not be in direct contact with the end-customer. The ROVs are sold to MacArtney, which sells it to the end-customer either as a stand-alone product or bundled.

Although the company had international ambitions due to a small home market, Brazil was not a strategic target for the company before Sperre was asked to participate in the Navigator project by the local Innovasjon Norge office. As the offshore segment generates the largest revenues for the company, this industry is targeted in Sperre's expansion efforts in Brazil. More specifically,

the company wants to target the area vessels offshore, delivering ROVs for subsea observation and inspection services. The MacArtney group is already present in Brazil, and Sperre wants to extend their current sales representative agreement to include the Brazilian market. MacArtney is envisioned to deal with both sales and after-sales service – and potentially welding and final assembly of the ROVs to satisfy local content regulations. The company has explored other potential partners in Brazil, but none of them match MacArtney's attractiveness. Establishing a subsidiary is regarded as too expensive and resource demanding for the company:

"We are planning to use MacArtney as a dealer for us in Brazil as well. We will not establish ourselves in any way if MacArtney is interested — and as long as they make an equal to sell our products as in the other countries they represent us. We are far too small to do it on our own, and we see that knowing the language is an advantage [MacArtney has local employees in Brazil]. It is also an advantage to know how the Brazilians behave — it is very different to do business there compared to how it is done at home."

The company has both Norwegian and international competitors that they meet in tendering processes, but has not performed a detailed study of the competitive situation in the Brazilian market:

"What our competitors do towards the Brazilian market; we have not figured it out yet, and have not used many resources on it. It would of course be interesting to know, but people say Brazil is kind of similar to the Norwegian market in the 80s – so we definitely have an opportunity to succeed there if we get MacArtney to believe in our products."

Risk Management Activities

Concerning risk in the internationalization process, no detailed framework is in use. However, the company has a quality system that it uses to limit the risk of technical faults. When the company loses a tender, the quality system is updated with the feedback from the holder of the tendering process – this way the company is better prepared for the next tendering process they enter. The company also perform a technical risk assessment prior to foreign assignments, illustrating that the main risk considered by the company are of technical nature; live circuits, faulty documentation and faults relied to a client's improvised repairs. The company believes to have these risks under control:

"To us risk would be to deliver faulty equipment, getting a bad reputation, but I cannot really remember any fatal faults. We have put time and resources into documentation and standardization, making it easy to do maintenance and explaining what not to do with the ROV. There is always a certain risk of failure, but we manage to repair the equipment. If something is returned under warranty it might get expensive, but it usually turns out all right—we have always landed on our feet."

Brazilian import regulations are regarded as most important challenge for handling the Brazilian market. This is partly based on the company's earlier export experiences, which included considerable paper work and in some cases an application for an exportation license. However, the company does not believe importation challenges will result in any insurmountable obstacles:

"We have kind of an open mind; we do not believe that it [importation] will be a huge problem, we just have to try and see how it goes. At the same time we know that Brazil has some special regulations that you need to relate to in order to avoid the largest pitfalls — but this something we need to deal with as it occurs. We have sold some equipment to Russia, a market many are skeptical to trade with, but we have not experienced any major challenges there."

Empirical Background

Lack of a Brazilian network and local content demands have also been identified as challenges. While the first is sought overcome through the relationship with Innovasjon Norge, Sperre plans to satisfy local content regulations by letting MacArtney do part of the assembly of ROVs in Brazil.

5 Empirical data analysis

The cross-case data analysis follows the structure outlined in the theoretical background, where the firms' risk assessment process is separated into the three distinct phases; risk identification, risk evaluation and risk mitigation.

The analysis of each phase follows the same pattern. Each phase is introduced by the main findings of the data analysis followed by a table listing the B-categories found in the cross-case analysis of the identified A-categories. Further, each B-category is discussed under a separate heading, making the argumentation underlying the formation of each B-category transparent. Under each discussion, the A-categories supporting the relevant B-category are presented in a table.

5.1 Risk Identification

The risk identification phase is found to be influenced by the firms 'resource constraints and perceived level of uncertainty. The perceived level of uncertainty is influenced by firm- and managerial experience, as well as third party inputs. Innovasjon Norge seems to have an important role both in reducing the resource demands in the internationalization process of small firms, and in reducing the perceived level of risk in the internationalization process – thus reducing both resource- and psychological barriers of internationalization. Further, the risk identification process is found to be a muddling-through process by default, and a process where formal risk assessment frameworks are not used.

B-Categories – Risk Identification

- The resource constraints of SMEs shape the risk identification process by reducing the scope and the number of entry strategies evaluated
- 2 Experience strongly influences the perceived level of uncertainty, and what risk factors are identified
- 3 Personal characteristics of manager(s) are influential to the thoroughness of the risk identification process
- 4 Third party input is of high importance in the risk identification phase, both to fill own knowledge-gaps and to confirm managerial perceptions
- 5 Normal reasoning, assumptions and gut feelings replace formal risk models

Table 8 - B-Categories for risk identification

5.1.1 Resource-Limitations Reduce the Scope of the Risk Identification Process

The involved case firms all have a limited number of employees and small turnover compared to larger companies; both within the SME classification - which can include companies with up to 250 employees - and certainly compared to large MNCs. The resource-limitations do influence the case firms, both in terms of scope and process structure, but this is not regarded as a large problem by the involved companies.

Cybernetica focuses specifically on how the limited human resource base makes it difficult to use specialists in each process, and how the roles are necessarily more fluent in a smaller company. The company also experienced how resource constraints make it necessary to peel away aspects that could otherwise have been evaluated. This is in line with Norske Ventiler, which emphasizes that the amount of resources limits how thoroughly the market can be evaluated. In addition, Norske Ventiler states that the resource base influences which strategies are evaluated as potential entry strategies — as a limited number of entry strategies reduces the scope and complexity of the risk assessment process. SafeClean also recognizes that resources have an impact on the risk

assessment process, but emphasizes that the inherent uncertainty is another important factor for how systematic the risk assessment process is - as high uncertainty makes it difficult to plan an approach beforehand. Lastly, when asked how resources influence the risk assessment process, Sperre's answer is shaped by the fact that they focus more on technical risk aspects than business risk. The risk assessment process is only performed prior to performing an assignment for a foreign customer, and given the technical scope and internal technical product competence the resource limitations is unlikely affect this process to the same agree as in the other case firms.

1: The resource constraints of SMEs shape the risk identification process by reducing the scope and the number of entry strategies evaluated

- Our company is very small, and the roles are very fluent. We mostly do this on an ad-hoc basis, arranging a A11-19 meeting and deciding something. We are light-footed in that aspect, you would certainly get another answer talking to a larger company.
- If a larger company were to do something, they would immediately put a specialist on the task, focusing on processes, the decision-making basis, etc. When you only see a part of the total picture, you need much more rigid processes.
- A11-27 Steinar had time to work with these issues, but without him the pot of available resources is smaller.

 Consequently we have to peel way aspects that could be interesting to evaluate, and focus on one thing (..).
- A12-14 Our resource base limits how thoroughly we can investigate the Brazilian market. We do not have an abundance of resources, and this is also a reason for the strategy we have chosen in Brazil.
- [The degree to which risk assessment is systematic] does of course have something to do with resources, but it is also difficult to have a theoretical approach to this up front, Then you have to make up scenarios based on inadequate information. (...)We can always sit down and try to think about what will meet us, but we risk throwing it in the bin right afterwards
- A14-20 We have not evaluated business risk up until now, but when we lose a tendering process we always ask why we did not succeed and put this into our quality system.
- When we do routine assignments in the Norwegian market we have not specified any specific requirements with regards to risk, but in relation to foreign assignments we always perform a risk assessment prior to the job.
- Table 9 A-Categories: Resource constraints in risk identification process

5.1.2 Experience Influences Risk Identification

The experiences gained by the management teams influence the risk identification process of all case firms. A common trait is a tendency of a comparative analysis of the risk picture in Brazil relative to the companies' Norwegian operations, and international experience, if any. The experience leads to clear differences in the perception of risk among the case companies – especially relied to local content demands and cultural differences.

SafeClean specifically states that the firm's risk identification strategy involves comparing Norwegian and Brazilian market differences, and while the other firms do not explicitly state this as a strategy there is a clear tendency of similar comparisons. While Cybernetica states that the company considers the risk of entering Brazil as elevated relative to other market they have presence in, Sperre compares import regulations in Russia against Brazilian import regulations when stating that the Brazilian import system should only offer surmountable challenges. Lastly, Norske Ventiler compares sales of valves to the Brazilian market to its other national and international sales – not finding Brazilian sales to be any different.

SafeClean and Sperre consider the local content requirements as an opportunity, and neither firm use the words risk or added uncertainty in association with local content demands. This can be explained by the impact of experience, as both Norske Ventiler and Cybernetica explicitly perceive local content demands to involve both uncertainty and risk. While SafeClean has experience in separating their chemical cleaning services and the production of chemicals into

two separate companies, Sperre's experience indicates that customers are able to dismantle and assemble the ROVs – indicating that assembly of the ROV is possible to do leave to a Brazilian agent. Neither Cybernetica nor Norske Ventiler have any experience in production splitting, and both companies international experience suggests that it is possible to run international operations from Norway. Local content demands make running the business from Norway more challenging, and both companies experience difficulties in understanding whether the local content demands can be avoided and how the requirements will affect their currently planned and future operations.

Cultural differences represent another area where experience clearly influences the firm's perception of risk. Norske Ventiler's manager states that his experience makes him treat cultural differences as a low risk factor, as they are possible to overcome by mutual adjustment. Sperre's representative relies on similar experience when drawing on sales to Russia and a female presence in a male dominated oil industry as factors reducing the challenges of cultural differences — although the firm does not completely rule out the challenges of cultural differences realizing that a local agent is necessary to understand how Brazilians do business. Cybernetica relies on experience telling them that the hardest part of making sales is convincing a potential client of the technological potential, and although the company recognizes the risk inherent in operating in the Brazilian market, the cultural risk of cooperating with Petrobras does not seem to be considered a factor worth additional focus. Lastly, SafeClean is the company which finds cultural differences to be most challenging. This perception is grounded in how the company lacks experience in the Brazilian market, and how the company has not been exposed to risks related to cultural differences, risks or bribes before.

2: Experience strongly influences the perceived level of uncertainty, and what risk factors are identified

- A11-18 The risk of entering Brazil is large. It is a hard country to do business in compared to the other markets we are in and we also skip several steps. We should have started with the home market, getting as far as we could there before taking on the North Sea Basin.
- A21-01 We believe that Petrobras, since they recruit a high amount of managers from Cenpes and have adopted a long-term technology strategy, will be more open for our technology.
- A12-04 Selling valves for use in Brazil through the large engineering companies makes it just like any other sale. This simplifies the process, and we avoid complicating the process through having to consider all criteria related to other entry forms.
- A22-15 I have travelled the world, and have a very relaxed attitude towards cultural differences. There are cultural differences, but then again; smile to the world and the world will smile back. There is a lot of literature out there, but I have a very relaxed attitude towards it.
- A13-07 We try to uncover what is different between the Norwegian and Brazilian market. The customer challenges are exactly the same, but doing business down there is completely different.
- A13-10 We are more or less not exposed to cultural differences, corruption and bribes at home. Down there you will be exposed automatically, so you will have to think this through before you go
- A23-22 While many regard local content with skepticism, we turn it around and believe it will give a competitive edge. At least it is a strength looking at it this way, and we will stimulate as much as possible to raise the local content.
- A14-06 The largest challenge operating or selling abroad must be to get equipment through customs clearance with all the papers and commotion there.
- A14-11 We have not really identified any particular risks tied to the Brazilian expansion. In order to get Brazilian content we can deliver the electronics, and they can weld and finish the assembly in Brazil maybe even machine something.
- A24-02 We have been selling to Russia. While many ask us how we dare to do it, and how we do it, we have not really experienced any problems there.
- A24-08 There is a certain distance, but after you have become friends with a Brazilian from what I have understood you are really good friends. It might be harder to establish relations, but a female in the oil and gas industry is so rare that I think it is possible.

- A24-10 I think we are dependent on finding a Brazilian partner, to really understand how the Brazilian are behaving it is quite different how business is done there compared to at home.
- A24-11 Doing part of the production in Brazil should not be that hard. We can make the drawings, and they can do the machining.
- Table 10 A-Categories: Perceived level of uncertainty in risk identification process

5.1.3 Managerial Risk Perceptions Influence How the Risk Identification is Performed

In addition to the influence of experience on what risk factors are considered to be important, perceptions of risk among the managers are seen to influence the thoroughness of the risk identification process.

SafeClean exhibits traits of risk aversion, as the company is not certain it will be able to handle a financial loss tied to failure in Brazil, and this is expressed through a need to gather more information before a final decision is taken. The risk identification process of SafeClean therefore seems to be more thorough than what is the case in some of the other companies. Norske Ventiler emphasize that it is impossible to analyze all scenarios, and that the decision will eventually depend much on a general feeling of belief in the project. When asked whether cultural differences could be an important risk factor, the manager had a relaxed attitude towards the differences and did not see a reason to investigate them more thoroughly. The evaluation of a subset of risk factors is also a trait in Cybernetica's risk identification process. Feeling that the risks involved in the Brazil project is within what the company can handle financially – the company will not establish a subsidiary, and a cost estimation showed the costs could be covered within the current company budget – the risk identified are specifically related to a research cooperation with Petrobras. Sperre seems less risk averse than SafeClean, realizing that they might be competing with larger actors but operating without a specific strategy towards them. The most obvious example of these differences is SafeClean's use of delivery simulation to identify risk sources in the importation process, and Sperre's strategy for overcoming import hurdles as they occur – not worrying unless it is necessary.

3: Personal characteristics of manager(s) are influential to the thoroughness of the risk identification process

- A11-21 We evaluate risk based on two aspects; our long-term strategy, and a criterion of always budgeting with positive returns
- A12-26 When we evaluated the risk of the Brazil project, we made a budget and evaluated the cost related to the project with the available budget resources. We saw that we had the necessary resources; if we lose the money, we can afford it.
- A11-27 Steinar had time to work with these issues, but without him the pot of available resources is smaller. Consequently we have to peel way aspects that could be interesting to evaluate, and focus on one thing; getting a project with Petrobras. I think the outcome would have been the same anyway, but at least this is the way we do it after he quit.
- A12-13 We do not really see any risk factors related to the Brazilian market entry as long as we stick to the known customer constellation. (...)
- A22-10 You can analyze yourself to death, both considering costs and possible scenarios. However, in the end it balances on whether you really believe in it, if the organization believes in it, and if there is any substance to it
- A22-15 I have travelled the world, and have a very relaxed attitude towards cultural differences. There are cultural differences, but then again; smile to the world and the world will smile back. There is a lot of literature out there, but I have a very relaxed attitude towards it.
- A13-06 The size of our wallets is another reason that we cannot take any decision with the current information. We cannot risk locking up 5-10 million without a certain payback

- A23-05 We work a twofold strategy on the importation problem. Through Innovasjon Norge we try to get in contact with agents or companies in the business of facilitating importation to Brazil. At home we contact actors that have experience from transport and logistics in the offshore industry actors that are established in Brazil and know the system from their side.
- A23-06 We think working these two directions ought to make it possible to point to a practicable way through the customs clearance. Then we have to consolidate the information, and simulate a delivery. The simulation is likely to identify some fences that we have to evaluate further.
- A23-25 Risk in the expansion process is a crucial factor; we basically cannot afford to fail (...)
- We could have stayed in Norway (...), but we have higher ambitions. We realize we might be a competitor to the larger actors, but we try to hang in there.
- A24-09 We have an open mind with regards to importation, we do not think it will be a huge problem. We just have to try and see how it goes, although I know there are special regulations in Brazil. We just have to cross the pitfalls when we get there, not taking the sorrows for granted
- Table 11 A-Categories: Managerial characteristics in the risk identification process

5.1.4 External Knowledge Provides Important Complements to Internal Knowledge

All firms are dependent on external sources to complement own knowledge in the risk identification process. Innovasjon Norge naturally plays an important role for the companies, both as a direct source of information and through referrals facilitated by the organization's extensive network. Consequently, Innovasjon Norge is one of several external sources of information for the case firms, but play an essential role in facilitating the firms' internationalization process through pushing the firms risk frontier – several of the case firms would not have evaluated a Brazilian venture without being contacted by the Navigator project.

Neither SafeClean, nor Sperre would have considered entering the Brazilian petroleum sector unless contacted regarding the Navigator project. For both companies, the Navigator project constitutes an important asset in the risk identification process, as a source of information and for referrals. While SafeClean emphasizes Innovasion Norge's role in breaking both resourceand mental barriers in the internationalization process, Sperre focuses on their role as a door opener for a company without an extensive network. Cybernetica considered entering the Brazilian petroleum sector before being contacted by Innovasjon Norge, but still points to Innovasjon Norge's role as an information provider. Recognizing that the costs for participating in the Navigator project is small compared to the cost of gathering the information, the company decided to join the Navigator project. Lastly, Norske Ventiler uses the market information provided by Innovasjon Norge and Intsok to evaluate the market potential in markets of interest. In addition to this, the company is the sole company to exploit a cluster membership for additional information and experiential knowledge - reducing the firm's reliance on Innovasjon Norge for these aspects. The cluster meetings and network are exploited to get feedback on risk aspects and strategies that Norske Ventiler has evaluated – a trait Innovasjon Norge pulls forward as a historically important contribution from the Navigator projects to the participating firms.

4: Third party input is of high importance in the risk identification phase, both to fill own knowledge-gaps and to confirm managerial perceptions

A21-27 Brazil is a country that we have studied a little, and we had some contacts before the Navigator project contacted us. However, we regarded the participation as a way of performing much of the necessary knowledge gathering – which we would have to do regardless – for a limited cost.

- A22-09 We use the NCE subsea for cluster meetings and relationship building. Even if we have decided upon a strategy, it is very comfortable to get feedback from people that have done what you want to do, or have successively established elsewhere. To get a confirmation that what you do seems somewhat right.
- A22-11 I usually say that there is nothing as underrated as good relationships. Being a cluster member, meeting firms you can identify yourself and your product with it is usually free, and far preferable to paying for consultants that will tell you whatever you want to hear without much substance.
- A22-17 After internal discussions of the possibility to enter Brazil, we did an evaluation of the Brazilian valve market using number from Innovasjon Norge and Intsok. It gave us a firm understanding of opportunities in this market for the next 10-15 years, and we evaluated the possibilities for establishing contacts via Innovasjon Norge, Intsok or other government entities.
- A13-17 We use both internal and external sources to identify risk factors. The commitment of Innovasjon Norge has been very positive; they offer a huge commitment and a short response time.
- A13-22 We had not evaluated neither Brazil nor internationalization in general when Innovasjon Norge invited us to join the Navigator project. We were uncertain in the beginning thinking that we still had much undone in the home marked but decided to join based on a feeling that we could always pull out of the project. However, we have received much information during the project breaching barriers and mental barriers so it's really the process that makes us certain there is a potential that we want to spent time and resources on.
- A23-05 We work a twofold strategy on the importation problem. Through Innovasjon Norge we try to get in contact with agents or companies in the business of facilitating importation to Brazil. At home we contact actors that have experience from transport and logistics in the offshore industry actors that are established in Brazil and know the system from their side.
- A23-27 Innovasjon Norge has an extensive network. They know who to go to, and then we can talk further with these contacts. It has been of great help.
- A14-15 MacArtney has been in Brazil for about three years, but it was not straight forward for them I think they stumbled a bit in the beginning. (...)
- A14-17 They say that you have to have Brazilian content in Brazil, or pay full import fees and that it is very expensive to get things into the country (...)
- A24-19 We would never have been in the position we are in today with regard to Brazil had it not been for the request from Innovasjon Norge. They have been an important door opener for us, and efforts like the Navigator program is very useful for smaller firms that cannot bear the cost of making such efforts alone.
- Table 12 A-Categories: Third party input in risk identification process

5.1.5 Formal Risk Models are Not Used in the Risk Identification Process

None of the case companies employs any formal risk assessment models in the risk identification process, although one of the companies uses a business model framework to simulate how different business models would be organized in the Brazilian market – facilitating the identification of risk factors. The remaining companies do not find it worthwhile to apply any specific framework for identifying risk factors, and largely identify risk factors based on their potential costs.

SafeClean is the company with the most formal risk identification process, employing a model for mapping a business model that is used to simulate different business models applicable to a Brazilian entry. Through these simulations the company gets an overview of all the components necessary to operate in the market with the given business model – thus facilitating the identification of risk factors. Although the use of the business model framework facilitates the risk identification process of SafeClean, the differences in the number of identified risk factors (Appendix 11.8) cannot be explained solely by use of a business model framework. Sperre focuses mainly on technological risk, while Cybernetica focuses on identifying risks related to cooperation with Petrobras. Consequently, there is no clear evidence suggesting that the business model framework has helped SafeClean identify more risk factors than the other companies. Both Norske Ventiler and Cybernetica emphasize that they do not see the need of any formal models for risk identification, and both companies rather rely on cost estimates that are

compared to the firms' ability to handle a potential loss. The manager of Norske Ventiler emphasizes that it is not possible to evaluate all risk factors, and that the final decision eventually relies on a gut feeling and general belief in the project. The manager of Cybernetica is less inclined to trust gut feeling, but believes evaluation of projects against the firm's business plan, a criterion of positive budget balance and organizational routines makes the potential losses of a project endurable. The company also assesses a sub-set of risk factors, as only risk factors directly linked to a research cooperation with Petrobras are found relevant, and emphasize the need for a more thorough risk assessment if larger commitments are made – a sentiment shared by SafeClean. Lastly, Sperre is most focused on technical aspects of risk, performing a technical risk assessment prior to foreign assignments and using a quality system to add experiential data from tendering processes.

5: Normal reasoning, assumptions and gut feelings replace formal risk models

- A11-21 We evaluate risk based on two aspects; our long-term strategy and a criterion of always budgeting with positive returns
- A11-28 We do not feel a need for using formal fault-tree analysis or statistical tools for evaluating the risk. We have built organizational structures for risk reduction including a quality system, contract templates that have been developed with lawyers, a strict employment process and a business culture of responsibility and accountability.
- A11-29 If we do not get anything out of this, what is the cost? The risk relied to a financial loss. The other big risk factor is the consequences, losses and law suits if we could face if we get a later implementation and fail the liability for damages. We did not evaluate this last risk in any detail, but would we traditionally use lawyers and insurance agents to make sure we are covered if anything goes wrong."
- A12-11 We have not done anything to map the competitive climate in Brazil, although we expect Brazil in 5 years to be similar to the Gulf of Mexico every valve producer and trader will be present
- A12-12 We have not used ant formal methods to evaluate risk, except what you might call normal reasoning; if you need an organization of 10 employees in Brazil, you need wages, office rent you can use the multiplication table to find the exposure. Then you have to be able to relate this to your cost limit, and be very certain that you have a volume that can cover and defend such an investment.
- A22-08 In the end, the choice of an agent is strongly correlated to gut feeling. In addition to traits that can be documented and information from third parties, the gut feeling is important; does it work, is there chemistry, are they ready to pull up their sleeves for us.
- A22-10 You can analyze yourself to death. In the end, it gets down to whether you believe in it, if the organization believes in it, and if there is any substance to it
- A13-05 We have used Alex Osterwalder's model to evaluate three different business models; a franchise, use of an agent and establishing and establishing a Brazilian entity. In a workshop, several employees have simulated the business models based on the currently available information.
- A13-07 We try to uncover what is different between the Norwegian and Brazilian market. The customer challenges are exactly the same, but doing business down there is completely different.
- A23-10 Up until now we have not done any formal evaluation of risk it might not be according to the text books but you get a picture of it in the process. This said, we have to go through more formal processes to draw up the risk. Up until now, we have not done any formal evaluations, except the continuous evaluation of individual risk factors.
- A14-20 We have not evaluated business risk up until now, but when we lose a tendering process we always ask why we did not succeed an put this into our quality system
- A14-21 When we do routine assignments in the Norwegian market we have not specified any specific requirements with regards to risk, but in relation to foreign assignments we always perform a risk assessment prior to the job.
- Table 13 A-Categories: Use of risk models in the risk identification process

5.2 Risk Evaluation

The risk evaluation phase is found to be significantly influenced by firms' previous experience, which affects how risk is evaluated and the perceived importance of a few, key risk factors. Risk is evaluated against a risk tolerance frontier, while potential gains of the internationalization process are evaluated in terms of the strategic fit to the Brazilian market. There seems to be a lack

Empirical data analysis

of relevant information related to the firms' competitive environment, and some firms make efforts to acquire extra information.

B-Categories – Risk Evaluation

- 1 Evaluation of risk factors is strongly influenced by managerial experience and firm characteristics
- 2 Risk factors are evaluated against a risk tolerance frontier, where the total commitment is evaluated in monetary terms.
- 3 Several distinct risk factors are recognized, but attention is put on a few critical factors
- 4 A lack of relevant information on the firm's competitive environment in Brazil affects risk evaluation Table 14 B-Categories for the risk evaluation process

5.2.1 Evaluation of Risk Factors is Strongly Influenced by Managerial Experience and Firm Characteristics

Evaluation of risk factors is found to be strongly influenced by managerial factors and characteristics of the case firms. The potential effect of risk factors is generally evaluated on the basis of managerial experience and business practices from the firms' markets. The degree to which firms have experience relevant to the risks of Brazilian market entry seems to affect both how thoroughly risk factors are evaluated and the level of risk they pose. This is especially evident in the firms' evaluation of risk associated with cross-cultural factors and corruption, which receives a more thorough treatment by SafeClean - the firm with the least international experience.

Norske Ventiler possesses considerable international experience, which the management team has gained both from Norske Ventiler's activities and from past work. As previously discussed, this experience is of decisive importance when the manager of Norske Ventiler states that risks related to cultural differences only require limited analysis and attention. Cybernetica takes a position close to Norske Ventiler, realizing that Brazil is a hard country to do business in, but only paying lip service to cross-cultural risk. Cybernetica has made all previous international sales and projects from its base in Norway, seemingly without experiencing difficulties related to cultural distance – which might explain why this is not brought up as a likely problem in the Brazil market entry. In addition to the influence from experience, the apparent lack of focus can be attributed to the fact that Cybernetica and Petrobras have been in a research project dialogue for several years – making them well known to each other.

Sperre's manager displays greater awareness of cross-cultural risk, stating that an understanding of how Brazilians conduct business can only be gained by working alongside Brazilians. However, the firm does not seem to regard cultural risk as something that must be dealt with prior to market entry. The company has made several international sales without experiencing problems related to cultural risk, notably in Russia. Further, by using the Brazilian subsidiary of MacArtney as a sales agent in Brazil, Sperre will have a limited exposure to cultural differences. The combination of some international experience and plans of selling ROVs through an agent seems to have a moderating effect on perceived cultural risk for Sperre.

SafeClean's lack of international experience – the management team has no previous international experience, and the firm has no history of international activities - seems to have an effect in the perceived level of cultural risk. While SafeClean has not yet encountered any problems in their interactions with Brazilian actors, there is an anticipation of challenges related to differences in the Brazilian and Norwegian way of doing business. Specifically, the firm has

identified employee loyalty as a potential risk of using local staff. The managers of SafeClean regard loyal, experienced employees as important to the quality of the services they provide and fear that Brazilian workers will not be as loyal as their current employees. As the firm has no experience from managing employees across countries, the newness of the situation increases the associated risk.

The evaluation of corruption risk seems to follow a pattern consistent with the case firms' assessment of cultural risk factors. While Norske Ventiler and Cybernetica do not signal any concern over corruption risk, Sperre displays awareness over the issue but seems to consider it as something that must be dealt with if it arises, while SafeClean expects to be exposed to corruption and identifies it as an issue that requires attention. As such, the case firms' consistently different evaluation of cross-cultural risk and corruption risk supports the impression that firms' organizational culture and personal experience of the decision-maker to a great extent determines how these factors are evaluated.

1: Evaluation of risk factors is strongly influenced by managerial experience and firm characteristics

	9-000
3	The risk of entering Brazil is large. It is a hard country to do business in – compared to the other markets
	we are in – and we also skip several steps. We "should" have started with the home market, getting as far as
	we could there before taking on the North Sea Basin.

- A21-02 The reason we chose to enter Brazil is a belief that it might be easier there that they are more interested as they have a different perspective than the actors in the North Sea.
- A22-15 I have travelled the world, and have a very relaxed attitude towards cultural differences. There are cultural differences, but then again; smile to the world and the world will smile back. There is a lot of literature out there, but I have a very relaxed attitude towards it.
- A13-07 We try to uncover what is different between the Norwegian and Brazilian market. The customer challenges are exactly the same, but doing business down there is completely different.
- A13-12 In Norway we have enjoyed loyal employees that have acquired good experience. A question in Brazil is whether the workforce will be equally loyal an important factor with regards to the services we deliver.
- A24-02 We have been selling to Russia. While many ask us how we dare to do it, and how we do it, we have not really experienced any problems there.
- A24-10 I think we are dependent on finding a Brazilian partner, to really understand how the Brazilian are behaving it is quite different how business is done there compared to at home.

Corruption

- A13-10 We are more or less not exposed to cultural differences, corruption and bribes at home. Down there you will be exposed automatically, so you will have to think this through before you go.
- A24-15 (...) With regard to corruption, it seems like they have managed to come a long way. (...)
- Table 15 A-Categories: Influences in the risk evaluation process

A11-18

5.2.2 Risk Factors are Evaluated Against a Risk Tolerance Frontier, Where the Total Commitment is Evaluated in Monetary Terms

The case firms evaluate risk factors against a risk tolerance frontier determined by the perceived level of uncertainty in the internationalization process. This is done by balancing the commitment to the market entry – in the form of financial and human resources – against the prospects of getting a return in the form of sales in the Brazilian market. The case firms have a high level of uncertainty tied to if and when such sales will occur as they are in an early phase of the internationalization process; Cybernetica and SafeClean have not made any sales in the Brazilian market, and Norske Ventiler and Sperre have only sold through middlemen. This income stream uncertainty reduces the risk tolerance frontier of the case firms, and while firms confident with the sales outlook in the Brazilian market are willing to make greater commitments, resource commitments are still kept at the minimum required level.

The risk the firms take is evaluated in monetary terms – man hours, travelling expenses and the participation fee of the Navigator project. While the costs of participation in the Navigator-program are below the risk tolerance frontier of all firms, establishing an office in Brazil seems to be above the risk tolerance frontier of Cybernetica, Norske Ventiler and Sperre. Sperre plainly states that they are too small to establish a sales office in Brazil on their own. Cybernetica and Norske Ventiler finds the costs of local investments and human resources spent on governance too high. Only SafeClean is currently open to establishing a Brazilian entity as a possible entry mode, but it still depends on the level of market interest after a pilot project.

The resource commitment the firms are willing to make to the Brazilian market entry seems to be related to their assessment of chances to make sales relatively quickly. All case companies are reluctant to increase their commitment to the Brazilian market until they are more certain that they will get a return on the resources spent. As firms get closer to making a sale, they are willing to commit more resources. Cybernetica offers a relevant example by keeping resource commitment to a minimum until the firm was closer to reaching a research project agreement with Petrobras. After positive signals from Petrobras, Cybernetica was willing to allocate resources to an IRD jointly funded with Innovasjon Norge, as it found the chances of making a subsequent sale to Petrobras sufficiently high. Another example of this is how Norske Ventiler states that very certain estimates are required on expected sales volumes before commitment on the scale of establishing a Brazilian subsidiary will be made.

2: Risk factors are evaluated against a risk tolerance frontier, where the total commitment is evaluated in monetary terms.

- A11-11 It is very complicating for a small firm like us to establish in an expensive place like Rio, with a single customer and time-consuming establishment processes.
- A11-16 The longer we do this without getting return on investment, the harder it will be for us to continue. Just counting hours, it gets quite expensive before we get any return.
- A21-28 We were skeptical towards an IRD agreement, but this eventually became the solution. I felt that Innovasjon Norge marketed the IRD solution in a way that blocked any chance of getting a real project in place. (...) an IRD agreement can be a natural first step due to Petrobras' circumstantial bureaucracy with an IRD agreement we choose a path with much less bureaucracy.
- A12-08 The largest risk if you establish a subsidiary in Brazil is the risk of losing money. A worker in Brazil is equally expensive as a Norwegian. Brazil is an industrialized country with regards to costs.
- A12-09 To establish an office in Brazil, with regards to our size, is not something I think is wise. It will imply a very high risk, so you will need very certain estimates on expected sales volumes.
- A22-12 We have kept a low profile, we have visited Brazil twice and talked to potential customers, but not made any commitments besides answering potential requests for quotations.
- A22-18 Opening an office in Brazil is not something that we plan to do at this stage I think it is too resource demanding and that we are too small. But that may change in 5-10 years' time.
- A13-05 We have used Alex Osterwalder's model to evaluate three different business models; a franchise, use of an agent, and establishing a Brazilian entity. In a workshop, several employees have simulated the business models based on the currently available information.
- A23-26 We have a goal is that in the next 6-12 months, we will do a pilot project in Brazil, where we bring all resources from Norway. Our hope is that the customer will be so interested in our services that it opens up for further expansion
- A14-10 We are far too small to establish a sales office, or a subsidiary in Brazil.
- A24-05 It would be nice to figure out what our competitors think about Brazil. But it is really kind of like the 80s at home [the North Sea], so we have a good chance of succeeding if we get MacArtney interested in pushing our products.
- Table 16 A-Categories: How risk factors are assessed in the risk evaluation process

5.2.3 Risk Exposure is Determined by an Overall Evaluation of Risk Components, Resulting in Focus on a Few, Key Risk Factors.

The identification phase left the case firms with a number of risk factors that were considered important; all firms found local content requirements, cultural distance, competitive uncertainties, uncertainties related to newness, inexperience, firm size and foreignness, and psychic distance to be important sources of risk. Despite similar cognitive risk maps across the sample (Appendix 11.8), the importance of the individual risk factors is evaluated differently. While firms initially assess the potential risks of a wide range of factors, they narrow their focus towards the factors found to cause greatest risk in the evaluation process. This reductionist process is illustrated in the fact that all risk factors are evaluated by at least one of the case firms, bit no single firm is found to do an evaluation of all factors.

Several case companies emphasize the need to remove less important factors in the risk evaluation process. As previously discussed, Norske Ventiler's manager is most direct, stating that not all factors can be evaluated and that a final decision eventually relies partly on gut feeling. Although Cybernetica's manager does not emphasize an importance of gut feeling, also he recognize that not all factors can be evaluated – feeling the need to peel away aspects that could otherwise be investigated when an employee quit. As a consequence of the perceived inability of evaluating all factors, the firms only focus on risk factors directly related to the pursued entry strategies; a research project and direct exports from Norway.

Sperre does not explicitly state an inability to evaluate all risk factors. Nevertheless, the company focuses mainly on technical risk factors. This is evident in statements from the firm acknowledging several risk factors that have not been evaluated thoroughly; the acknowledgement that more knowledge of competitor actions would be beneficial, and indications of a complicated legal system compared to other markets. It is therefore clear that also Sperre prioritizes which risk factors are being evaluated, thereby reducing the number of risks brought from the identification phase to the evaluation phase.

The only company breaching this pattern is SafeClean, which emphasizes the need to identify and evaluate each single risk factor on a continuous basis. As evident in previous discussions, the company several times distinguishes itself by doing the most thorough evaluation of individual risk factors. However, SafeClean is also the only firm that has not chosen an entry strategy for the Brazilian market – the firm still evaluates three different entry strategies – which implies a need to evaluate a larger set of risk factors than firms having settled on a single entry strategy.

3: Several distinct risk factors are recognized, but attention is put on a few critical factors

- A11-21 We evaluate the risk based on two aspects; our long-term strategy and a criterion of always budgeting with positive returns.
- A11-22 Our long term strategy is to run the operations from our Trondheim office as long as possible. Establishing offices in other locations increases both risk and cost.
- A11-24 We evaluate all risk on the basis that we will operate all projects from Norway and not establish any presence in Brazil. Then the local content requirements which seem to be designed to hinder just that are a challenge.
- A11-27 Steinar had time to work with these issues, but without him the pot of available resources is smaller.

 Consequently we have to peel away aspects that could be interesting to evaluate, and focus on one thing; getting a project with Petrobras (...)

- A12-13 We do not really see any risk factors related to the Brazilian market entry as long as we stick to the known customer constellation. These are customers we have served for a number of years, and we assume that their Brazilian subsidiaries have the same internal procedures as their Norwegian offices.
- A12-14 Our resource base limits how thoroughly we can investigate the Brazilian market. We do not have an abundance of resources, and this is also a reason for the strategy we have chosen in Brazil.
- A22-10 You can analyze yourself to death, both considering costs and possible scenarios. However, in the end it balances on whether you really believe in it, if the organization believes in it, and if there is any substance to it.
- A22-26 When we started the Navigator project, we had a much broader set of possible strategies for handling the Brazilian market. However, after getting more knowledge of the market, and taking our resources into account, we landed on a strategy of focusing on our Norwegian customers established in Brazil
- A22-27 When we chose to focus on the Norwegian customer entities in Brazil, which after all covers 60-70 % of the market, the whole strategy became significantly easier. We did not have to consider distributors, agents, or an eventual establishment making the strategy less resource and cost demanding than the original alternatives.
- A13-16 There are many elements of risk; leakage of technology, economic impact, damage to the firm's reputation and many factors to evaluate.
- A23-19 Things we consider in the evaluation phase include cost structure, when we will generate income, building customer relations, and sales channels... All this is constantly evaluated.
- A23-25 Risk in the expansion process is a crucial factor; we basically cannot afford to fail. It is vital to draw an overall risk picture, and evaluate each single element.
- A24-05 It would be nice to figure out what our competitors think about Brazil. But it is really kind of like the 80s at home [the North Sea], so we have a good chance of succeeding if we get MacArtney interested in pushing our products.
- A24-07 We have focused more on quality assurance lately; that we double check and routinely go over the equipment and components several times.
- A24-15 When it gets to Brazil, I think we will succeed if we manage to get some sales and a good reputation. With regard to corruption, it seems like they have managed to come a long way. However, I think the laws down there are a bit more complicated than in Russia.
- Table 17 A-Categories: Attention on key risk factors in the risk evaluation process

5.2.4 Availability of Relevant Information on the Firms' Competitive Environment Affects Risk Evaluation

All of the case firms had difficulties finding information that could provide insights in the competitive environment in their particular segment. This is largely due to the case firms' size and niche positioning. While information on investment outlooks and expected trends in the Brazilian petroleum sector is readily available from a large number of consultancies and banks, micro-level information on a single firm's potential customers, partners and competitors is not. The lack of relevant micro-level information complicates the assessment of the potential effects of various risk factors. More intimate market knowledge would make it easier for the case firms to separate relevant from irrelevant factors, and allow the firms to make a more accurate risk assessment. However, careful market research takes time and comes at a cost, and the case firms display a differing need for detailed market information; the company with the least international experience seems to have the greatest difficulties overcoming the challenges related to limited available information.

SafeClean expresses the greatest need for detailed market knowledge. The firm describes how it continuously makes changes and adjustments as more information is gained throughout the risk assessment process, and stresses that gathering information is critical to accurate risk assessment. The high perceived need for market information made SafeClean take a second trip to Brazil outside the Navigator program to gather information on the expected market demand. Norske Ventiler displays a highly different perspective to risk evaluation than SafeClean, and does not seem to have any difficulties with gathering necessary information prior to market entry. The firm

uses macro level indicators such as the oil price and long term investment plans to assess the Brazilian market, and uses the firms in the maritime cluster to get feedback and confirmation regarding strategies and market assessments. Like Norske Ventiler, Sperre seems comfortable with gathering macro-level information. In evaluating the market potential in Brazil, general market trends are emphasized, e.g. by comparing the Brazilian petroleum market to the North Sea in the 1980s - a period of significant growth. Cybernetica seems to have a greater need for detailed market information, as the company has had difficulties evaluating whether the Brazilian process modelling company TriSolutions is a potential partner or competitor. In contrast to SafeClean, Cybernetica has not made extra efforts to gain further information on the topics which they find they have insufficient information on, thus accepting a certain level of uncertainty.

As in the identification process, Innovasjon Norge is an important information contributor to the firms – providing both relevant information to the case companies, and important referrals. The case companies that apparently have the greatest need for support by Innovasjon Norge in the risk assessment process are Sperre and SafeClean. Both companies emphasizes that they would not have managed a Brazilian expansion without the facilitation from Innovasjon Norge. While Sperre focuses on how Innovasjon Norge reduced the need for the pressure on smaller companies' resource base, SafeClean emphasizes the important barriers the organization helps remove.

4: A lack of relevant information on the firm's competitive environment in Brazil affects risk evaluation

- A21-03 We are not sure whether Tri-Solutions is a direct competitor to us, or if they try to compete against ABB and Hannibal it is a bit hard to evaluate based on the information we have today.
- A12-11 We have not done anything to map the competitive climate in Brazil. But if you look at the Gulf of Mexico, Brazil will probably look like that in about 5 years (...).
- A22-03 As long as more oil is consumed than produced globally, a decrease in the oil price is unlikely. With an oil price at the current level, most of the projects considered by the large operators will offer attractive returns on investment thus ensuring a high level of activity.
- A22-14 We follow the activity level in the general oil market (...)
- A22-17 After internal discussions of the possibility to enter Brazil, we did an evaluation of the Brazilian valve market using number from Innovasjon Norge and Intsok. It gave us a firm understanding of opportunities in this market for the next 10-15 years, and we evaluated the possibilities for establishing contacts via Innovasjon Norge, Intsok or other government entities.
- A22-24 I think any competitors to our subsea valves in Brazil lies far ahead in time. There are large costs related to product development, and it is time consuming as well, so it will take years before other actors enter the Brazilian market offering similar products.
- A13-22 We had not evaluated neither Brazil nor internationalization in general when Innovasjon Norge invited us to join the Navigator project. We were uncertain in the beginning thinking that we still had much undone in the home marked but decided to join based on a feeling that we could always pull out of the project. However, we have received much information during the project breaching barriers and mental barriers so it's really the process that makes us certain there is a potential that we want to spent time and resources on.
- A23-01 The background for the second Brazil trip was a feeling that we lacked important information about our products' attractiveness in the Brazilian market. This made it difficult to sort out the right strategies for market entry. It was not beneficial to use time and resources on planning before this question was answered.
- A23-02 Based on the information we have, we have made some drafts. We then have to get back to this as more information is available; make changes, adjustments until we reach a point where we can take the decision
- A23-12 The most important element when it comes to balance, or manage the risk is to gather as much information as possible. It is by no means insurmountable, but as it is new, it is important to get necessary information in order to understand how it works.

- A23-27 Innovasjon Norge has an extensive network. They know who to go to, and then we can talk further with those contacts. It has been of great help.
- A24-05 It would be nice to figure out what our competitors think about Brazil. But it is really kind of like the 80s at home [the North Sea], so we have a good chance of succeeding if we get MacArtney interested in pushing our products.
- A24-19 We would never have been in the position we are in today with regards to Brazil had it not been for the request from Innovasjon Norge. They have been an important door opener for us, and efforts like the Navigator program is very useful for smaller firms that cannot bear the cost of making such efforts alone.
- Table 18 A-Categories: Amount of information in the risk evaluation process

5.3 Risk Mitigation

Following the risk identification and evaluation phases, the case firms employ a number of risk mitigation strategies in order to deal with various risk factors. Risk reduction is the dominating risk mitigation strategy, and only one of the case firms is found to use a risk sharing strategy for entering the Brazilian market. Two of the case firms reduce response uncertainty through information acquisition and boundary spanning activities, but from a different starting point. One of the firms seeks to gain knowledge on topics where the management team lacks experience, while the other, more experienced firm uses information acquisition and boundary spanning activities to reaffirm risk assessments. Last, the case firms experience significant uncertainty related to the market entry, and as a response pursue a minimum resource commitment entry strategy.

B-Categories – Risk Mitigation

- 1 Firms will use four distinct management strategies to mitigate risk
- 2 Some firms engage in information acquisition and boundary spanning activities to gather relevant information
- 3 The firm's market commitment and sales strategy is a result of firm factors and the perceived level of risk Table 19 B-Categories for risk mitigation

5.3.1 Firms Use Four Distinct Risk Management Strategies

The risk mitigation strategies employed by the case firms fall into the four categories outlined in the theoretical background; risk rejection, risk sharing, risk reduction and control, and risk acceptance. In general, the selection of risk mitigation strategy is made by considering the benefits and risks of making a resource commitment. The risk mitigation strategy that likely will give the greatest benefits is selected, meaning that strategies involving a high level of uncertainty must yield the most substantial benefits. We find most evidence of risk reduction efforts, and the least focus on risk acceptance. However, the lack of focus on risk acceptance might be caused by a tendency of focusing on factors that pose a challenge - choosing to accept the risks involved with pursuing a particular strategy does not invite to lengthy reflection.

By participating in the Navigator program all firms implicitly accept a certain level of risk, as continued participation is resource consuming. From the A-categories it is clear that all companies have accepted some of the risk associated with an attempt to penetrate the Brazilian market. Generally, the case firms find risk factors that are familiar from the home market to be acceptable, as they do not contribute to increasing the uncertainty of Brazilian entry. This is evident when considering how Norske Ventiler and Sperre find familiar sales setups to be risk reducing factors – making the risk easier to accept. As previously discussed, Cybernetica evaluates fewer risk factors than SafeClean (Appendix 11.8). This trait can be explained by Cybernetica's acceptance of the overall risk level of the expansion project; the company knows that it will not affect their other operations.

1: Firms will use four distinct management strategies to mitigate risk

Risk acceptance

- A21-02 The reason we chose to enter Brazil is a belief that it might be easier there that they are more interested as they have a different perspective than the actors in the North Sea.
- A12-13 We do not really see any risk factors related to the Brazilian market entry as long as we stick to the known customer constellation. These are customers we have served for a number of years, and we assume that their Brazilian subsidiaries have the same internal procedures as their Norwegian offices.
- A22-25 Selling valves for use in Brazil through the large engineering companies makes it just like any other sale. This simplifies the process, and we avoid complicating the process through having to consider all criteria related to other entry forms.
- A23-26 We have a goal is that in the next 6-12 months, we will do a pilot project in Brazil, where we bring all resources from Norway. Our hope is that the customer will be so interested in our services that it opens up for further expansion
- A14-05 We could have stayed in Norway, selling two ROVs a year and surviving on this and maintenance, but we have higher ambitions. We realize we might be a competitor to the larger actors, but we hang in there.
- A24-15 When it gets to Brazil, I think we will succeed if we manage to get some sales and a good reputation. With regard to corruption, it seems like they have managed to come a long way. However, I think the laws down there are a bit more complicated than in Russia.

Table 20 - A categories: Use of risk acceptance in the risk mitigation process

The case firms all reject the risk of establishing a subsidiary in Brazil as their initial entry mode, both due to the substantial costs involved and uncertain return. Cybernetica and Sperre attribute this is to firm size, while Norske Ventiler and SafeClean do not rule out establishing a subsidiary in Brazil in the future. For Norske Ventiler and SafeClean, the uncertainty related to the market demand in Brazil seems to be the main reasons for rejecting FDI as entry mode, and this uncertainty is likely to be reduced post entry. As such, risks that are rejected under the current conditions might be accepted as the firms gain experience in Brazil.

1: Firms will use four distinct risk management strategies to mitigate risk

Risk rejection

- A11-11 It is very complicating for a small firm like us to establish in an expensive place like Rio, with a single customer and time-consuming establishment processes.
- A22-18 Opening an office in Brazil is not something that we plan to do at this stage I think it is too resource demanding and that we are too small. But that may change in 5-10 years' time.
- A13-06 The size of our wallets is another reason that we cannot take any decision with the current information. We cannot risk locking up 5-10 million without a certain payback
- A14-10 We are far too small to establish a sales office, or a subsidiary in Brazil.
- Table 21 A categories: Use of risk rejection in the risk mitigation process

Sperre is the only firm planning to sell through a partner with offices in Brazil, seeking to reduce the complexity of operating in the Brazilian market by relying on MacArtney as their agent - in effect a risk sharing strategy. Cybernetica considered forming an alliance with the local firm TriSolutions, but found that such a partnership would yield few benefits and pose greater risk than going directly or a partnership with Petrobras.

1: Firms will use four distinct risk management strategies to mitigate risk

Risk sharing

- A21-24 We are ambivalent with regard to cooperation with Tri-Solutions. Petrobras asked us to contact them, and we did, but we have not heard anything from them after that. We feel that we have done our part, and will not do much unless Petrobras drags them to the table
- A24-03 Concerning service in Brazil, we are planning to train MacArtney in Brazil to be equally good as the boys in our repair shop. Maybe bring them to Norway for training, so that they can be around our boys.
- We hope that Innovasjon Norge can open some doors for us, in order to get the first contacts. And then we will also have to work more with MacArtney, to convince them to be our dealer down there.
- Table 22 A categories: Use of risk sharing in the risk mitigation process

Empirical data analysis

None of the case firms are found to use control strategies, where the main objective is to utilize market power to control competitors. Rather, the case companies are concerned with how to minimize the risk of internationalization by keeping commitment to the Brazilian market at a minimum while at the same allocating sufficient resources to maintain progress, in effect risk reduction strategies.

Minimization of risk while making sure that potential rewards are within reach is expected, rational firm behavior. However, the need for keeping rewards within reach means that the case companies have a varying degree of flexibility with regard to how much risk can be reduced - as product characteristics to some extent dictate the minimum resource commitment at market entry. Norske Ventiler and Sperre have the opportunity to reach the Brazilian market through intermediaries and choose to do so mainly because it is a low-commitment entry option where some risks of operating in Brazil are omitted. The sales strategies of SafeClean and Cybernetica, where pilot studies are intended to drum up market interest require the firms to make greater commitments and thus take greater risk.

While the preceding discussion concerned risk reduction strategies for the overall level of risk associated with the Brazilian market entry, there is also evidence of risk reduction efforts targeted at specific risk factors. Again, the firms' planned sales strategies are influential – although they are not the only factor at work. A clear example of the influence of sales strategies is how neither Norske Ventiler, nor Cybernetica will have to deal with distributors, agents or a sales subsidiary in the Brazilian market – making it unnecessary to reduce exposure to these risks for the firms. Sperre, which is exposed to the risk of dealing with an agent, tries to reduce this risk by following up MacArtney on a regularly basis.

Another highly influential factor for the firms' effort to reduce risk, is the perceived level of risk associated with a risk factor. Sperre, which considers technological failure as the most important risk factor, seeks to reduce risk by improving equipment quality and product documentation. SafeClean, exhibiting traits of risk aversion, experiences significant risk from a greater number of risk factors than the other case firms. Consequently, SafeClean seeks to mitigate a broader set of risk than the other firms. To address cultural distance, SafeClean is in the process of establishing organizational routines to increase awareness of cultural factors and corporate social responsibility (CSR). Further, planned interaction between Norwegian and Brazilians on assignments in Norway or Brazil is intended to help the organization gain insight into Brazilian business practices and later communicate more effectively with customers and partners in Brazil. Finally, the firms seek to reduce input uncertainty by simulating a delivery of chemicals from Norway to Brazil.

Although Cybernetica plans to conduct a research project in Brazil, the company does not make efforts to address specific risk prior to market entry. Instead, the firm seeks to hinder risks factors from having a negative effect on the firm's operations in the first place, and trusts that existing administrative routines such as using lawyers to review all contracts and make sure that insurance against claims for damages are valid for all operations that the firm conducts.

1: Firms will use four distinct risk management strategies to mitigate risk

Risk reduction and control

- A21-18 We have not really made any large commitments yet. The only sunk cost is being a part of the Navigator project. Therefore we do not really run the risk of losing a lot of money backing out. And it will be like this until we have signed something.
- A22-05 Billing and delivering equipment to Norwegian subsidiaries of international EPC companies is risk free, and preferable to billing to an address in Angola
- A22-27 When we chose to focus on the Norwegian customers entities in Brazil, (...), the whole strategy became significantly easier. We did not have to consider distributors, agents, or an eventual establishment, making the strategy less resource and cost demanding than the original alternatives.
- A23-07 We try to increase the cultural consciousness of the firm, and also the corporate social responsibility awareness especially concerning corruption and bribes. We are running a process there now, wanting to be up-front with regards to establishing routines and increase awareness concerning these problems. We believe this can have a preventive effect.
- A23-08 In a response to cultural differences, we have considered using Norwegian supervisors in a transition period, although the Brazilian's will be running the operations in the long term. We have also though about doing it the other way around; bringing Brazilians with us on assignments in Norway. We are very conscious concerning this subject, then time will show if we were conscious enough.
- A23-09 We are very conscious about the limited negative feedback, and try to stimulate to questions to undercover underlying feelings. It is in these questions we feel there is a positive vibe towards the concept, and an interest.
- A24-06 (...) We have put a lot of effort into [product] documentation, and made a video film to illustrate the maintenance process knowing that many people do not consult the manual before things go really wrong
- A24-07 We have focused more on quality assurance lately; that we double check and routinely go over the equipment and components several times.
- Table 23 A categories: Use of risk reduction and control in the risk mitigation process

5.3.2 Some Firms Engage in Information Acquisition and Boundary Spanning Activities to Gather Relevant Experience

There is a need among the case firms to collect information in areas they find relevant to the Brazilian market entry where the case firms lack experience. The Navigator program seems to have been an important arena to share information and experiences for the case companies. However, two of the case firms have taken extra steps through information acquisition and boundary spanning activities beyond the scope of the program. Interestingly, it is the firms with the least and the most international experience that have conducted such activities.

Norske Ventiler emphasizes the benefits of being able to discuss and get feedback on internationalization plans. The firm has done so through meetings in a cluster of local offshore firms, and regards this to be more useful input than what consultants might come up with. SafeClean stresses the need for collecting information prior to decision-making, and the firm has made greater information acquisition efforts than any of the other case firms, among other things by making an extra trip to Brazil and contacting logistics firms to identify bottlenecks in the importing process. The key difference between Norske Ventiler's and SafeClean's information acquisition and boundary spanning activities is that Norske Ventiler uses cluster meetings to reaffirm an impressions or get feedback on selected strategies, while SafeClean collects information on areas in which the firm lacks experience. SafeClean has a higher perceived need for market information because the firm lacks international experience, and finds it necessary to allocate resources to fill these experience gaps.

2: Some firms engage in information acquisition and boundary spanning activities to gather relevant information

- A22-09 We use the NCE subsea for cluster meetings and relationship building. Even if we have decided upon a strategy, it is very comfortable to get feedback from people that have done what you want to do, or have successively established elsewhere. To get a confirmation that what you do seems somewhat right.
- A22-11 I usually say that there is nothing as underrated as good relationships. Being a cluster member, meeting firms you can identify yourself and your product with it is usually free, and far preferable to paying for consultants that will tell you whatever you want to hear without much substance.
- A13-17 We use both internal and external sources to identify risk factors. The commitment of Innovasjon Norge has been very positive. (...)
- A23-01 The background for the second Brazil trip was a feeling that we lacked important information about our products' attractiveness in the Brazilian market. This made it difficult to sort out the right strategies for market entry. It was not beneficial to use time and resources on planning before this question was answered.
- A23-03 We have to be careful, and then you will get to a point where you have to make a strategic decision but the foundation for such a choice is not solid enough.
- A23-05 We work a twofold strategy on the importation problem. Through Innovasjon Norge we try to get in contact with agents or companies in the business of facilitating importation to Brazil. At home we contact actors that have experience from transport and logistics in the offshore industry actors that are established in Brazil and know the system from their side.
- A23-12 The most important element when it comes to balance, or manage the risk is to gather as much information as possible. It is by no means insurmountable, but as it is new, it is important to get necessary information in order to understand how it works.
- Table 24 A-Categories: Information gathering in the risk mitigation process

5.3.3 The Firm's Market Commitment and Sales Strategy is a Influenced by Firm Factors and the Perceived Level of Risk

The perceived level of risk clearly influences the amount of resources committed to the Brazilian market entry, and the entry mode or sales strategy of the case firms. The inherent risk and income stream uncertainty makes the establishment of a subsidiary unrealistic for three out of four companies, and all companies have chosen a low commitment entry as their first sales strategy for the Brazilian market. A risk aversion is thus clearly present among the case firms – a risk aversion that is primarily related to the risk of financial loss in the case of failure to generate sales in Brazil.

Neither Cybernetica, Norske Ventiler nor Sperre consider a Brazilian subsidiary to be a feasible option given their current resource situation – although Norske Ventiler does not disregard the possibility for establishing one at a later stage, given a more certain demand. SafeClean can be considered the exception in this case, but also this company is reluctant. The company emphasizes how the available financial resources impede any commitment decision before extra information is gathered and the product demand is more certain.

All companies have chosen different entry modes for their Brazilian venture, but all entry modes can are characterized by low resource commitment. Norske Ventiler has chosen to serve the Brazilian market through direct exports as this is found to reduce the risk of market entry, and the company specifically targets the subsea valve segment in order to bypass local content regulations that might make a direct export sales strategy futile. Sperre does not finds the risk of selling to Brazil to be moderate, and this is probably because the company has not planned to invest in great resources in Brazil, instead choosing to let an agent to represent them in Brazil. Cybernetica has chosen a research project financed through an IRD agreement with Petrobras as their sales strategy, hoping that this project will eventually lead to a pilot project. Initially, Cybernetica hoped that Petrobras would fund the project, providing an opportunity of a very low

commitment entry. However, Petrobras was more interested in funding it through an IRD agreement between them, Cybernetica and the Norwegian government's support programs. Due to a higher perceived risk in awaiting project approval thorough the hierarchical Petrobras system if the project was to be financed by Petrobras, Cybernetica eventually agreed to a higher commitment entry mode than initially wanted – as the IRD agreement meant company had to cover some of their own costs. Lastly, SafeClean is aiming for a pilot project within the next year to prove their technologies potential and attract potential customers. Although this commitment mode imposes higher cost on the company than some of the other companies' entry modes, it is still a relatively low commitment sales strategy – especially compared to the other sales strategies considered by the company.

3: The firm's market commitment and sales strategy is a result of firm factors and the perceived level of risk

- A11-11 It is very complicating for a small firm like us to establish in an expensive place like Rio, with a single customer and time-consuming establishment processes.
- A11-16 The longer we do this without getting return on investment, the harder it will be for us to continue. Just counting hours, it gets quite expensive before we get any return.
- A11-18 The risk of entering Brazil is large. It is a hard country to do business in compared to other markets we are in and we also skip several steps. We "should" have started with the home market, getting as far as we could there before taking on the North Sea Basin.
- A21-02 The reason we chose to enter Brazil is a belief that it might be easier there that they are more interested as they have a different perspective than the actors in the North Sea.
- A21-28 We were skeptical towards an IRD agreement, but this eventually became the solution. I felt that Innovasjon Norge marketed the IRD solution in a way that blocked any chance of getting a real project in place. I still think so, but have learnt that an IRD agreement can be a natural first step due to Petrobras' circumstantial bureaucracy with an IRD agreement we choose a path with much less bureaucracy.
- A12-09 To establish an office in Brazil, with regard to our size, is not something I think is wise. It will imply a very high risk, so you will need very certain estimates on expected sales volumes.
- A22-01 We believe the margins in the subsea market are more promising, and there are fewer players. This gives us more room than in the conventional valve market.
- A22-06 As it looks like now, with the local content restrictions, we will prioritize subsea valves in Brazil. There seems to be fewer challenges related to local content there than with the traditional valves.
- A22-13 If a large request is getting more likely, we have to put more into it. Up until now we have just used a limited amount on travel and to evaluate the market. If things develop we have to put more money into it, but we do it in that order.
- A22-26 When we started the Navigator project, we had a much broader set of possible strategies for handling the Brazilian market. However, after getting more knowledge of the market, and taking our resources into account, we landed on a strategy of focusing on our Norwegian customers established in Brazil.
- A13-06 The size of our wallets is another reason that we cannot take any decision with the current information. We cannot risk locking up 5-10 millions in a Brazilian expansion without a certain payback.
- A23-12 The most important element when it comes to balance, or manage the risk is to gather as much information as possible. It is by no means insurmountable, but as it is new, it is important to get necessary information in order to understand how it works.
- A23-25 Risk in the expansion process is a crucial factor; we basically cannot afford to fail. It is vital to draw the total risk image, to plot it, and to evaluate each single element.
- A23-26 We have a goal is that in the next 6-12 months, we will do a pilot project in Brazil, where we bring all resources from Norway. Our hope is that the customer will be so interested in our services that it opens up for further expansion
- A14-10 We are far too small to establish an sales office, or a subsidiary in Brazil.
- A14-11 We have not really identified any particular risks tied to the Brazilian expansion. In order to get the Brazilian content we can deliver the electronics, and they can weld and finish the assembly in Brazil maybe even machine something.
- A24-21 We do not plan to invest much in Brazil, but we hope to train MacArtney technicians at our facilities so that maintenance of our ROVs can be done in Brazil
- Table 25 A-Categories: Market commitment and perceived risk in the risk mitigation process

6 Discussion of Findings

The case company presentations, the Brazilian background and the preceding case analysis serve as the context for a discussion of the case firms' approach to risk based on the theoretical propositions. Congruencies and discrepancies across the firm sample allows for discussion of the degree to which existing theory can explain the processes of identification, evaluation and mitigation of risk in the internationalization. The following discussion is structured in the tripartite structure used in the case analysis section. The theoretical propositions are discussed under separate headings, followed by a conclusion for each of the three sections that directly address the research questions.

6.1 Risk Identification

The risk identification discussion in the theoretical background provided several propositions regarding how the risk identification process would be performed, and what factors that would be influential towards the process. It was proposed that the level of firm resources would influence the risk identification process and that risk frameworks would help the firms identify relevant risk factors. Further, the level of perceived uncertainty was suggested to be firm dependent, and an important influence both with regard to the level of resources allocated to the risk identification process and the degree of process formality. Each of the propositions are discussed under a separate heading.

6.1.1 Firm Resources

"Firm resources will influence the risk identification phase, making resource strapped firms perform a constrained risk identification process"

March and Shapira (1987) state that both firm resources and managers' cognitive abilities are likely to affect the risk identification process, as a lack of either can increase the risk of overlooking relevant risk factors. Three out of four case firms recognize that their resource limitations make the risk identification process less systematic and less thorough. Norske Ventiler emphasizes that the resource base limits the thoroughness of the market evaluation. While Cybernetica also recognize the resource constraints limit the number of factors that can be evaluated, the firm does not believe the outcome of the risk identification process is significantly affected. In addition to acknowledging the effect of resource constraints, SafeClean sheds light on an interesting point; the available information is an important inhibitor in the risk identification process. The lack of information, or Brazilian market experience, makes it difficult to construct scenarios and implies a risk of conducting a scenario analysis that is irrelevant when new information becomes available. In the end, this is also a question of resources; the company's limited resource base makes the firm wary of spending limited resources on something that might not be relevant at a later stage. Sperre does not recognize a large influence of resource constraints on the risk identification process, but emphasizes the importance of Innovasjon Norge to reduce the resource demands on small internationalizing firms – showing that also this company is in fact resource constrained in the internationalization process.

Nevertheless, the resource base is given, and resource scarcity has not prevented early internationals from successful foreign market expansions. Hence, the firms must be aware of the danger of overlooking important factors, but more importantly adapt their risk assessment approach to their resource base. This is something all firms seem to be doing, as all case firms

are considering a subset of possible entry strategies in the Brazilian market. Norske Ventiler specifically states that the resource base limits the number of available entry strategies, SafeClean has reduced the number of possible entry strategies to three, and Sperre and Cybernetica implicitly recognize this by considering a foreign subsidiary as unrealistic. This adjustment to firm resources, evaluating only a subset of entry strategies, yields a limited amount of factors to consider and can thus reduce the risk of overlooking factors.

In conclusion, the risk identification process is noticeably affected by the resource limitations of the case firms, but the firms' limited resource base is accepted rather than regarded as an obstacle for a successful foreign market expansion. A key influence resources have on the risk assessment process, is that only a subset of entry modes, mostly lower commitment entry modes, are regarded as realistic entry modes by the case firms. This is in line with suggestions both from gradual and early internationals perspectives. While the gradual international perspective attributes this to a lack of international experience and risk aversion, the early international perspective explains it as a way to overcome resource scarcity and handle risk. Both perspectives have obvious explanatory value; while SafeClean clearly stressed the lack of international experience and market knowledge as important, Norske Ventiler emphasizes that resource scarcity leads to fewer available entry strategies. Despite an ability to explain resource scarcity and risk handling, there is limited evidence of the reliance on alliances suggested in the early international perspective. While several firms have evaluated the possibility of forming an alliance, only Sperre relies on an alliance when entering the Brazilian market.

6.1.2 Use of a Risk Factor Framework

"The use of a risk factor framework will help a firm identify relevant risk in an internationalization process"

For three out of four firms, the Brazilian market entry is the first planned foreign market entry - Norske Ventiler being the exception with the firms' planned entry into the Australian market. Both Cybernetica and Sperre have international customers, but these are a result of chance rather than planned expansion efforts toward a particular market. This makes the Brazilian internationalization effort the first planned foreign market entry for most case firms, and given the new situation there is not thoroughly prepared routines for how to handle an international expansion from the onset.

None of the case companies use any of the risk frameworks presented in the theoretical background. When asked why no models are applied in the risk identification process, the case firm managers do not find the use of frameworks necessary and rather rely on cost estimates of to identify large risk factors. However, rather than relying on quantification of risk factors, such as the frameworks Cybernetica does not see the benefit of using, the frameworks presented in the theoretical background can highlight links between risk factors and firm performance (Baird & Thomas 1985; Miller 1992). Hence, we do not believe the disregard of the presented risk frameworks is a reflection of an evaluation of the appropriateness of the presented risk models, but a trait explained by the companies not being aware of their existence. This can be attributed to the position of risk models within international business research, as no single risk identification framework can be said to be universally accepted by researchers or practitioners (Bromiley, Miller & Rau 2005). Furthermore, risk frameworks need to be adapted to a firm's unique situation (Oviatt, Shrader & McDougall 2004; Shrader, Oviatt & McDougall 2000), an

adaption that might require competence and specific experience that firms in their first internationalization effort might not have or will not allocate resources to. Last, the lack of empirical evidence supporting that use of risk frameworks will be beneficial to practitioners decreases the chance that firms actually aware of them will put them into use.

Although none of the case firms use any of the risk frameworks presented in the theoretical background, SafeClean is diverging from the other case firms by applying Osterwalder's (2010) business model framework to evaluate risk factors related to the subset of entry modes considered. This model was introduced to the firms in the Navigator project, and the use seems to facilitate the risk identification process by making the entry strategies and involved processes more transparent – consequently making the risk factors tied to each business model easier to identify. Despite facilitating risk identification by helping the firm evaluate all components of their business model and adherent value chain, there is no indication that this use contributes to a significant increase in the number of identified risk factors.

The fact that the business model framework does not contribute to an increased number of risk factors is not surprising, considering the intended purpose. However, a framework presenting risk factors of general validity could help inexperienced firms to identify risk factors relevant to their operations in a new market. Several of the case firms point toward Innovasjon Norge as a vital support in the process, making the prospect of a Brazilian market expansion far more attainable for the involved firms. As all the firms have similar cognitive risk maps, it is likely that Innovasjon Norge has influenced the risk identification process by pointing towards differences and possible pitfalls in the Navigator project. In the same manner that Innovasjon Norge has made it possible for the case firms to navigate the abundance of information, a framework of different generic risk factors could reduce the complexity of the information search for smaller firms with limited international experience. This can be of vital importance, as both SafeClean and Sperre emphasize that they would never have entered the Brazilian market without the support of Innovasjon Norge – they would not even have known where to start their analyses.

In conclusion, it is clear that a formal risk framework is not applied in the risk identification process of the case firms. The reason for this seems to be a combination of an impression that formal risk models do not contribute valuable input to the process or is unnecessarily complicated to use, and the fact that the companies are unaware of the presented risk frameworks' existence. The constrained risk evaluation process, where several firms only consider risk factors directly related to a chosen low commitment entry mode, implies that the use of a framework would not increase the number of evaluated risk factors. Nevertheless, the reliance on third party support in the process indicates a need for guidance in the internationalization process of SMEs with little international experience. As such, a risk factor framework might provide an important substitute, or complement, to governmental export programs for smaller, inexperienced firms.

6.1.3 Level of Perceived Uncertainty

"The perceived level of uncertainty will be a function of firm and managerial experience, and a high level of uncertainty will increase the amount of resources spent on risk identification"

Tversky and Kahneman (1986) introduce framing and priming as explanatory variables for the differences in the perception of choice problems. Case firm findings suggest that framing – or what the case firms expect to find - clearly influences what risks are identified. There are two clear examples of this in the case firm material; how firms treat the subjects of local content demands and cultural differences. In both cases, the influence of experience on problem framing is obvious.

While SafeClean and Sperre treat local content demands as a condition that needs to be satisfied, Norske Ventiler and Cybernetica hope to avoid the local content demands by claiming that they are the sole supplier of such products. This framing influences whether or not local content demands are treated as a risk factor. While experience related to production splitting makes SafeClean and Sperre treat local content demands as an opportunity - neither company associates the local content with higher risk or uncertainty – lack of the same experience, in addition to experience of being able to run operations from Norway, seems to make Norske Ventiler and Cybernetica consider local content requirements as a risk. Further, the lack of experience makes SafeClean regard cultural differences as a risk factor – leading the company to seek to mitigate the risk by gathering information and training employees in cultural awareness. In contrast, Norske Ventiler's experience indicates that cultural distance is a risk factor that can be overcome by mutual adjustment.

The clear link between framing and experience indicates that while one firm's experience with a given situation makes the perceived uncertainty lower, the lack of experience with the same situation will make a firm perceive a higher level of uncertainty. As uncertainty is linked to risk, an increased uncertainty will make the perceived risk higher - as one firm might bluntly accept the risk, another company might see a need to mitigate or reject the same risk. This is in support of the suggested relation between international experience and perceived level of uncertainty in international business (Johanson & Vahlne 1977; Sambharya 1996).

Milliken (1987) argues that the time and money allocated to the risk identification process is a function of the perceived state uncertainty of managers. A clear example of this is how SafeClean's risk identification process differs from the risk identification process of Sperre. The two firms have very different perceptions of the risks involved with the Brazilian market entry, and as a consequence different approaches to the risk identification. SafeClean's risk identification process is very thorough, with an apparent sense of a constant lack of information and postponement of the entry mode decision. The company therefore commits a considerable amount of time to make sure the scenarios used to identify risks are as close to reality as possible. Sperre on the other hand, focuses mainly on technical risk aspects, and already has implemented a quality assurance system where technical risk aspects identified in earlier assignments are addressed. Although they perform a risk assessment prior to a delivery to a foreign customer, the company uses considerably less resources in the risk identification phase than SafeClean.

Despite support for Milliken's suggestions in the case of SafeClean and Sperre we argue that, although the perceived level of state uncertainty influences the time and money allocated to the

process, a high perceived state uncertainty can also make the firms commit fewer resources to the risk identification phase. This is evident in the case of Norske Ventiler. While Norske Ventiler recognizes that more information could be gathered, the company emphasizes that although you can analyze yourself to death, the final decision rest on gut feeling and whether or not you believe in the project yourself. The risk of entering the Brazilian market through an agent or own subsidiary is regarded as high, and instead of using a considerable amount of time and resources evaluating a number of different entry modes, Norske Ventiler has decided to follow a familiar approach of selling directly to its customers' Norwegian subsidiaries.

In conclusion, the level of perceived uncertainty is clearly a function of firm and managerial experience, making risk perceptions non-objective and firm dependent. Khaneman and Tversky's concept of framing seems to be particularly important explanatory variables for the differences in uncertainty and risk perceptions among the case companies. The strong relation between experience and framing makes both home market and foreign market experience highly influential in the risk identification process – as situational experience is found to lower the perceived uncertainty. Further, Milliken's suggested relation between an increase in perceived state uncertainty and amount of resources attributed to the risk identification process is disputed. The case study evidence suggests that some firms increase resource commitment when faced with a high perceived state uncertainty, while others reduce their commitment – relying more on gut feeling than what they consider uncertain information.

6.1.4 Formality of the Risk Identification Process

"The perceived level of uncertainty in the internationalization process will affect the formality of the risk identification process, making it less systematic under high uncertainty"

As proposed in the theoretical background, the perceived level of uncertainty does influence the risk identification process. Milliken (1987) proposed that a muddling-through process would be followed in situations with high state of uncertainty, as uncertainty regarding environmental changes will make it difficult to identify threats and opportunities with any degree of confidence. SafeClean's risk identification process seems to support this view; their preliminary risk mapping is a continuous risk identification process, where risk factors are incrementally added as they are discovered. The company already has the most formal risk identification process, but argues that a more formal risk identification process is needed when a preliminary risk mapping is done – at a lower level of state uncertainty.

However, while we believe that state uncertainty influence the formality of the risk identification process, we do not believe that the state uncertainty is the most important variable at play. Considering the empirical data, company size seems to be an important factor influencing process formality. As Cybernetica states, a limited number of employees makes it impossible to have specialist evaluating each aspect in the internationalization process, and as Norske Ventiler and Sperre emphasize, limited organizational resources does not allow use of too much resources on a single aspect. Thus, the risk identification phase of smaller firms seems to follow a muddling through pattern by default – rather than as a function of uncertainty. Another trait supporting this is the fact that case firms exhibits a consistent degree of formality, meaning that the degree of formality is the same from the risks are identified until eventual risk mitigation strategies are laid out. If state uncertainty was the sole explanatory variable, one would expect the degree of

formality to increase as state uncertainty decreased and the final entry decision grew closer – except for SafeClean, there have not been indications of increased formality in this direction.

Another important discovery with regard to the formality of the risk identification process, is that none of the case firms approach risk in the three distinct phases suggested by Rowe (1977) and later adopted by multiple researchers (Baird & Thomas 1985; Mascarenhas 1982; Milliken 1987) and risk practitioners (COSO 2004; HBR Analytic Services 2011). The case companies appear to do risk identification and evaluation in a single, intertwined process, which subsequently leads to one of the four suggested risk mitigation strategies. Thus, all identified risks are evaluated to some extent, but not in a process that is regarded as separate from the identification process.

In conclusion, although the perceived level of uncertainty influences the degree of formality in the risk identification process, the small firm size seems to cause a muddling through process by default rather than as a result of an elevated degree of uncertainty. A key insight is that while identification, evaluation and mitigation activities are performed – they are part of a cyclic, rather than linear process. Hence, there is an apparent discrepancy between the suggested theory and observed practice, with the identification, evaluation and mitigation activities being performed in a more interlinked fashion than suggested by researchers.

6.1.5 Conclusion

The risk identification process of the case firms is clearly resource constrained. However, the resource scarcity is accepted rather than perceived as an insurmountable obstacle in the internationalization process. Accepting the resource scarcity makes the firms consider only a subset of entry modes in the risk identification process, discarding entry modes perceived as too resource demanding. This implies that high commitment entry modes, such as subsidiaries, are discarded and the resources available for risk identification are used on a subset of lower commitment entry modes.

The case companies do not use risk frameworks in the risk identification process. There is no awareness of the existence of frameworks helping the companies to identify relevant risk factors, and the case companies dismiss the need for frameworks in the risk identification process - pointing towards simpler cost evaluations and gut feeling as the basis for assessing risk factors. There is however a reliance on third party support in the risk identification process, especially for the firms with limited international experience, and a risk factor framework could decrease this dependence. For firms with more international experience, such a framework might be less useful as resource constraints limits the risk identification process to key factors.

The perceived uncertainty in the Brazilian market expansion is clearly influenced by the case firms' experience, and this has clear implications for the risk identification process. As experience lowers the perceived level of risk, firms will evaluate the same risk factor differently. This makes experience both from home and foreign markets an important influence for the perceived overall risk level of a foreign market expansion. Nevertheless, the case study evidence does not support the suggested relation between the level of state uncertainty and resources spent in the risk identification process. While one of the case firms clearly increases resource allocation in the search of new information when faced with higher levels of state uncertainty, other case firms

instead reduce the commitment through choosing a low commitment strategy that decreases the amount of resources needed in the risk identification process.

The risk identification process is found to be a muddling-through process by default. Rather than an effect of state uncertainty, the size of the case firms implies a need for the employees to occupy several roles in the internationalization process. Furthermore, there is no formal division between the risk identification and risk evaluation process. In contrast to the linear process suggested by researchers, the risk identification and evaluation process is found to be cyclic and interlinked.

6.2 Risk Evaluation

The theoretical propositions on risk evaluation indicate that manager- and firm characteristics would influence the evaluation process that the process was likely to an idiosyncratic process resulting in a focus on a few, key factors, and that evaluating the relevance of information would be a key challenge. Trends in the firms' behaviour provide a rich background for comparison of the suggested and observed evaluation process. In line with the structure of the discussion of the risk identification process, each theoretical proposition is treated under a separate heading.

6.2.1 Influence of the Firm's Context and Manager Characteristics on Risk Evaluation

"Firm context and managerial characteristics will influence the risk evaluation process by shifting the neutral reference point used to evaluate gains and losses"

The evaluation of risks associated with different entry modes resembles prospect theory processes presented by Tversky and Kahneman (1986). The case firm's consideration of the risks and rewards of foreign direct investment can be likened to the concept of a net present value calculation, where future cash flows are discounted to the present value prior to comparison. Consequently, the level of risk is measured in terms of financial gains and losses, and the entry mode requiring the greatest level of investment therefore must promise the greatest rewards. Importantly, the timing of the potential benefits of such a high commitment benefits seems to have an impact on the evaluation of the associated risk and rewards. The resources for a foreign direct investment are committed before returns are certain, and it may take years before the benefits materialize. Due to this uncertainty, the potential future gains must greatly outweigh the investment needed at an early stage. This indicates a loss aversion bias where potential losses are weighted more heavily than potential gains. The loss aversion bias can be explained partly based on the firm context, and partly on managerial risk aversion.

Of the elements in the firms' context, organizational slack is found to have the largest influence on the risk evaluation of the case firms. All case firms stress that they will not make commitments to the Brazilian market that puts the firms' survival in question. Consequently, firms find the resource consuming option of FDI unfeasible – as it involves a significant potential loss found to outweigh potential benefits of a clear market commitment and compliance with local requirements. Hence, the limited organizational slack affects the case firm's perception the risks involved with foreign direct investment (FDI) – an entry mode found to be a highly competitive entry strategy to small firms in the long term by Zahra *et al.* (2000).

Managers play a pivotal role in the risk evaluation process as well as the internationalization process as a whole. The responsibility for the Brazilian entry is laid on one or two managers, and they fill the role of planner, researcher and decision maker. The key role of managers is underlined by the observed impact of experience on the level of perceived risk. Specifically, neither Sperre nor SafeClean evaluated a Brazilian market entry before being contacted by Innovasjon Norge – both feeling that the prospect of gains in a Brazilian market expansion was far lower than the risks and costs involved. During the course of the Navigator project, this risk evaluation has changed, and both firms now feel that it is possible to find an acceptable balance between costs and gains in a Brazilian expansion. The manager of Cybernetica provides a similar example of the importance of managerial risk perception in the evaluation of benefits and gains. At onset, he was very skeptical towards the prospect of agreeing to a deal with Petrobras involving large commitments from Cybernetica's side. However, learning that this might be the easiest way to get into a research project with Petrobras, he decided to increase the company's commitment and agree to an IRD agreement financed by Cybernetica and the Norwegian government. While the level of investment and potential gains remained constant, the managerial risk perception decreased – thus making a previously unacceptable risk acceptable.

The fact that risk taking propensity is likely to increase with the level of managerial experience, as the level of perceived risk decreases, is in partial support of Johansson and Vahlne's (1977) suggest relationship between market knowledge and market commitment. However, they focused more on the firm-level market knowledge, although they acknowledged that managerial experience from previous markets could replace the need for firm market experience in the given market. The dominant role of managers in the case firms is more in accordance with early internationalization theory, although the theory also suggests a higher risk-taking propensity among entrepreneurial managers - a trait not found in this study.

In conclusion, both the firm context and managerial characteristics influences the evaluation of risks and gains in the risk evaluation process. Of the firm level factors, the organizational slack has the largest influence - making an investment in a Brazilian subsidiary considered unfeasible as a first entry strategy of all the case firms. Of managerial factors, the risk perception is seen as the most potent influence. As case evidence indicates that the perceived risk is likely to decrease with the level of experience, the amount if risk taken is likely to increase with experience – in support of Johansson and Vahlne's suggested relation between market knowledge and market commitment.

6.2.2 Measurement of Risk Exposure

"The risks and benefits of internationalization are not likely to be reduced to a single construct"

We find that none of the case firms have reduced the individual risk factors to a single number for evaluation purposes, in accordance with research by Shapira (1995) and recommendations of Taleb *et al.* (2009). Only the costs that the firms have incurred during the course of the internationalization process are tracked as numbers, while risk factors such as threats from competitors, cultural distance and potential difficulties of importing are structured qualitatively, in order of perceived impact. The main reason for this is that most of the risk factors evaluated make more sense when evaluated qualitatively than quantitatively –reducing risk to a number makes assessment of the interdependencies of various risk factors difficult. On an overall level,

however, the risk of the Brazilian venture is measured by a single construct – the potential loss associated with the foreign venture. The use of potential amount to lose, rather than an outcome distribution (probabilistic approach), is in accordance with the findings of March and Shapira's (1987) study.

Furthermore, we observe behavior coherent with Figueira-de-Lemos, Johanson and Vahlne's (2011) concept of a maximum tolerable risk frontier. The upper constraint of the maximum tolerable risk lever is the resource commitment that each firm can take as a loss and still survive financially. As long as the total resource commitment made is below this frontier, and the activity is seen as beneficial to the internationalization effort, firms go through with the activity in question. As previously discussed, establishing a Brazilian subsidiary is currently above the maximum tolerable risk level of all firms and therefore not of interest, while allocating resources for travelling to Brazil is well below the risk frontier and contributes to reducing the uncertainty of market entry. This tolerable risk level is obviously dependent on each firms' organizational slack, and this helps explain why the case firms find the perceived level of risk associated with the same risk factors to be different.

In conclusion, the overall risk exposure is measured in terms of potential loss - a single quantifiable construct – while other risk factors largely are evaluated in qualitative terms without being reduced to any single quantifiable construct. This is a consequence of the difficulty of evaluating individual risk factors in a single construct – as the potential impact of certain risk factors are more appropriately assessed in qualitative terms. A maximal tolerable risk frontier in terms of total resource commitment is found to constitute the basis of which the risk inherent in the foreign ventures is evaluated against.

6.2.3 Risk is Determined by an Overall Evaluation of Risk Components, and Focus is Put on a Few, Key Risk Factors

"The firm's risk exposure will be determined by an overall evaluation of distinct risk components, resulting in a focus on a few, key risk factors"

In general, the case firms make a broad initial assessment of risk, by considering a broad range of risk factors found to be important by the case firms. This resembles what Miller (1993) labels *optimal risk management practices*, with the important distinction that the case firms cannot be said to consider the *full* spectrum of corporate exposures given managers' bounded rationality and a muddling-through risk assessment process. However, after the broader initial assessment, focus was put on a smaller number of what each firm considered to be key risk factors. This focus on a few key factors during the risk assessment process is also seen in research by March and Shapira (1987).

The key risk factors are identified based on their expected impact on the case companies' market entry, and factors found to have a small impact are not given much attention. Although the case firms have identified largely same key risk factors, the outcome of the subsequent risk evaluation is unique to each firm, and largely attributed to firm- and managerial factors. All case firms identified cultural distance as a potentially important risk factor, indicating that the firms experienced what Johanson and Vahlne (2009) call liability of outsidership. However, after Norske Ventiler chose to sell valves through firms based in Norway, cultural risk is no longer seen as a pressing issue by the company. SafeClean, on the other hand, plans to use an entry

mode where cultural risk is a significant risk factor, making cultural differences a key risk factor to the firm.

In conclusion, the case firms exhibit a trend of doing an initial evaluation of a large number of risk factors before focus is put on the most impactful risk factors. What is considered to be key risk factors is highly dependent on managerial and firms factors.

6.2.4 Availability of Relevant Information for Risk Evaluation

"Evaluating the relevance of available information is a challenge in the risk evaluation phase, rather than lack of information"

As proposed by Milliken (1987) the process of identifying the relevant risk factors - factors that may actually affect firm performance - from irrelevant factors is a major challenge to the case firms. There is an abundance of information on macro trends and opportunities in the Brazilian petroleum sector from various consultancies, banks and academics. However, information useful to small, niche firms trying to map their competitive situation is more limited. The firms are therefore left with the option of interpreting available information to the firms' unique setting, but this is a challenge for several reasons. First, such interpretation requires significant resources, and the firms have very limited experience which would have made the evaluation easier. Second, it will be nearly impossible for the case firms to gain an intimate understanding of the competitive situation that awaits them in Brazil, as these firms operate in highly specialized niches on which relevant information is scarce and fragmented. Third, the firms are in a pre-entry phase and entry strategies, which to a great extent determine risk exposure, are not finally decided. Further, evaluation of prospective partners or customers is complicated by the lack of corporate data in Brazil (OpenCorporates 2012; The Economist 2012b), although this is not explicitly stated by any of the firms. Finally, the language barrier complicates market research, and SafeClean acknowledges that targeting customers in Brazil is significantly more difficult than in the Norwegian market.

Nonetheless, the challenge of separating relevant from irrelevant information is to some extent mitigated by participation in the Navigator program. Innovasjon Norge is an important source of information to the case firms, and arguably, this has contributed to reducing the perceived competitive uncertainty. Further, the case firms display a varying need for detailed market information to use as a basis for separating irrelevant from relevant risk factors. Sperre seems comfortable with a macro-level analysis, repeatedly comparing the current situation in the Brazilian market to the petroleum market in the North Sea in the 1980s, and suggesting that the Brazilian market will develop in a similar fashion. Thus, to Sperre, general market information is most relevant to evaluate the attractiveness of entering the Brazilian market, and this information is readily available.

SafeClean, on the other hand, expresses a need for more detailed knowledge on the Brazilian market, to be able to evaluate risk on the best possible basis. The firm has made extra efforts to gain knowledge on specific issues, namely the Brazilian import regime. The company contacted logistics specialists with relevant experience from Brazil, and this is an example of how third party involvement can substitute for lacking managerial experience, as proposed by Crick and Jones (2000). In contrast to SafeClean, Norske Ventiler regards over-analysis as a risk factor in itself, indicating that some risk factors have to be dealt with as they arise. Consequently, limited

availability of information is to a varying degree a challenge during the firms' risk evaluation process.

Although the case companies have a differing inclination to gather information, a general trend can be observed; low availability of relevant information for risk evaluation combined with a high perceived level of uncertainty makes the case firm's reluctant to make large commitments and therefore opt for a gradual, incremental market entry. Thus, the availability of relevant information seems to influence the speed at which commitments are made to the Brazilian market. This relation is also acknowledged by Johanson and Vahlne (1977), who argue that firms need to integrate the knowledge they gain in the internationalization process with existing firm knowledge, a process that takes time and might slow down the internationalization process.

In conclusion, evaluating the relevance of information is a key challenge in the internationalization process, a challenge further complicated by the lack of readily available company-specific information. Hence, the case firms must map their competitive situation in Brazil and evaluate risks themselves implying a need to interpret general market information to their specific setting. This is a challenge to the case firms as it requires resources and skills most of the firms do not have. The case firms have a differing need for detailed market information, as some firms commit significant resources to information gathering and processing while other firms are satisfied with their current level of knowledge. The availability of relevant information for risk evaluation seems to influence the speed of the internationalization process, as problems with collecting sufficient information for comparison with existing firm knowledge slows down the risk evaluation process.

6.2.5 Conclusion

Both firm- and managerial factors influence the risk evaluation of the case firms. Of the firm factors, organizational slack has the largest influence, while the manager(s)' risk perception is the most important managerial influence. Together the two factors influence how the risks are evaluated, the most important implications being that limited organizational slack leads to a loss aversion bias that is strengthened by lack of experience of a similar situation – as this increases the manager's perceived level of risk.

The risk exposure of a firm is measured in terms of total potential loss related to the foreign expansion, a single quantifiable construct. Individual risk factors are, with exception of easily quantifiable variables such as investments and direct expenses, measured in qualitative dimensions and not as a single construct. The total risk exposure of a firm is evaluated relative to a risk frontier – indicating the financial loss the firm can handle – where risks surmounting this barrier are rejected.

The risk factors are, after an initial evaluation of a wider range of factors, reduced to a few, key risk factors. This is in accordance with findings from the risk identification analysis, which showed that resource scarcity imposed a need to consider a reduced set of risk factors.

Lastly, evaluating the relevance of information is a challenge in the case firms internationalization process. This challenge is caused by a lack of international experience, making it hard for the case firms to interpret the relevance of background information – a situation that is complicated by the fact that there is limited information available on a firm-specific level. The support of

Innovasjon Norge, and other third parties, provides important facilitation in this challenge. In the end, the availability of relevant information seems to influence the speed of the internationalization process, as problems with collecting relevant information slows down the risk evaluation process.

6.3 Risk Mitigation

The theoretical background outlined four possible risk mitigation strategies that could be used to handle risk in the internationalization process. Further, the theoretical propositions indicated that firms experiencing response uncertainty would seek to reduce this uncertainty through information acquisition and boundary spanning activities. Last, it was suggested that resource commitment would be inversely related to the level of perceived risk. As in the preceding sections, each of the propositions are discussed under separate headings.

6.3.1 Selection of Risk Mitigation Strategies

"Firms will employ several of the presented risk mitigation strategies to mitigate the identified risk factors"

Baird and Thomas (1985) state that risk mitigation strategies may either involve hindering an event from happening in the first place, or mitigating the effect of an event identified as a risk. They further argue that the selection of risk mitigation strategies is dependent on the perceived controllability of risk factors. The case analysis suggests that risk factors that are generally sought reduced, given that they are perceived as controllable by the case firms - supporting the claim of Baird and Thomas (1985) that influence over risk is important to how a firm handles it. Norske Ventiler's approach to cultural differences and local content requirements offer an example of how the controllability of risk factors affects risk mitigation efforts. Exposure to cultural risk is perceived to be a controllable risk factor by the firm, and the firm seeks to reduce the associated risk by adapting to the local business culture. Local content requirements are found to be a much more impactful risk factor to the firm. However, the firm finds this risk factor to be uncontrollable, and seeks to avoid it rather than reducing it.

Considering Forlani and Mullins' (2000) definition of risk, risk can be reduced either by reducing the uncertainty of a situation or the potential loss involved. Keeping the resource commitment to a minimum is emphasized by all case firms, making risk reduction the dominant risk mitigation strategy. In fact, the firms' focus on keeping the resource commitments low is predominant both in the pre-entry phase and in future market plans (post-entry). A risk reduction strategy pursued by through minimal resource commitment is apparent throughout the internationalization process. This is close to the hypothesized incremental market entry process of gradual internationals (Figueira-de-Lemos, Johanson & Vahlne 2011; Johanson & Vahlne 1977). Norske Ventiler and Sperre serves as good examples of this low-commitment approach. Neither firm is willing to establish a subsidiary in Brazil, as both firms prefer the lower commitment strategies of direct exports and agent representation. While Sperre does not expressed intentions to establish a subsidiary in the foreseeable future, Norske Ventiler is only willing to establish a subsidiary given certain prospects of a high market demand. Arguably, participation in the Navigator program is in itself a means of risk reduction, as the case firms enjoy Innovasjon Norges extensive network in Brazil at a modest cost.

SafeClean is also unwilling to establish a subsidiary under the current conditions of uncertain market demand, but like Norske Ventiler, the firm does not rule out establishing a Brazilian subsidiary in the future. As proposed by Figueira-de-Lemos, Johanson and Vahlne (2011), we find that activities that involving greater risk than the firms' tolerable risk level are rejected. However, the examples of SafeClean and Norske Ventiler illustrate that risk rejection is not a final decision; risks that are currently rejected might be accepted at a later stage.

Risk rejection was proposed by Mascarenhas (1982) as a strategy for dealing with activities that posed a greater risk than the level of expected returns could justify. The examples of rejecting to establish a Brazilian subsidiary as the initial entry mode illustrate a risk rejection strategy. SafeClean's continued evaluation of several entry modes is further an example of a deferral strategy, as suggested by Milliken (1987). However, the risk rejection strategies pursued by the case firms are in effect risk reduction strategies, as they reduce the level of risk and are not regarded as final by most of the case firms.

Although several researchers have identified risk sharing as a particularly relevant risk management strategy to SMEs (Boisot & Child 1999; Di Gregorio 2005; McDougall, Shane & Oviatt 1994), only Cybernetica and Sperre seriously considered this strategy, which Cybernetica later rejected. According to Di Gregorio (2005), risk sharing strategies are especially suitable when the nature of risk factors are ambiguous and market information is unevenly distributed – and local firms have an advantage as experienced market actors. The case firms' focus on cultural distance and competitive uncertainties indicates that they face such conditions, yet only one firm makes use of the cooperative risk management arrangements suggested by Miller (1992). However, establishing a relation with a local firm is not considered to be an effective strategy for reducing uncertainty, as the expected contribution from partners is seen as inadequate compared to the risks involved. While Cybernetica expressed concerns over what a local partner would contribute with besides possible access to Petrobras, SafeClean expressed concerns over the possibility of partner exploitation in an unbalanced relationship. This is contrary to the assertion of McDougall, Shane and Oviatt (1994) that resource scarcity will make smaller firms rely on hybrid structures.

As all case companies have made sure that their resource commitments so far are within the risk tolerance frontier continuing these efforts will not put the firms outside their risk tolerance frontiers. This indicates an overall acceptance of the associated risk of pursuing entry into the Brazilian market. However, the term 'not rejected' might be more appropriate than 'accepted' to describe the risks that the case companies tolerate in the internationalization process. The case firms accept a certain risk level, which is heavily influenced by experience. Thus, risk levels similar to those associated with corresponding operations in the home market are not rejected in the Brazilian market either. An example of risk acceptance is how Norske Ventiler does not find the risk of selling valves to a well-known customer to be higher than any other sale, whether the valve is to be used in Brazil or in the North Sea.

In conclusion, reducing risk as much as possible is an overarching objective to the case firms, and sought done in all activities. All four risk mitigation strategies are employed, with risk reduction as the dominant mitigation strategy, due to the case firms' urge to keep resource commitment at an as low level as possible. The perceived controllability of the risk factors

determines whether risks factors are sought prevented or the effects of the risks sought mitigated. Further, the maximum tolerable risk and the risks accepted from operations in the home market set the boundaries for what risks are rejected and what risks are accepted. As the maximum tolerable risk might change as firms gain experience, risks initially rejected might be accepted at a later stage. Risk sharing is the least used mitigation strategy, as cooperating with local actors is believed to yield limited benefits

6.3.2 Response Uncertainty

"Response uncertainty will lead to information acquisition and boundary spanning activities, in search of relevant information from firms that have faced a similar situation"

The effect of the chosen mitigation strategies is hard to assess for the case firms prior to market entry, resulting in what Milliken (1987) labels response uncertainty. The response uncertainty can to a great extent be attributed to the fact that the case companies are not certain of whether identified risk factors will have the expected effect. Further, the continuous form of the risk evaluation process leads to constant changes to the planned mitigation efforts, likely to increase the state of uncertainty.

In an effort to reduce response uncertainty, some of the possible activities put forward by researchers – boundary spanning and information acquisition (Milliken 1987) and emulation (Miller 1992) – are put to use. We find no evidence of emulation strategies, possibly because the case companies have not identified any appropriate organizations to emulate. Norske Ventiler conducts boundary spanning activities by gaining insight into how firms in the local offshore cluster has made international sales, and SafeClean collects information on a wide range of topics seen as important to entry, such as logistics, imports, and prospective market demand. The Navigator program is an important arena for collecting and sharing information for the case firms, and Cybernetica and Sperre are not to found to do targeted information acquisition or boundary spanning activities beyond the scope of the program.

While Norske Ventiler and SafeClean share the objectives of broadening the scope of possible mitigation options and make the risk mitigation strategies more effective, the firms do so from a different starting point. Norske Ventiler has gained access to a network of offshore cluster where information can be collected at minimal cost, in contrast to SafeClean which allocates significant resources to the effort. Further, SafeClean collects information to fill an experience gap, while Norske Ventiler seeks to reaffirms selected strategies. The effect of international experience is evident in the perceived need for market information. Norske Ventiler appears only to seek third part affirmation after choices are made, while SafeClean finds it necessary collect information from external actors prior to decision-making.

In conclusion, the level of response uncertainty is considerable, chiefly because of the uncertainty related to how the identified risk factors actually will affect the firms' operations in Brazil. Response uncertainty is addressed by two of the case firms through information acquisition and boundary spanning activities. The level of international experience seems to be decisive for the use of the collected information, as the experienced firm acquires information with the purpose of third party confirmation at a low cost, while the inexperienced firm puts significant resources into collecting information as a basis for decision-making.

6.3.3 Resource Commitment and Perceived Risk

"Risk aversion implies that resource commitments are inversely related to the managers' perceived risk in the internationalization process"

A strong aversion to financial loss in the case of market failure in Brazil makes the case firms seek a minimum commitment entry into the Brazilian market. It is the combination of high income stream uncertainty and limited organizational slack (Palmer & Wiseman 1999) that makes the firms reluctant allocate more resources than they can tolerate to loose without seriously affecting activities in other geographical markets.

Miller (1992) argued that mitigation of risk factors that firms face in the internationalization process would likely involve trade-offs in order to minimize risk exposure to multiple, interdependent risk factors. Although none of the case firms have explicitly stated that they find risk management activities to involve trade-offs, we observe that the case firms seek to minimize risk by simultaneous consideration of potential benefits and associated risks. The case firms seek to maximize the likelihood of a successful entry by reducing income stream uncertainty while keeping resource commitment at a minimum. Faced with a multitude of risks that increase income stream uncertainty this is a difficult balancing act rather than a straightforward process.

Shrader et al (2000) found early internationals to manage risk by simultaneous determination of trade-offs in three dimensions; political and economic risk, resource commitment and foreign revenue exposure. We find that resource commitment is the most influential factor for the overall risk level, while economic and political risk and foreign revenue exposure are not as important. Rather, the trade-off facing the case firms is reducing the risk factors associated with income stream uncertainty while keeping resource commitment at the lowest possible level. The income stream uncertainty experienced by the case firms arises because of the case firms suffer from liability of outsidership (Johanson & Vahlne 2009) and foreignness (Zahra 2005) – they lack experience from operating in the Brazilian market and knowledge on competitors and the preferences of suppliers and customers. Thus, the case firms must commit a certain amount of resources in order to overcome these liabilities and become market insiders, and the selected entry strategies are the result of this trade-off.

The resource commitment made by the case companies is not only dependent on the perceived risk, but also on the companies' flexibility with regard to resource commitment for market entry. It is mainly product characteristics that dictate the required presence of firm personnel in order to conduct sales in Brazil. Both Cybernetica and SafeClean must come in a position where they can explain the potential benefits in order to generate interests, and this is obviously more time-and resource consuming than selling products which the purpose of is clearly evident, such as the products of the other case firms, valves an ROVs. Thus, attributes of the firms' products clearly influence the resources required for market entry, and does not necessarily reflect the firms' perception of the risk of entry. Norske Ventiler, which has the most relaxed attitude towards cultural risk and states that selling valves to the Brazilian market with the chosen sales setup does not increase the level of risk, makes the lowest resource commitment, while SafeClean, which regards the Brazilian business environment to be completely different from their home market, still plans to do a resource consuming pilot project and is the only firm to still consider FDI as a possible entry mode.

Several firms indicate that a successful market entry will lead to greater commitment to the Brazilian market, in line with Johansen and Vahlne's (1977) stages model. Norske Ventiler, which arguably makes the lowest resource commitment of the case firms, still signals that given a positive market response, the company might have a subsidiary in Brazil in 5-10 years' time. Using minimal resources in the course of the internationalization process is however not a trait unique to the gradual internationals model, it is a rational objective to all managers and expressed in early internationals theory as well. Aspelund *et al.* (2007) argue that early internationals generally select an entry mode requiring the least resources, due to resource limitations and as a means of reducing risk. Nevertheless, the suggested need perspective of internationalization is not found to have significant impact on the firms' willingness to take risk.

In conclusion, high income stream uncertainty and limited organizational slack results in a high perceived risk and aversion to financial loss among the case firms. As a result of the risk aversion, the firms seek to keep the resources they commit to the Brazilian market at minimum level until they are more certain that market entry will give a positive return. However, the case firms face a trade-off involving keeping the resource commitment at a minimum while at the same time reducing income stream uncertainty arising due to liability of foreignness and outsidership. Importantly, both the perceived risk and minimum possible resource commitment is dependent on firm factors, primarily managerial experience and product characteristics, which is reflected in the case firms' different entry strategies.

6.3.4 Conclusion

While all four risk mitigation strategies are applied, keeping the resource commitment as low as possible - while still ensuring progress - is the overarching objective and dominating risk mitigation strategy for the case firms. The case firms are found to select risk management strategies based on the perceived level of risk; activities involving greater risk than the maximum tolerable risk frontier are rejected, while activities found to pose no greater risk than activities conducted in the home market are accepted. However, risk rejection is not a final decision. As risks are continuously evaluated and the level of perceived uncertainty changes with the level of market knowledge, activities initially rejected might be accepted at a later stage.

Response uncertainty leads to information acquisition and boundary spanning activities by some firms only, specifically the case firms that find lack of international experience as a hindering factor for decision-making and firms that have easy access to actors with relevant experience.

The case firms face a trade-off where both resource commitment and income stream uncertainty are sought minimized. Income stream uncertainty arises mainly from liabilities of outsidership and foreignness, and overcoming these liabilities requires a certain resource commitment. The minimum level of resource commitment is influenced by the level of resources needed to conduct an effective sales process. The selected entry mode, determining the firms' risk exposure, is the outcome of the above mentioned trade-off.

7 Implications

7.1 Implications for Managers

A return to the managerial challenges associated with risk assessment presented in the introductions, is helpful to explain the relevance of this study to managers of SMEs pursuing international activities. The risk assessment process was highlighted as a highly complex endeavor, requiring significant resources and resulting in a trade-off between resource allocation to risk assessment and other managerial activities. This case study shows that it is possible to reduce both complexity and resource requirements in the risk assessment process by adapting the process to a small firm context. The following paragraphs outline how complexity can be reduced and the impact of complexity-reduction on resource requirements.

First, managers should only seek to identify risk factors relevant to a subset of feasible entry modes, and the potential impact of these risk factors on firm performance. In order to understand the relationships between risk factors and firm performance, relevant experience is of high value and firms that lack relevant experience should seek to gain this from third parties. Separating relevant from less relevant information was found to be a challenge to the case firms, and third parties can provide valuable context-specific information which facilitates the process of identifying the most relevant information. For more experienced firms, third parties can also be used to confirm risk assessments, yielding much needed decision-support in a complex business environment. When relationships between the risk factors and firm performance are mapped, focus should be put on the most influential risk factors, in order to reduce the complexity of the risk assessment process. Furthermore, some entry modes will be rejected based on the risk evaluation – thus reducing complexity in the risk mitigation process as only a subset of risk factors must be mitigated.

The resources needed for a thorough risk assessment process is directly reduced by the complexity-reducing approach of focusing on a subset of entry modes and only key risk factors. Furthermore, third party support in the information acquisition process can limit resource requirements by providing context-relevant information and decision support, thus saving valuable time for the management teams. Nevertheless, third-party reliance implies a need to establish connections to sources with relevant information (e.g. governmental institutions or government backed internationalization programs, experienced firms, consultancies or other actors). In order to reduce the resource requirements, these connections should be established in a cost-efficient manner and the least cost-intensive connections preferred.

Although the measures presented above both reduce complexity and resource demands, there will be a need to allocate a significant amount of resources to the risk assessment process. The risk factors identified, evaluated and sought mitigated can be decisive for the success, or failure, of the foreign venture. Consequently, this is a process of vital importance, strongly affecting all subsequent phases of the internationalization process.

7.2 Implications for Policy Makers

Third-party support in the internationalization process has been found to be of critical importance, both to motivate and facilitate SME internationalization. All case firms emphasize the importance of third-parties for market information and referrals, and two of the case firms would never have considered entering the market in question without being a participant in a government-led internationalization program. The importance of internationalization programs to SME internationalization, and the vital importance of SMEs and international activity to the Norwegian economy, accentuates the need for government-led internationalization programs.

The internationalization program's role as a motivator implies a need for active search for firms with an international market potential, rather than reactive approach were firms with international ambitions contact the organization. Such an approach can push firms that would not consider international expansion on their own towards a gradual internationalization. To the case firms, important motivational factors have been the visits to the target market, as well as the general reduction of resource and psychological barriers to internationalization.

The role as a facilitator requires internationalization programs to be able to provide necessary market information, referrals to contacts in an extensive network and financial support. The market information reduces both physical and psychical barriers to internationalization by providing a cost efficient alternative to collecting information individually, and an important guide to navigating the vast amount of market information available to firms. As third party knowledge has been seen to substitute the lack of international experience, it is vital for the firms to gain access to such knowledge – either by the internationalization program directly, or through referrals provided by the program to actors with relevant experience. Lastly, the financial support options provided by governmental institutions have proven to be important to the internationalization process by making it easier to generate the first sale and thus increasing the speed of internationalization.

8 Limitations and Further Research

A major limitation of the study is that time constraints made it impossible to study each of the case firms at the desired level of detail. We were able to conduct only two interviews with each firm, and the limited number of observations made it difficult to evaluate the risk assessment process in great depth. Further, we have not been able to observe the risk assessment processes first-hand, which introduces the risk of managerial bias in the empirical data. Regarding this, interviews with more company representatives would have been valuable additional sources of data.

Further, we are evaluating the firms at an early stage in the internationalization process, and not all firms have made a final decision regarding entry mode. This means that what we have classified as risk mitigation strategies are often just stated plans, and the scope of this thesis does not allow for evaluation of the degree to which risk mitigation strategies are in fact implemented. Consequently, pro-active firms that articulate the full range of their planned strategies may seem to put more effort into risk mitigation than firms that either seek to omit the greatest risk factors or have only made a few risk mitigation plans, awaiting selection of entry mode.

A major limitation with regard to the generalizability of the findings is the fact that all case firms were participants in a government-led internationalization program. Arguably, such a program attracts a certain type of firms, and excludes firms relying purely on themselves and their network for information gathering and decision-support. Specifically, risk-aversion might be a trait that significantly separates firms likely to participate in such programs and firms that are not. The latter type of firm would likely be less risk-averse than firms that do not initiate internationalization efforts before they contacted by a third party.

In order to generalize our findings, future research should address the risk assessment process in a larger number of companies, representing different industries and countries, both inside and outside the context of government-led internationalization programs. Specifically, researchers should focus on the formality of the risk assessment process, the effect of managerial experience, and the trade-off between income stream uncertainty and resource commitment. This calls for both qualitative and quantitative studies. Qualitative studies should be well suited to address the context-sensitivity of the risk assessment process, while quantitative studies could provide much-needed statistical generalization of the findings.

On a general level, much of the risk-related research we have found useful is several decades old. This implies a need for a renewed attention on this important aspect of the internationalization process. Specifically, we find that the risk models developed by academics are of little relevance to the observed risk assessment process, and of little help to managers. Thus, there is a need to develop risk models that are both of higher explanatory power and more useful to practitioners.

In order to further develop risk models, several hurdles need to be overcome. First, risk is an ambiguous term that is not possible to confine to a single research stream. A search for the terms risk and uncertainty yields numerous results within a range of research areas — each with a different interpretation of the two terms. Thus, there is a need for studies of risk in the internationalization process to agree on a terminology for risk and uncertainty. This will make the

available risk research more accessible to researchers as it is easier to get a thorough overview of the field - facilitating further research.

Second, existing internationalization process models and risk models all contain explanatory aspects of the risk assessment process done during an internationalization effort. Thus, future research should focus on developing these models further. Specifically, gradual and early internationals models – which both are needed to explain the observed risk assessment process – should be sought joined to better explain internationalization of SMEs. Further, the risk models present relevant risk factor, but fail to explain necessary trade-offs made by small firms between resource commitment and perceived risk. Hence, the risk models need to be adapted to a practitioner context, and this also implies a need for more thorough empirical testing.

9 Conclusion

The objective of the study was to establish how managers of Norwegian SMEs identify, evaluate and mitigate risk factors in the internationalization process. The research questions were sought answered through a case study of firms participating in an Innovasjon Norge-led SME internationalization program.

The risk identification process is found to be muddling-through by default as there is a limited need for a more formalized and structured process for the small case firms, and thus not a function of the perceived level of risk. The process does not include the use of any risk model frameworks, but is highly influenced by third parties – including Innovasjon Norge and other parties with international experience that the firms have access to. Finally, the risk identification process is a resource-constrained process. This has implications for the number of risks identified, as only a subset of entry modes considered feasible given the firm's resource base are assessed in the risk identification process.

The risk evaluation process is not separated from the risk identification phase, and the two phases are performed in an interlinked, cyclical fashion. The evaluation of risk factors is clearly dependent on both firm- and managerial factors - of which organizational resources, product characteristics and managerial risk perception are the most influential. While the overall risk level is measured in terms of the total financial loss related to the failure of the Brazilian venture, the individual risk factors are largely evaluated in qualitative terms. After a consideration of a larger set of risk factors, only the key risk factors are thoroughly assessed in the risk evaluation process. The overall evaluation of risk is based on a comparison against the risk tolerance frontier of the firm – in effect an evaluation of whether or not the firm is able to handle the financial loss related to a venture failure.

The risk mitigation process is characterized by an overarching objective of keeping the resource commitment as low as practically possible while preserving the likelihood of successful entry. There is a continuous trade-off between keeping the resource commitment at a low level and reducing the venture's income stream uncertainty. As the liabilities of outsidership and foreignness declines, implying a lower income stream uncertainty, the case firms seem willing to commit more resources to the foreign market venture.

10 References

- **Aker Solutions 2011,** *Third Quarter Results 2011*, Aker Solutions, viewed April 17 2012, http://www.akersolutions.com/en/Global-menu/Media/Press-Releases/All/2011/Aker-Solutions-ASA-Third-quarter-results-2011/>
- Aldrich, HE 1979, Organizations and Environments, Prentice-Hall, Englewood Cliffs, N. J.
- **Andersen, O 1993**, 'On the Internationalization Process of Firms: A Critical Analysis', *Journal of International Business Studies*, vol. 24, no. 2, pp. 209-31.
- Aspelund, A, Madsen, TK & Moen, Ø 2007, 'A review of the foundation, international marketing strategies, and performance of international new ventures', *European Journal of Marketing*, vol. 41, no. 11/12, pp. 1423--48.
- **Aspelund, A & Moen, CF 2010**, 'International new ventures and governance structures-are international entrepreneurs strategic or entrepreneurial?', *Journal of Management and Governance*, pp. 1-22.
- **Autio, E 2005**, 'Creative Tension: The Significance of Ben Oviatt's and Patricia McDougall's Article 'Toward a Theory of International New Ventures", *Journal of International Business Studies*, vol. 36, no. 1, pp. 9-19.
- **Aven, T & Renn, O 2010**, Risk Management and Governance Concepts, Guidelines and Applications, vol. 16, Springer, Berlin.
- ---- 2011, Risk Management and Governance, Springer-Verlag Berlin Heidelberg.
- **Azevedo Jr, V 2011**, *Brazil Drilling Report*, Intsok, viewed Februaru 3rd 2012. http://www.intsok.no/style//uploads/doc/CountryReports/Brazil_Drilling-Report_August_2011.pdf
- **Baird, IS & Thomas, H 1985**, 'Toward a Contigency Model of Strategic Risk Taking', *The Academy of Management Review*, vol. 10, no. 2, pp. 230-43.
- **Bates, MJ 1989**, 'The Design of Browsing and Berrypicking Techniques for On-Line Search Interface', *Online Review*, vol. 13, no. 5, pp. 407-31.
- **Bell, J 1995**, 'The internationalization of small computer software firms: A further challenge to 'stage'theories', *European Journal of Marketing*, vol. 29, no. 8, pp. 60-75.
- Birkinshaw, J, Brannen, MY & Tung, RL 2011, 'From a distance and generalizable to up close and grounded: Reclaiming a place for qualitive methods in international business research', *Journal of International Business Studies*, vol. 42, pp. 573-81.
- **Boisot, M & Child, J 1999**, 'Organizations as Adaptive Systems in Complex Environments: The Case of China', *Organization Science*, vol. 10, no. 3, pp. 237-52.
- **Bourgeois, LJI 1981,** 'On the Measurement of Organizational Slack', *The Academy of Management Review*, vol. 6, no. 1, pp. 29-39.
- **Boyacigiller, N 1990**, "The Role of Expatriaters in the Management of Interdependence, Complexity and Risk in Multinational Corporations', *Journal of International Business Studies*, vol. 21, no. 3, pp. 357-81.
- **Bradshaw, Y & Wallace, M 1991,** 'Informing Generality and Explaining Uniqueness: The Place of Case Studies in Comparative Research', *International Journal of Comparative Sociology*, vol. 32, no. 1, pp. 154-71.
- Bromiley, P, Miller, KD & Rau, D 2005, 'Risk in Strategic Management Research', in MA Hitt, RE Freeman & JS Harriosn (eds), *Handbook of Strategic Management*, Blackwell, Oxford, pp. 259-88.
- Bryman, A 2008, Social Research Methods, 3rd editionn, Oxford University Press, Oxford.
- Bryman, A & Bell, E 2003, Business research methods, Oxford University Press, Oxford.
- **Burgel, O & Gordon, CM 2000**, 'The International Market Entry Choices of Start-Up Companies in High-Technology Industries', *Journal of International Marketing*, vol. 8, no. 2, pp. 33-62.

- Cavusgil, ST, Knight, G & Riesenberger, JR 2008, International business: strategy, management, and the new realities, Pearson Prentice Hall, Upper saddle River, N.J.
- Clark, E & Marois, B 1996, Managing risk in international business: techniques and applications, International Thomson Business Press, London.
- **European Commission, The 2010,** *Internationalisation of European SMEs*, European Commission, viewed January 18th 2012. http://ec.europa.eu/enterprise/policies/sme/market-access/files/internationalisation_of_european_smes_final_en.pdf
- Cooper, AC, Woo, CY & Dunkelberg, WC 1988, 'Entrepreneur's perceived chances for success', *Journal of Business Venturing*, vol. 3, no. 2, pp. 97-108.
- COSO, Committee of Sponsoring Organizations of the Treadway Comission 2004, Enterprise Risk Management - Integrated Framework, COSO, viewed March 6th 2012. http://www.coso.org/documents/coso_erm_executivesummary.pdf
- **Coviello, NE 2006**, 'The Network Dynamics of International New Ventures', *Journal of International Business Studies*, vol. 37, no. 5, pp. 713-31.
- Crick, D & Jones, MV 2000, 'Small High-Technology Firms and International High-Technology Markets', *Journal of International Marketing*, vol. 8, no. 2, pp. 63-85.
- Crick, D & Spence, M 2005, 'The internationalisation of 'high performing' UK high-tech SMEs: a study of planned and unplanned strategies', *International Business Review*, vol. 14, no. 2, pp. 167-85.
- **De Oliveira, A 2012**, 'Brazil's Petrobras: strategy and performance', in DG Victor, DR Hults & M Thurber (editorss), Oil and Governance. State-owned Enterprises and the World Energy Supply, Cambridge University Press, Cambridge, pp. 515-56.
- **Di Gregorio, D 2005**, 'Re-thinking country risk: insights from entrepreneurship theory', *International Business Review*, vol. 14, no. 2, pp. 209-26.
- Dixon-Woods, M, Bonas, S, Booth, A, Jones, DR, Miller, T, Sutton, AJ, Shaw, RL, Smith, JA & Young, B 2006, 'How can systematic reviews incorporate qualitative research? A critical perspective', *Qualitative Research*, vol. 6, no. 1, pp. 27-44.
- **Doz, Y 2011**, 'Qualitative research for international business', *Journal of International Business Studies*, vol. 42, no. 5, pp. 582-90.
- **Dubois, A & Gibbert, M 2010**, 'From complexity to transparency: managing the interplay between theory, method and empirical phenomena in IMM case studies', *Industrial Marketing Management*, vol. 39, pp. 129-36.
- **Dubois, FL & Reeb, D 2000**, 'Ranking the International Business Journals', *Journal of International Business Studies*, vol. 31, no. 4, pp. 689-704.
- **Economist Intelligence Unit 2011**, *Human Resources in Brazil.* The Economist Intelligence Unit Limited, London
- ---- **2012**, Organising an investment in Brazil. Prepare for opportunity. The Economist Intelligence Unit Limited, London
- **Eisenhardt, KM 1989**, 'Building Theories from Case Study Research', *The Academy of Management Review*, vol. 14, no. 4, pp. 532-50.
- **Etemad, H 2004,** 'Internationalization of Small and Medium-sized Enterprises: A Grounded Theoretical Framework and an Overview', *Canadian Journal of Administrative Sciences*, vol. 21, no. 1, pp. 1-21.
- European Commission 2009, COMMISSION STAFF WORKING DOCUMENT on the implementation of Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises, European Commission.
- Figueira-de-Lemos, F, Johanson, J & Vahlne, J-E 2011, 'Risk management in the internationalization process of the firm: A note on the Uppsala model', *Journal of World Business*, vol. 46, no. 2, pp. 143-53.

- **Financial Times 2011**, *Brazil: Platform for growth*, Financial Times, viewed April 21st 2012, http://www.ft.com/intl/cms/s/0/fa11320c-4f48-11e0-9038-00144feab49a.html %>.
- Fischhoff, B, Watson, SR & Hope, C 1984, 'Defining Risk', *Policy Sciences*, vol. 17, no. 2, pp. 123-39.
- Fjose, S, Jakobsen, EW & Espelien, A 2010, Internasjonalisering av norske offshoreleverandører. 2009: Befester stillingen i mer krevende markeder, Menon Business Economics, Oslo.
- Forlani, D & Mullins, JW 2000, 'Perceived Risks and Choices in Entrepreneurs' New Venture Decisions', *Journal of Business Venturing*, vol. 15, no. 4, pp. 305-22.
- **Gall, N 2011**, Oil in deep waters., Instituto Fernand Braudel de Economia Mundial, São Paulo, Brazil.
- **Ghemawat, P 2011**, World 3.0: Global prosperity and how to achieve it, Harvard Business Press Books, Boston.
- **Ghoshal, S 1987**, 'Global Strategy: An Organizing Framework', *Strategich Management Journal*, vol. 8, no. 5, pp. 425-40.
- **Gibbert, M & Ruigrok, W 2010**, "The "What" and "How" of Case Study Rigor: Three Strategies Based on Published Work', *Organizational Research Methods*, vol. 13, pp. 710-37.
- Gibbert, M, Ruigrok, W & Wicki, B 2008, 'What passes as a rigorous case study?', Strategic Management Journal, vol. 29, no. 13, pp. 1465-74.
- Glaser, BG & Strauss, AL 1967, The discovery of grounded theory: strategies for qualitative research, Aldine, Chicago.
- HBR Analytic Services 2011, Risk Management in a Time of Global Uncertainty, HBR Analytic Services, viewed March 9th 2012.http://www.zurich.com/internet/main/sitecollectiondocuments/insight/risk-management-in-a-time-of-global-uncertainty.pdf
- Henisz, WJ 2002, Politics and International Investment, Edward Elgar, Cheltenham, UK.
- Henisz, WJ & Zelner, BA 2010, 'The Hidden Risks in Emerging Markets', *Harvard Business Review*, vol. 88, no. 4, pp. 88-95.
- Hershberg, J 1993, James B. Conant: Harvard to Hiroshima and the Making of the Nuclear Age. Knopf. New York
- Inventure Management 2011, How to do business in Brazil. A guide for oil, offshore and maritime companies entering Brazil, Rio de Janeiro, Brazil.
- ---- **2012**, *Chevron Faces Another Lawsuit*, Inventure Management, viewed April 24th 2012, http://www.newsletter.inventuremanagement.com/chevron-faces-another-lawsuit/>.
- **Johanson, J & Vahlne, J-E 197**7, 'The Internationalization Process of the Firm-A Model of Knowledge Development and Increasing Foreign Market Commitments', *Journal of International Business Studies*, vol. 8, no. 1, pp. 23-32.
- Johanson, J & Vahlne, J-E 2009, 'The Uppsala internationalization process model revisited: From liability of foreignness to liability of outsidership', *Journal of International Business Studies*, vol. 40, no. 9, pp. 1411-31.
- **Johanson, J & Wiedersheim-Paul, F 1975**, 'The internationalization of the firm Four Swedish cases', *Journal of Management Studies*, no. 12, pp. 305-22.
- Jørpeland, G 2012, CEO of K. Lund Offshore to AB Karlsen & KE Dahl, March 14th.
- Kahneman, D 2011, Thinking, fast and slow, Penguin Group, London.
- Knight, G & Cavusgil, ST 2004, 'Innovation, Organizational Capabilities, and the Born-Global Firm', *Journal of International Business Studies*, vol. 35, no. 2, pp. 124-41.
- **Knight, GH 1997**, Emerging Paradigm for International Marketing: The Born Global Firm, Michigan State University, Doctoral dissertation.
- **Laitenen, EK 1992**, 'Prediction of Failure of a Newly Founded Firm', *Journal of Business Venturing*, vol. 7, no. 4, pp. 323-40.

- **Lindblom, CE 1959**, 'The Science of "Muddling Thorugh", *Public Administration Review*, vol. 19, no. 2, pp. 79-88.
- MacCrimmon, KR & Wehrung, DA 1990, 'Characteristics of Risk Taking Executives', *Management Science*, vol. 36, no. 4, pp. 422-35.
- **Madsen, TK & Servais, P 1997**, 'The internationalization of Born Globals: An evolutionary process?', *International Business Review*, vol. 6, no. 6, pp. 561-83.
- Majors, J 2012, Marketing and Communication Director Inventure Management to AB Karlsen & KE Dahl, March 6th.
- March, JG 1978, 'Bounded Rationality, Ambiguity, and the Engineering of Choice', *The Bell Journal of Economics*, vol. 9, no. 2, pp. 587-608.
- March, JG & Shapira, Z 1987, 'Managerial Perspectives on Risk and Risk Taking', *Management Science*, vol. 33, no. 11, pp. 1404-18.
- March, JG, Simon, HA & Guetzkow, H 1958, Organizations, Wiley, New York.
- **Mascarenhas, B 1982,** 'Coping with Incertainty in International Business', *Journal of International Business Studies*, vol. 13, no. 2, pp. 87-98.
- McAuley, A 1999, 'Entrepreneurial Instant Exporters in the Scottish Arts and Crafts Sector', Journal of International Marketing, vol. 7, no. 4, pp. 67-82.
- McDougall, PP & Oviatt, BM 1996, 'New venture internationalization, strategic change, and performance: A follow-up study', *Journal of Business Venturing*, vol. 11, no. 1, pp. 23-40.
- McDougall, PP, Shane, S & Oviatt, BM 1994, 'Explaining the Formation of International New Ventures the Limits of Theories from International-Business Research', *Journal of Business Venturing*, vol. 9, no. 6, pp. 469-87.
- Merton, RK, Fiske, M & Kendall, PL 1990, The focused interview: a manual of problems and procedures, Free Press, New York.
- Miles, G, Preece, SB & Baetz, MC 1999, 'Dangers of dependence: The impact of strategic alliance use by small technology-based firms', *Journal of Small Business Management*, vol. 37, no. 2, pp. 20--9.
- Miller, KD 1992, 'A Framework for Integrated Risk Management in International Business', *Journal of International Business Studies*, vol. 23, no. 2, pp. 311-31.
- ---- 1993, 'Industry and Country Effects on Managers' Perceptions of Environmental Uncertainties', *Journal of International Business Studies*, vol. 24, no. 4, pp. 693-714.
- ---- 1998, 'Economic Exposure and Integrated Risk Management', *Strategic Management Journal*, vol. 19, no. 5, pp. 497-514.
- Miller, KD & Bromiley, P 1990, 'Strategic Risk and Corporate Performance: An Analysis of Alternative Risk Measures', *The Academy of Management Journal*, vol. 33, no. 4, pp. 756-79.
- Miller, KD & Reuer, JJ 1996, 'Measuring Organizational Downside Risk', *Strategic Management Journal*, vol. 17, no. 9, pp. 671-91.
- Milliken, FJ 1987, 'Three Types of Perceived Uncertainty about the Environment: State, Effect, and Response Uncertainty', *The Academy of Management Review*, vol. 12, no. 1, pp. 133-43.
- Moen, Ø & Servais, P 2002, 'Born Global or Gradual Global? Examining the Export Behavior of Small and Medium-Sized Enterprises', *Journal of International Marketing*, vol. 10, no. 3, pp. 49-72.
- NHD, Nærings ogHandelsdepartementet 2011, Små og mellomstore bedrifter, Nærings- og Handelsdepartementet, Oslo.
- Nolan, PA & Thurber, MC 2010, On the state's choice of oil company: Risk management and the frontier of the petorleum industry, Program on Energy and Sustainable Development, Stanford University, Stanford.
- **Norseng, R 2011**, 'Brazil offshore market opportunities and challenges for Norwegian suppliers', Offshore strategikonferansen 2011, viewed March 29th 2012.http://www.strategikonferansen.org/2011/files/09_rune_norseng.pdf >

- Oetzel, JM, Bettis, RA & Zenner, M 2001, 'Country risk measures: how risky are they?', *Journal of World Business*, vol. 36, no. 2, pp. 128-45.
- Oilinfo.no 2011, *Hodene finner sammen*, Oilinfo, viewed February 4 2012, http://wwww.oilinfo.no/index.cfm?event=doLink&famId=226202">http://www.oil
- OpenCorporates 2012, The Closed World of Corporate Data. An examination of how open company data is in Open Government Partnership countries. OpenCorporates, viewed May 18th 2012 http://www.access-info.org/documents/images/Closed_World_Company_Data.pdf >
- **Osterwalder, A & Pigneur, Y 2010**, Business model generation: a handbook for visionaries, game changers, and challengers, Hoboken, N. J.
- **Oviatt, BM & McDougall, PP 1994,** 'Toward a Theory of International New Ventures', *Journal of International Business Studies*, vol. 25, no. 1, pp. 45-64.
- Oviatt, BM & McDougall, PP 2005, 'Defining International Entrepreneurship and Modeling the Speed of Internationalization', *Entrepreneurship Theory and Practice*, vol. 29, no. 5, pp. 537-54.
- Oviatt, BM, Shrader, RC & McDougall, PP 2004, 'The Internationalization of New Ventures: A Risk Management Model', *Advances in International Management*, vol. 16, pp. 165-85.
- Oxelheim, L & Wihlborg, C 1987, Macroeconomic uncertainty: International risks and opportunities for the corporation, Wiley, Chichester.
- Palmer, TB & Wiseman, RM 1999, 'Decoupling Risk Taking from Income Stream Uncertainty', *Strategic Management Journal*, vol. 20, no. 11, pp. 1037-62.
- **Patton, MQ 2002**, *Qualitative research and evaluation methods*, 3 edn, Sage Publications, Thousand Oaks, Calif.
- Petrobras 2011, 2011-2015 Business Plan, Rio de Janeiro.
- PetroNews 2011, 'Brasil: Fristelser i grønt, gult og blått', PetroNews, no. 5.
- **Porter, ME 1980**, Competitive strategy: techniques for analyzing industries and competitors, Free Press, New York.
- ---- **2008**, 'The Five Competitive Forces That Shape Strategy', *Harvard Business Review*, vol. 86, no. January, pp. 79-93.
- Rennie, MW 1993, 'Born global', McKinsey Quarterly.
- **Rialp, A, Rialp, J & Knight, GA 2005**, The phenomenon of early internationalizing firms: what do we know after a decade (1993–2003) of scientific inquiry?', *International Business Review*, vol. 14, no. 2, pp. 147-66.
- **Ronstadt, R 1988**, 'The Corridor Principle', *Journal of Business Venturing*, vol. 3, no. 1, pp. 31-40. **Rowe, WD 1977**, *An Anatomy of Risk*, Wiley, New York.
- Rugman, AM, Hodgetts, RM & Collinson, S 2009, International business, 5th edn, Prentice Hall/Financial Times, New York.
- Rystad Energy 2010, INTSOK Annual Market Report (2011-2014). INTSOK, viewed March 14th 2012.
 - http://www.intsok.no/style//uploads/doc/Annual%20Market%20Reports/Annual%20MArket%20Reports/Annual%20Market%20Market%2
- **Sambharya, RB 1996**, 'Foreign Experience of Top Management Teams and International Diversification Strategies of U.S. Multinational Corporations', *Strategic Management Journal*, vol. 17, no. 9, pp. 739-46.
- Sasson, A & Blomgren, A 2011, Knowledge Based Oil and Gas Industry, BI, viewed April 28th. http://web.bi.no/forskning/papers.nsf/b63c43a0385ff61dc1256e620043c6b0/f025a647fbc5759dc1257871004ae50e/\$FILE/2011-03-Sasson&Blomgren.pdf
- Shapira, Z 1995, Risk taking: a managerial perspective, Russel Sage Foundation, New York.
- **Sharma, R 2012**, 'Bearish on Brazil. The commodity slowdown and the end of the magic moment', *Foreign Affairs*, vol 91, no. 3, April/June

- **Shrader, RC 2001,** 'Collaboration and Performance in Foreign Markets: The Case of Young High-Technology Manufacturing Firms', *Academy of Management Journal*, vol. 44, no. 1, pp. 45-60.
- **Shrader, RC, Oviatt, BM & McDougall, PP 2000**, 'How New Ventures Exploit Trade-Offs among International Risk Factors: Lessons for the Accelerated Internationization of the 21st Century', *The Academy of Management Journal*, vol. 43, no. 6, pp. 1227-47.
- **Simon, HA 1956**, 'Rational choice and the structure of the environment', *Psychological Review*, vol. 63, no. 12, pp. 129-38.
- Simpson, CLJ & Kujawa, D 1974, 'The Export Decision Process: An Empirical Inquiry', *Journal of International Business Studies*, vol. 5, no. 1, pp. 107-17.
- Soanes, C, Hawker, S & Elliott, J (editors) 2006, Paperback Oxford English Dictionary, 2 edn, Oxford University Press, Oxford.
- **SSB 2011**, *Utenriksøkonomi*. Statistisk Sentralbyra, viewed April 18th 2012. http://www.ssb.no/ur_okonomi/>.
- **Sweig, JE 2010**, 'A new global player. Brazil's far-flung agenda', *Foreign Affairs*, vol. 89, no. 6, November/December.
- Taleb, NN, Goldstein, DG & Spitznagel, MW 2009, 'The Six Mistakes Executives Make in Risk Management', *Harvard Business Review*, vol. 87, pp. 78-81.
- Tanzi, TJ & Textoris, R 2012, 'Risk engineering', paper presented to Athens course taught at ParisTech (Ecole de Mines), Paris, France.
- **The Economist 2009a,** 'Brazil's oil policy. Preparing to spend a "millionaire ticket" from offshore', from the September 3rd edition.
- ---- 2009b, 'Special report on business and finance in Brazil', from the November 12th edition.
- ---- 2010, 'Lula on his legacy. Interview with Brazil's president Lula.', from the September 30th edition.
- ---- 2011a, 'Oil exploration in Brazil. The drilling edge', from the February 1st edition.
- ---- 2011b, 'Brazil's oil boom. Filling up the future', from the November 5th edition.
- ---- **2011c**, 'Chevron and Brazil's oil industry. Oil water and trouble.', from the December 31st edition.
- ---- 2012a, 'Special report: State capitalism. The visible hand', from the January 1st edition.
- ---- 2012b, 'Transparency: Light and shady', from the April 19th edition.
- **Thompson, JD 1967**, Organizations in action: social science bases of administrative theory, McGraw-Hill, New York.
- **Thurber, MC, Hults, DR & Heller, PRP 2011**, 'Exporting the "Norwegian model": The effect of administrative design on oil sector performance', *Energy Policy*, vol. 39, no. 9, pp. 5366-78.
- Ting, W 1988, Multinational risk assessment and management: strategies for investment and marketing decisions, Quorum Books, New York.
- **ToolingU.com 2012**, *What is the definition of exotic metal?*, ToolingU.com, viewed April 19th 2012, http://www.toolingu.com/definition-200325-87686-exotic-metal.html >.
- **Trading Economics 2012**, *Brazil inflation rate*, Trading Economics, viewed April 26th 2012, http://www.tradingeconomics.com/brazil/inflation-cpi.
- **TU.no 2011**, *Aker rydder opp i Brasil*, Teknisk Ukeblad, viewed April 17th 2012. http://www.tu.no/olje-gass/2011/12/08/aker-rydder-opp-i-brasil >.
- ---- 2012, Han er Akers ryddegutt i Brasil, Teknisk Ukeblad, viewed April 17th 2012. http://www.tu.no/olje-gass/2012/04/17/han-er-akers-ryddegutt-i-brasil >
- Tversky, A & Khaneman, D 1986, 'Rational Choice and the Framing of Decisions', *The Journal of Business*, vol. 59, no. 4, pp. 251-78.
- **Utenriksdepartementet 2011**, *Regjeringens Brasil-strategi. Nye perspektiver på et tradisjonsrikt forhold.*Utenriksdepartmentet, viewed March ^{8th} 2012. <

- http://www.regjeringen.no/upload/UD/Vedlegg/Naeringsliv/280311brasilstrategi_web N.pdf >
- Vlek, C & Stallen, P-J 1980, 'Rational and Personal Aspects of Risk', *Acta Psychologica*, vol. 45, no. 1-3, pp. 273-300.
- Waite, M 2005, Oxford Thesaurus of English, Kunnskapsforlaget. Oslo.
- Walsh, D & Downe, S 2005, 'Meta-synthesis method for qualitative research: a literature review', Journal of Advanced Nursing, vol. 50, no. 2, pp. 204-11.
- Wangen, G 2012, 'International opportunities are huge. The Norwegian petroleum cluster in a unique position to capture more business'. Offshore Strategikonferansen 2012, viewed April 24th 2012. http://www.intsok.com/style/uploads/doc/Presentations/INTSOK-Presentasjon_OffshoreStrategikonferanse2012.pdf
- Widding, LØ 2003, 'Bygging av kunnskapsreservoarer i teknologibaserte nyetableringer', Handelshøgskolen i Bodø. Bodø.
- Wiersema, MF & Bantel, KA 1992, 'Top Management Team Demography and Corporate Strategic Change', *The Academy of Management Journal*, vol. 35, no. 1, pp. 91-121.
- Wiseman, RM & Bromiley, P 1996, 'Toward a Model of Risk in Declining Organizations: An Empirical Examination of Risk, Performance and Decline', *Organization Science*, vol. 7, no. 5, pp. 524-43.
- Wold, K 2012, Commercial manager Topside Corrosion Roxar Trondheim to KE Dahl.
- **World Bank, T 2012**, *Doing Business. Measuring Business Regulations*, The World Bank, viewed February 5th 2012, http://www.doingbusiness.org/data/exploreeconomies/brazil/">http://www.doingbusiness.org/data/exploreeconomies/brazil/ %>.
- World Oil Online 2011, Technology trends. Petrobras builds technology to optimize presalt recovery, World Oil, viewed April 24th 2012, http://www.worldoil.com/April-2011-Petrobras-builds-technology.html %>.
- Yin, RK 2009, Case study research: design and methods, Sage, Los Angeles.
- Yuyenyongwatana, RP & Carraher, SM 2008, 'Academic Journal Ranking: Important to Strategic MAnagement and General Management Researchers?', *Journal of Business Strategies*, vol. 25, no. 2, pp. 1-8.
- **Zahra, SA 2005**, 'A Theory of International New Ventures: A Decade of Research', *Journal of International Business Studies*, vol. 36, no. 1, pp. 20-8.
- Zahra, SA, Ireland, DR & Hitt, MA 2000, 'International expansion by new venture firms: international diversity, mode of market entry, technological learning, and performance', *Academy of Management Journal*, vol. 43, p. 5.
- Zahra, SA, Korri, JS & Yu, J 2005, 'Cognition and international entrepreneurship: implications for research on international opportunity recognition and exploitation', *International Business Review*, vol. 14, no. 2, pp. 129-46.

11 Appendices

11.1 The Navigator project

The Navigator project is organized by Innovasjon Norge (IN) in order to facilitate the internationalization process of Norwegian SMEs. After a pilot project from 2008-2010, different Navigator projects have been conducted for different technologies and market segments. The project's objective is to increase the speed and reduce the risk of the participating firms' internationalization process. All programs have a similar structure, focusing on competence building within areas such as business strategy, network building and the undertaking of an internationalization project.

The Navigator project for the Brazilian petroleum sector is the first within the petroleum industry, and the first targeting the Brazilian market. The project stretches over a 16-month period, and is organized through five forums where all firms participate. Each forum has a topic, and the firms, together with a firm specific business consultant²⁷, prepare deliverables ahead of each meeting – including a situation analysis and a business plan for the Brazilian venture. The goal of the Navigator program is for the companies to construct a situation analysis, decide to follow one or more internationalization projects, that an action plan is developed, and finally that the market is visited.

	Agenda	Location
Meeting 1	Joint platform, situation analysis	Norway, spring 2011
Meeting 2	Revised situation analysis, choice of internationalization project	Norway, summer 2012
Meeting 3	Market and network, foreign market discussion	Brazil, fall 2011
Meeting 4	Concretization of internationalization plan	Norway, January 2012
Meeting 5	Continuation and implementation of internationalization plan	Brazil, March 2012
Meeting 6	Recruitment to other IN services	Norway, August 2012

Table 26 - Navigator forum overview

Two of the forums have been held in Brazil, while the remaining meetings have taken place in Norway (Table 26). The meeting agenda is a result of the companies' business plans which point towards critical success factors, and IN's own experience. From the firms, handling of cultural differences was regarded as a critical success factor, while IN's experience suggest a need to learn how to plan long-term, make business models and prepare for client meetings.

IN finds that the most valuable contribution from the Navigator participation is firm dependent. While some firms find it valuable to have an advisor and a discussion partner, others think of the network between the participating companies as most valuable and appreciate group discussions around important topics in their internationalization process. Furthermore, some firms find the meeting topics and guest lectures most valuable, while others find the market information provided by IN's foreign offices most important.

Based on positive feedback on the Navigator projects, IN have decided to include the Navigator project in their ordinary service offering - the 'Fram' program²⁸. Navigator will therefore change logo and name to 'Fram Marked', without any changes in content.

²⁷ Pre-qualified and appointed by Innovasjon Norge.

²⁸ http://www.innovasjonnorge.no/fram-og-Navigator/bedre-ledelse-gir-okt-lonnsomhet1

11.2 Risk Models in the field of international business development Baird and Thomas (1985)

Baird and Thomas' (1985) risk taking model conceptualizes how variables of an organization's external and internal environment, traits of the decision maker(s) and the strategic problem interact to determine the level of risk accepted by a firm. Variables affecting risk taking are grouped into five categories; environmental variables, industry variables, organizational variables, decision maker variables and strategic problem variables. The variables of each category contribute to the "risk impetus" of each category, and the risk level can be altered by a scale of managerial risk-taking likelihood. Further, Baird and Thomas point to interaction effects within and between risk categories that may affect the overall risk exposure.

Miller (1992)

Miller (1992) presented three main sources of uncertainty; the *general environment*, and *industry*- and *firm* specific factors. Perhaps more importantly, Miller argues that risk factors are linked and must be treated with a holistic perspective. The linkages of the risk factors lead to a trade-off in risk mitigation; reducing one source of uncertainty might increase uncertainty from other factors (Miller 1992). Several researchers have supported Miller's view of risk as a multidimensional concept (Bromiley, Miller & Rau 2005; Oviatt, Shrader & McDougall 2004; Shrader, Oviatt & McDougall 2000).

Shrader, McDougall and Oviatt (2000)

Shrader, McDougall and Oviatt (2000) conduct an empirical test of Miller's (1992) theory of interdependent international risk factors based on a sample of 87 US firms making 212 international entries within their first six years of existence in the 1980s. Shrader *et al.*(2000) find that three risk factors – *foreign market exposure*, *host country risk* and *entry mode commitment* – are simultaneously determined by managers, supporting Miller's (1992) view of risk factors as interdependent and that risk management might involve trade-offs. Shrader *et al.* argue that managing risk by trade-offs might be especially relevant to young firms that go through a rapid internationalization process but are unlikely to have developed an international network, which is sometimes used by larger firms to manage risk (Ghoshal 1987).

Shrader, McDougall and Oviatt (2004)

In a subsequent article, Shrader, McDougall and Oviatt present a risk management model for new venture internationalization (Oviatt, Shrader & McDougall 2004). The model is based on Miller's (1992) integrated risk model and Baird and Thomas' (1985) risk variables, but focused on new firms and takes venture performance into consideration, as opposed to the previously discussed models. An important aspect of Oviatt *et al.*'s (2004) model is the mediating forces interacting between the six elements of the model; the *general environment, industry conditions, venture entrepreneurs*, the *venture, venture internationalization*, and *venture performance*.

The authors propose that factors related to the general environment affect industry conditions, which is in accordance with Baird and Thomas' (1985) model. Next, consistent with findings of Palmer and Wiseman (1999), Oviatt *et al.* propose that industry conditions primarily have an effect through managerial actions. Characteristics of the venture entrepreneurs is therefore highly important to how risks in the internationalization process is managed, as "personal characteristics, psychological traits, and network relationships influence how entrepreneurs

interpret industry conditions" (Oviatt, Shrader & McDougall 2004, p. 173). Traits of the venture, such as its size, tangible and intangible resources, strategies and governance structure will together with the venture entrepreneurs directly influence the internationalization process and have an effect on the firm's performance (Oviatt, Shrader & McDougall 2004).

Cavusgil, Knight and Riesenberger (2008)

Cavusgil et al. (2008) identify four categories of risk that internationalizing firms meet – crosscultural risk, country risk, currency risk, and commercial risk- and must manage "to avoid financial loss or product failures" (Cavusgil, Knight & Riesenberger 2008, p. 11). Interestingly, Cavusgil et al.'s model is the only one to take into account cross-cultural risk factors, and the authors argue that the risk of cultural miscommunication might lead to inappropriate business strategies and suboptimal customer relationships. While Cavusgil et al. present risk factors related to political risk and financial risk factors similar to previously discussed risk models (Baird & Thomas 1985; Miller 1992), the commercial risk factors - "potential loss or failure from poorly developed or executed business strategies, tactics, or procedures" (Cavusgil, Knight & Riesenberger 2008, p. 12) – is another risk area not found in the previously discussed models. Further, relating uncertainties to specific countries is not supported by Miller's (1992) model. Miller argues that the relevance of country level risk analysis depends on the correlation of uncertainties across country borders, and this view is supported by Oviatt et al. (2004). Cavusgil et al.'s (2008) definition of country risk is however wide: "the potentially adverse effects on company operations and profitability caused by developments in the political, legal, and economic environment in a foreign country" (Cavusgil Knight & Riesenberger 2008, p. 12), and similar to what Baird and Thomas (1985), Miller (1992) and Oviatt et al. (2004) label environmental factors.

11.3 Search strategy

The Scopus database search was carried out by using a Boolean search string of keywords related to the research questions (Table 27). The search included findings in the title, abstract and keywords of the entries in the Scopus database. A wide approach was selected, implying that the entire Scopus database was searched through using the keywords, rather than a search concentrated to top journals. This ensured a robust search, not excluding articles published in smaller journals.

Company Keyword	AND	Internationalization Keyword	AND	Research Question Keyword
SME	OR	Internationalization	OR	Risk
Small and medium-sized enterprises	OR	Internationalisation	OR	Uncertainty
SMTBF	OR	Oversea expansion	OR	Risk identification
Small and medium-sized technology based firms	OR	Foreign market entry	OR	Identify risk
INV	OR	Foreign entry	OR	Identifying risk
International new venture	OR	Market entry	OR	Risk mitigation
ESTBF	OR	Globalizing	OR	Mitigating risk
Early stage technology-based firms	OR	Globalising	OR	Mitigate risk
BG	OR	Global expansion	OR	Risk management
Born global	OR	Decision-making	OR	Manage risk
Start-up	OR	Brazil	OR	Managing risk
Early stage	OR		OR	Internationalization risk
Early internationals	OR		OR	Risk perception
International firms	OR			•
Technology-based	OR			
Technology firm	OR			
International venture	OR			

Table 27 – Keywords for literature search

The first table column contains terms describing the type of company the study is focused on. However, this column had to be removed in order to obtain an adequate number of articles in the search. The second column contains terms describing the internationalization and decision-making process of firms, while the latter column is reserved for terms describing the research questions. As can be seen in the table, Bryman and Bell's (2003) suggestions for synonym use, alternative spellings and opposites were used in the keyword generation.

TITLE-ABS-KEY(((SME OR "small and medium-sized enterprises" OR SMBTF OR "small and medium-sized technology based firms" OR INV OR "international new venture" OR ESTBF OR "early stage technology based firms" OR BG OR "born global" OR "start-up" OR "early stage" OR "early internationals" OR "international firms" OR "technology-based" OR "technology firm" OR "international venture") AND (internationalization OR internationalisation OR "oversea expansion" OR "foreign market entry" OR "foreign entry" OR "market entry" OR globalizing OR globalising OR "global expansion" OR "decision-making" OR "brazil") AND (risk OR "risk identification" OR "identify risk" OR "identifying risk" OR "risk mitigation" OR "mitigating risk" OR "mitigate risk" OR "risk management" OR "manage risk" OR "managing risk" OR "international risk" OR "internationalization risk" OR "risk perception")))

Figure 21 - Search string

11.4 Interview guide

1. Bakgrunnsinformasjon

1.1 Selskapsnivå

- 1. Antall ansatte, omsetning, økonomiske resultater
- 2. Kan selskapets ledergruppe beskrives?
 - a. Antall personer, ansvarsområder, utdanning, ledelses- og bransje- og internasjonal erfaring
- 3. Hvem er eierne, hvem bidrar med finansiering?
- 4. Kan selskapets historie kort gjengis fra oppstart fram til i dag?
 - a. Hvilke faktorer har hatt størst betydning for selskapets utvikling?
 - b. Har selskapsvekst skjedd organisk, eller via oppkjøp, JVs etc.?
 - c. Spesielle muligheter/utfordringer?
 - d. Hvor mange av grunnleggerne er fremdeles med i bedriften?

1.2 Produktnivå

Hva er produktene/tjenestene selskapet tilbyr?

- a. Kort beskrivelse av teknologi/kompetanse
- b. Proprietær teknologi vs. moden teknologi som er allmenn tilgjengelig?
 - i. Er teknologiutviklingen i bransjen hurtig/stabil?
- c. Hvor stor del av omsetningen brukes på F&U?
- d. Er produktet/tjenesten avansert/enkelt?
- e. I hvor stor grad er produkt/tjeneste spesialtilpasset kunde vs standardisert?
- f. Utføres tjenesten on site eller ved hovedkvarteret til bedriften?
- g. Er det definerte inntektsmodeller etter salg? E.g. support etter salg?
- h. Produktfortrinn jfr med konkurrerende produkter? Hvilke?

1.3 Markedsnivå

1. Kunder

- a. Hvem er kundene? Norge? Internasjonalt?
- **b.** Mange potensielle kunder, eller begrenset antall?
- c. Er produkter og marked forutbestemt, eller kan en velge?
- **d.** Hvor lett er det å skifte kunder? (avhengighetsforhold?)

2. Hvordan markedsføres de ulike produktene?

- a. Kunder/segmenter
- b. Kanaler
- c. Prissetting
- **d.** Er det planer for ekspansjon, for eksempel til andre segmenter/land?
- e. Er tidsaspektet viktig avgjørende med hurtig aksept i markedet?

3. Hvordan foregår salg av produktene/service i Norge?

- a. Direkte fra hovedkontor/via agent/distributør/salgskontorer?
- b. Motiv for salgskanaler
 - i. Tjeneste/teknologi/erfaring/kundeforhold?

4. Hvem er konkurrentene?

- a. Norske/internasjonale?
- **b.** Store/små?
- c. Hva er bedriftens konkurransefortrinn overfor konkurrentene?

5. Hvordan er markedsutviklingen?

- a. Vekst, stabilitet, nedgang?
- b. Individuelle markedsforskjeller?

6. Hvor stor er en typisk ordre?

7. Hvordan er innkjøpsprosessen?

- a. Er produktet viktig for kundene?
- b. Har valg av leverandør langsiktige konsekvenser?

- c. Hva er de viktigste faktorene for kjøp hos kundene?
 - i. Kriterier for valg av løsning, leverandør, produkt?
- 8. Er der definerte inntektsmodeller etter salg? Hva tenkes rundt service/oppfølging?

2. Internasjonal virksomhet

2.1 Global tilstedeværelse, internasjonal erfaring, motivasjon for ekspansjon

- 1. Har bedrifter noen kunder eller aktiviteter utenfor Norges grenser?
- 2. Hvilke land/markedsområder er dere tilstede i?
 - a. Hvorfor disse landene?
 - b. Hvordan foregår prosessen med å velge satsingsområder eller -land?
 - i. Standardisert prosess? Faste roller og involverte eller ad-hoc?
- 3. Drivfaktorer (tilgang til markeder, råvarer, teknologi, internasjonal samarbeid)
- 4. Hvor tidlig ble det aktuelt å satse internasjonalt?
- 5. Hvilke inngangsstrategier er blitt benyttet ifm tidligere internasjonal ekspansjon?
 - a. Direkte eksport/agenter/distributører/samarbeidspartnere internasjonalt?
 - **b.** Hvorfor har disse strategiene blitt valgt?
 - c. Ressurser, egne erfaringer, eksterne erfaringer?
 - d. Hvordan har dette fungert?
- 6. Har internasjonaliseringsprosessen endret seg underveis?
 - a. Grunnet erfaringer/lærdom trukket ut?
- 7. I hvilken grad evaluerer dere prosessen som har vært i forkant av internasjonale satsinger?
 - a. Når skjer dette?

2.2 Muligheter/motiv for entry

- 1. Hvorfor ønsker bedriften å entre Brasil? Motiv?
- 2. Potensielle kunder i Brasil. Hvem? Antall?
- 3. Hvorfor tror dere bedriften vil lykkes i det brasilianske markedet? Mulige konkurransefortrinn?
- 4. Hvilken tidshorisont har bedriften for etablering i Brasil?

2.3 Valg av inngangsstrategi i Brasil

- 1. Hvilken inngangsstrategi ønsker bedriften å benytte i Brasil?
 - a. Direkte eksport, agent, distributør, salgskontor, franchising, JV?
 - b. Hvem vil utføre tjenesten, og hvor og hvordan? On site eller ikke?
 - c. Hvilke alternativer står/stod de mellom?
- 2. Hva er årsaken til at de vurderer akkurat denne/disse inngangsstrategiene? (faktorer med innvirkning på valget)
 - a. Aspekter ved det brasilianske markedet? Tidligere erfaring? Aspekter ved tjenestene? Nettverk? Kjennskap til det brasilianske markedet?
- 3. Hva er de viktigste kravene en inngangsstrategi må oppfylle?
- 4. Hva er de viktigste kravene en partner må oppfylle?
 - a. Tilgang til kunnskap om markedet, nettverk, fleksibilitet, local conten.
- 5. Var det noen alternative inngangsstrategier som aldri ble vurdert? Hvorfor?
 - a. Ressurs- og kapitalbegrensninger? Erfaring (internasjonalt og brasilkunnskap)
- 6. Sammenheng mellom tidligere erfaringer og inngangsstrategi?
 - a. Tidligere erfaringer de kan dra nytte av? (salgskanaler, samarbeidspartnere, internasjonal erfaring)
 - b. Sammenheng mellom salgskanaler i Norge og valg av inngangsstrategi i Brasil?
 - c. Nivå av internasjonal erfaring: annen inngangsstrategi eller vurderinger hvis mer de var mer erfarne (internasjonalt, brasil)
- 7. Partner
 - a. Avhengig av å ha en partner? Hvorfor?

- b. Formell kontrakt, eller basert på relasjoner og tillit?
- c. Kreves det mye opplæring av en partner?
- d. Vil en potensiell partner ha enerett til å selge deres produkter? Eksklusivitet?
- e. Er bedriften bekymret for at en partner skal utnytte negativt deres teknologi/kunnskap?
- f. Hvis forholdet med en spesifikk partner viser seg å ikke fungere, vil det være vanskelig eller kostbart å bytte partner? Hvorfor?
- g. Innvirkning på hva slags type partner? Franchising, JV, distribusjon, agent, samarbeid)

2.4 Utfordringer

- 1. Er organisasjonen forberedt på å støtte virksomhet både i Norge og i utlandet?
 - a. F.eks. med tanke på markedsføring og salgsstøtte i utlandet
- 2. Hva er de største utfordringene ved inngang i markedet?
 - a. Hva er den største inngangsbarrieren?
 - b. Innvirkning på inngangsstrategi?
- 3. Ser bedrifter noen ekstra utfordringer ved å operere i Brasil kontra et mer utviklet land som Norge?
 - a. Innvirkning på inngangsstrategi?
- 4. Hvordan går bedriften fram for å evaluere muligheter og utfordringer i Brasil?
 - a. Benyttes rammeverk eller definerte kriterier?
- 5. Bedriftens kjennskap til Brasil
 - a. Tidligere erfaringer fra Brasil?
 - b. Kjennskap til businesskultur og marked
 - c. Tilgang til nettverk
 - d. Innvirkning ved entry/inngangsstrategi?
- 6. Private property rights/legal protection
 - a. Er bedriften bekymret for uønsket lekkasje/utnyttelse av teknologi/kunnskap/ressurser i Brasil?
 - b. Er bedriften bekymret for uønsket lekkasje/utnyttelse av teknologi/kunnskap/ressurser i Norge?
 - c. Innvirkning på inngangsstrategi?
- 7. Usikkerhet/volatilitet
 - a. Brasil usikkert/risikabelt å gå inn i?
 - i. Økonomiske svingninger, politisk ustabilitet, valutasvingninger
 - b. Hvordan vurderer dere behovet for fleksibilitet og exit-muligheter?
 - c. Innvirkning på valg av inngangsstrategi?
- 8. Kulturforskjeller
 - a. Hvilke tanker har bedriften om kulturforskjeller mellom Norge og Brasil?
 - b. I hvor stor grad er bedriften nødt til å tilpasse seg den brasilianske forretningskulturen
 - c. hvilken betydning har kulturforskjeller for deres entry i Brasil?
 - i. Inngangsstrategi, behov for partner?
- 9. Korrupsjon
 - a. Oppfattes korrupsjon som et problem?
 - b. Hvordan påvirkes de i såfall av dette?
- 10. Myndigheter/forretningsklima
 - a. Det norske bedriftsmiljøet i Brasil/Rio?
 - b. Brasilianske myndigheters holdninger til utenlandske/norske bedrifter? (ulempe ift lokale?
 - c. I hvilken grad blir bedriften påvirket av føringer/lover fra brasilianske myndigheter
 - i. Local content
 - ii. Eierskap
 - iii. Føringer med innvirkning på inngangsstrategi?

2.5 Nettverksaktører i internasjonaliseringsprosessen

- 1. Har bedriften et internasjonalt kontaktnettverk?
- 2. Hvem er bedriftens sentrale samarbeidspartnere?
 - a. Rolle
 - b. Hvordan har samarbeidet utviklet seg over tid?

3. Støtte fra Innovasjon Norge (IN)

- a. Bidrar deltakelsen i Navigator-prosjektet til en enklere internasjonaliseringsprosess? Hvordan?
- b. Bruker dere støtte fra IN utenom Navigator-prosjektet?

4. Støtte fra andre aktører

- a. Får bedriften støtte fra andre aktører?
 - i. Intsok, handelskammer, ambassade, andre bedrifter, konsulentselskaper
 - ii. Hvordan ble kontakten opprettet?
 - 1. Profesjonelle/private nettverk
 - 2. Nettverk fra tidligere arbeid, eller utarbeidet i forkant av internasjonalisering?
- b. I hvilken form kommer denne støtten?
- c. Hvilken støtte er høyest verdsatt? Kommer bidragene i ulike deler av internasjonaliseringsprosessen?

5. Risikoidentifikasjon

- 1. Hva ligger dere i begrepet risiko/hvordan tolker dere begrepet?
 - a. Below target performance
 - b. Deviation from expected value
 - c. Unpredictability of outcome variables

2. Hvordan identifiseres risikofaktorer i internasjonaliseringsprosessen?

- a. Hvilke faktorer tas hensyn til? (Environmental risk (political, legal), industry risk, organizational/firm risk etc.)
 - i. Hvilke faktorer regner dere som viktigst?
 - 1. Noen produktrelaterte risikofaktorer?
 - 2. Er dette avhengig av land?
 - ii. Finnes det en «best practice» for risikoindentifikasjon?
- b. Gjøres alt internt, eller brukes også eksterne aktører for risikoidentifikasjon?
 - i. Hvilke? (Innovasjon Norge, analyseselskaper, nettverksaktører)
- c. Brukes egne verktøy/modeller i denne prosessen?

3. Hvordan evalueres ulike risikofaktorer

- a. Kvantifiseres risiko?
- b. Evalueres risikofaktorene samlet, eller invividuelt?
 - i. Hvordan sammneliknes risikofaktorer av ulik natur?
- 4. Hvordan integrerer dere funnene i en risikoanalyse i strategiutviklings-

/internasjonaliseringsprosessen?

- a. Risikoanalyse før strategiutvikling?
- b. Kontinuerlig risikoanalyse fulgt av strategijusteringer?
 - i. Låses strategien? Når?
- c. Sees mulig gevinst i sammenheng med mulig tap, eller er det en tendens til å overse mulige tap?
- 5. Hvor høyt prioriteres identifisering, evaluering og reduksjon av risiko i forhold til andre hensyn in internasjonaliseringsprosessen?
 - a. E.g. Markedsanalyser, partnersøk
- 6. Hvordan vil dere anslå risikobildet i forsøket med å gå inn i det brasilianske markedet i forhold til andre prosjekter bedriften har gjennomført?

6. Strategier for risiko-håndtering

- 1. Kan noen risikofaktorer påvirkes av deres valg?
 - a. Har risiko en relasjon til return? Får man noe igjen for å ta risiko?
 - b. Kan risiko kontrolleres, reverseres eller unngås? Er det eventuelt ren gambling?
 - c. Vil du si at bedriften er risikoavers, eller risikotakere?
 - i. Hva med beslutningstakerne?
 - ii. Hvordan påvirker bedriftens situasjon dette?
 - 1. Kan bedriften ta mer/mindre risiko hvis det går generelt bra/dårlig?

2. Hvilke strategier brukes/har blitt brukt for å håndtere risikoelementer?

- a. Internalisering/eksternalisering av prosesser
- b. Risiko trade-offs
 - i. Location, entry commitment, revenue share
- c. Strategiske risikotiltak
 - i. Imitasjon, avoidance, fleksibilitet, samarbeid, kontrolll
- d. Exit-strategier
- 3. Har det blitt vurdert å dra gradvis utfra Norge, til nærliggende land først?
 - a. Hvorfor, hvorfor ikke?
- 4. I hvilken grad spiller kostnader (e.g. transaksjonskostnader) en rolle under valg av strategi?
 - a. Transaksjonskostnader ved samarbeid vs. transaksjonskostnader ved internalisering

11.5 Timeline of central events affecting the Brazilian petroleum industry

	ustry
Year(s)	Event(s)
1950s and	The Brazilian economy grows steadily, largely financed with foreign debt
1960s	
1953	 Petróleo Brasileiro, or Petrobras, is created to fill the role of a state monopolist in the Brazilian oil industry. Petrobras was established before any meaningful oil resources were found in Brazil and relied on government subsidies until the 1970s.
	 Following the birth of Petrobras, there is an early debate on whether international oil companies should be allowed to operate in Brazil. The slogan "keep the Brazilian oil for Brazilians" was used to mark opposition to IOCs, and resembles slogans used to defend the current pre-salt production sharing regime.
1955	Onshore oil is found in the Amazon, but the field proves to be non-commercial
1963	• Centro de Pesquisas Leopoldo Américo Miguez de Mello (CENPES), Petrobras' R&D unit is created
1964	• Start of a 21-year military rule in Brazil, which is said to have given Petrobras a stable environment for growth and development of technical capabilities
1968	• First offshore discovery in the Guaricema field at a depth of 30 m
1970s	 Oil shortages lead to rapid oil price hikes in 1973 and 1979. The oil shock slows economic growth in Brazil while inflation rates and the foreign debt burden increases.
1974	 Offshore oil is discovered in the Campos Basin. Petrobras has little technological capability to operate offshore and cooperates with IOCs to extract the offshore oil. Later offshore projects move from shallow to deeper waters, and the Campos basin is regarded as an important R&D "laboratory" for the Brazilian petroleum sector.
1980s	 The annual inflation level reached 110 % in 1980, and the inflation level soared for the next 15 years. The government tries to reduce the effects of the aggressive inflation by linking wages to price increases. Instead, the result is a vicious cycle of price increases
	The Brazilian government's capacity to invest in infrastructure is very limited for the next two decades
1985	The military rule ends
1990-1994	• Inflation peaked in 1994 when prices for a period rose by 2100 %
1994	• A new currency, the Real is introduced and pegged to the US dollar, and price rises are under control as a consequence of the Real Plan.
100=	Foreign direct investment (FDI) increases dramatically
1997	 Petrobras' monopolistic power is loosened a part of a broader privatization reform The national petroleum agency ANP is created
1999	 ANP starts to run annual licensing rounds and foreign firms are invited to drill for oil (Economist, April 16th 2002)
	 International oil companies that enter the Brazilian market prefer to form joint ventures with Petrobras, as Petrobras has superior knowledge on Brazilian geology an political conditions Exchange-rate peg is abandoned, the Real is allowed to float
2000	 Productivity of Brazilian workers grew by a meager 0.2 %, compared to a productiveness growth of 4 % in China in the same period. This is largely attributed to lack of investment in personnel and technology by Brazilian firms.
2001	• The Petrobras 36 (P-36) platform sinks in the Roncador oil field, killing 11 workers
2002	• The Brazilian oil market is liberalized and concession rounds for oil fields start. Local content is required in the block licensing rounds.
2005	High oil prices allows higher offshore exploration activity by Petrobras and IOCs
2006	 Petrobras, British Gas (BG), Repsol and GALP announced that they had found oil 300 km off the coast of Brazil at depths up to 7000 m. The discovered oil field was originally called Tupi, and commercial production started in 2010. The Tupi field was later renamed <i>Lula</i>, in honor of the Brazilian president from 2003-2010, Luiz Inácio Lula da Silva. Brazil is self-sufficient with oil
2007	 More pre-salt oil fields are discovered. Licensing of pre salt blocks is stopped until 2009 due to development of a new licensing regime.
2008	• The Brazilian economy escapes the global recession relatively unharmed, and is one of the last countries into the financial crisis and is of the first countries to escape the crisis. Average annual GDP growth from 2008-2011 was 4 %
2009	 Activity in the Brazilian offshore market was only to a small extent affected by the global financial crisis Brazil becomes the second-largest destination for foreign direct investment of all developing countries, after China.
2010	First oil produced in the pre-salt Tupi (Lula) field

	 USD 70 billion is raised in a Petrobras share offering, the largest ever. USD 45 billion was raised by the Brazilian government. From 2008-2010, Petrobras increased its R&D spending fivefold, to more than USD 800 per year From 2005-2010, more than half of all deep water oil discoveries are done on the Brazilian continental shelf.
2012	• The oil and gas industry accounts for about 10 % of the Brazilian GDP.
	 Personal and corporate taxes amount to 38 % of GDP, limiting investment in human resources, technology and equipment
2015	Petrobras is expected to be the world's largest oil producer
(expected)	
2020	• Brazil is expected to be among the world's top five oil producers by 2020 (The Economist 2011b). Petrobras
(expected)	has set a 2020 production target of 6.4 million barrels of oil equivalents per day (boed), of which 2 million are to come from the pre-salt Santos basin. The Swiss bank Credit Suisse forecasts a 2020 production of 4.6 million boed.
	 Petrobras plans to drill 1000 wells by 2020, at a cost of USD 100 billion
	• 40.5 % of Brazilian oil production is to come from pre-salt fields by 2020
	• The oil and gas industry is expected to account for 25 % of the national economy

The timeline is based on the following sources: (De Oliveira 2012; Gall 2011; Inventure Management 2011; PetroNews 2011; Rystad Energy 2010; Sharma 2012; The Economist 2009b, 2010, 2011b, 2012a; Thurber, Hults & Heller 2011; World Oil Online 2011)

11.6 Key actors in the Brazilian petroleum industry

Key actors in the Brazilian petroleum sector				
National oil company (NOC) Petróleo Brasileiro (Petrobras)	Petrobras is a global energy conglomerate, involved with oil exploration and production, gas pipelines, petrochemicals, electricity production, and ethanol and biodiesel production. The company is a world leader in deep water oil exploration and production and has a dominant position in the Brazilian petroleum market. Petrobras operates more than 40 deep-water production units, more than the 2 nd , 3 rd and 4 th largest offshore operators combined. The investments made by Petrobras are regarded as a key driver of industry activity, and a majority the investments are made in the pre-salt fields. 75 % The company is expected to be the world's largest oil producer			
International oil companies (IOCs)	by 2015, and the staff is expected to grow from the current level of 77 000 to 103 000 by the same year. IOCs operate alone or in partnerships in in the non-pre salt fields, and in a partnership with Petrobras in pre salt fields. Some of the key			
e.g. Exxon-Mobil, Statoil, Chevron, Shell, Conoco-Phillips, BP-Amoco, OGX	actors: OGX: Is the largest private Brazilian oil company. Produced first oil in January 2012. The firm is known as less bureaucratic, more flexible and more accessible than Petrobras.			
	Suppliers			
Engineering, procurement and construction (EPC) actors e.g. Transocean, Halliburton, Schlumberger, Aker Solutions, Aibel and FMC	EPC actors are often met with a local content requirement of around 60 % on projects, which is passed on to suppliers. Some of the largest actors are			
Specialized suppliers	Specializes in certain areas of the oil and gas supply chain. Norwegian suppliers are highly competent several areas, such as seismic surveys, drilling technology, process and materials technology, and subsea equipment			
G	Sovernment agencies			
	Industry regulators			
The National Agency of Petroleum, Natural Gas and Biofuels (ANP)	ANP is responsible for issuing exploration licenses and ensuring compliance with regulations, such as local content requirements.			
Petrosal	State owned entity with ownership and administration rights of the pre-salt blocks. 50 % of Petrosal's revenues is to be allocated to financing science and technology education			
	Banks			
The Brazilian National Development Bank (BNDES)	BNDES is a heavy corporate lender and a tool for indirect government ownership, accounting for nearly 25 % of corporate debt in Brazil. Its lending capacity is said to approach saturation.			

Table 28 - Key actors in the Brazilian petroleum sector

Information compiled from (De Oliveira 2012; Inventure Management 2011; The Economist 2009a, 2012a; Utenriksdepartementet 2011)

11.7 A-Categories: Cybernetica

	RQ1 – Cybernetica				
A11-01 It is oil and gas we are considering in Brazil - although it is really our third and least developed business area or market	A11-02 The natural choice with regards to oil and gas would be to sell to Statoil, but the consultancy role is pacifying us in that direction	A11-03 We have tried selling a new application of a technology, that has not been used on platforms anywhere in the world	A11-04 We think it is unwise to aim too broadly; you need a certain amount of industry knowledge to sell these products		
A11-05 The potential benefits of applying our technology are often invisible to the customer. This makes it hard getting a new customer relationship on its feet.	A11-06 Getting new clients is very hard work. We do some cold calling, and it is often here you get a first sign of interest. However, it might take years from this phase until we can sell an application.	A11-07 The oil industry is a very hard industry to sell in. It is very, very large and fractioned. We are like a mosquito, no one has heard about us.	A11-08 We cannot even present at the conferences - which could have strengthened our position as experts within the field		
A11-09 Our experience is that the best practice for sales is to get hold of some kind of manager and get a meeting. As a small company, you do not get to meet the managers of a large oil company like Statoil. We have to convince the foot soldiers, which in turn have to sell the project internally.	A11-10 ABB has been a competitor to us in some ways, but no one has really sold this technology and gotten it implemented offshore. I do not know how high ambitions ABB has, I know they have ambitions, but it is difficult to say.	A11-11 It is very complicating for a small firm like us to establish in an expensive place like Rio, with a single customer and time-consuming establishment processes.	A11-12 It is very expensive to have an office there with a single employee. First you have to hire him, then keep him from quitting, and pay his wages — and then maybe also having to wait a year on Petrobras when having to pay him salary.		
A11-13 Installing instrumentation on a running processing plant is hard. It might have to happen under a planned maintenance shutdown. Then it might become a resource problem, and although the cost of adding the instrumentation is small, it might drown in all the tasks to be done within the shutdown.	A11-14 It is hard to get a clear answer to the local content question. It is difficult to separate legal demands from managerial wishes. And in the end it is hard for us to use the law against them – they can use the law against us, but we cannot use the law against them.	A11-15 Innovasjon Norge is very willing to tell Petrobras about the possibility of financing the project through an IRD. If the Petrobras research project ends up as a joint effort between us and the Norwegian state, our conditions are quite bad. We end up paying for most of it ourselves, with a little something from the government. Thus, in the end, we will have been paying to do research for Petrobras.	A11-16 The longer we do this without getting return on investment, the harder it will be for us to continue. Just counting hours, it gets quite expensive before we get any return.		
A11-17 Risk includes all unknown factors at the time of decision. For instance factors that was uncertain or unknown at the time when we decided to enter Brazil, but that in the end will affect the bottom line; that it is more complicated, takes longer time, gives less payback etc.	A11-18 The risk of entering Brazil is large. It is a hard country to do business in – compared to other markets we are in – and we also skip several steps. We "should" have started with the home market, getting as far as we could there before taking on the North Sea Basin.	A11-19 Our company is very small, and the roles are very fluent. We mostly do this on an ad-hoc basis, arranging a meeting and deciding something. We are light-footed in that aspect, you would certainly get another answer talking to a larger company.	A11-20 If a larger company was to do something, they would immediately put a specialist on the task, focusing on processes, the decision-making basis, etc. When you only see a part of the total picture, you need much more rigid processes.		
A11-21 We evaluate risk based on two aspects; our long-term strategy and a criterion of always budgeting with positive returns.	A11-22 Our long-term strategy is to run the operations from our Trondheim office as long as possible. Establishing offices in other locations increases both risk and cost.	A11-23 The fact that we always budget with positive returns strongly influences which projects we can and cannot take on.	A11-24 We evaluate risk on the basis that we will operate all projects from Norway and not establish any presence in Brazil. Then the local content requirements – which seem to be designed to hinder just that – are a challenge.		

Appendices A11-25 The most important A11-26 Right now, we are **A11-27** Steinar had time to A11-28 We do not feel a need thing learnt during the Brazil focusing on getting a research work with these issues, but for using formal fault-tree trip was how bureaucratic the deal with Petrobras, but if we without him the pot of available analysis or statistical tools for Brazilian society is. The more eventually want to something evaluating the risk. We have resources is smaller. we have seen, the clearer it gets else, we will seek companies Consequently we have to peel built organizational structures that we would be dependent on with relation to Norway – to for risk reduction including a away aspects that could be someone else if we wanted to exploit a Norwegian network interesting to evaluate, and quality system, contract towards Brazil. focus on one thing; getting a establish a presence in Brazil. templates that have been project with Petrobras. I think developed with lawyers, a strict the outcome would have been employment process and a the same anyway, but at least business culture of this is the way we do it after he responsibility and accountability. A11-29 If we do not get anything out of this, what is the cost? The risk relates to a financial loss. Also, potential liabilities, losses and law suits related to failures. We did not evaluate this last risk in any detail, but would we traditionally use lawyers and insurance agents to make sure we are covered if anything goes wrong RQ2 – Cybernetica **A21-01** We believe that A21-03 We are not sure **A21-02** The reason we chose **A21-04** I am a bit uncertain concerning what technology Petrobras, since they recruit a to enter Brazil is a belief that it whether Tri-Solutions is a direct Petrobras has access to in high amount of managers from might be easier there - that they competitor to us, or if they try to compete against ABB and relation to process simulation, Cenpes and have adopted a long are more interested as they have term technology strategy, will be a different perspective than the Hannibal – it is a bit hard to but I think they are missing a more open for our technology actors in the North Sea. evaluate based on the considerable amount than Statoil in the North Sea information we have today. A21-05 We have mainly done A21-07 It can be both an **A21-06** We ordinarily would **A21-08** Having a local office in network-based sales. It is just compete against Hannibal and advantage and a disadvantage Brazil makes it very recently that we have begun ABB, both much larger than us, being present in three markets, complicated, so it is much better calling people we don't know but have targeted a niche where but there is a certain level of for us if we can manage without the processes are so complex sturdiness to it. that their standard products will not work. **A21-09** Customer relationships **A21-10** We have considered A21-11 We are such a small **A21-12** If we write a patent we have had have usually started the risk of entering the company, that any patent application, explaining in detail with a research project. Navigator project as low, dispute with Petrobras, ABB or all the smart things we do, a considering that the Hannibal would be hopeless – competitor will just read the participation fee is quite low. we would have gone bankrupt application and implement it. Nevertheless, we do realize that before winning any trial. the real cost is higher due to the time we put into it.

A21-13 It might be an equally good IPR protection to have a product that it takes time to copy. If you start from scratch it might take 10 years before it is as mature as ours.

A21-14 The size of an eventual loss will not be devastating to us. At least we will have to take some decision before we reach such a point.

A21-15 We are able to handle a failure in Brazil, and we believe there is a large potential there if we succeed. It is really this that pushes us to enter Brazil.

A21-16 You can say that we have quantified the risk, but it is not really structured with numbers. It is rather in order of magnitude.

A21-17 Skipping steps in the internationalization process makes the risk higher, as we might do mistakes that we could have fixed in the Norwegian market first.

A21-18 We have not really made any large commitments yet. The only sunk cost is being a part of the Navigator project. Therefore we do not really run the risk of losing a lot of money backing out. And it will be like this until we have signed something.

A21-19 It will probably take more time in Brazil. It takes time to build the model, and then it is uncertain how long time Petrobras will need to install missing measuring instruments in the process system, and we will need to get offshore which implies a chamber and a helicopter seat. You are likely to have the lowest priority in these aspects, so that might be a challenge.

It might be easier for Petrobras to agree to an IRD, but who knows how long it will take to get through Petrobras' project approval process. We suspect it

A21-20

might take years.

A21-21 We evaluated that if we did not succeed, we could handle the loss. The downside is limited, while the upside is large. There will be several incremental decisions before a larger commitment is made; you do not have to do B because you did A.

A21-22 A specific problem with our efforts in the oil industry is that we have not succeeded in selling our product to the industry yet. So it is kind of a long shot, I mean, you take a risk trying to sell a product that we do not know will succeed.

A21-23 Growth in the oil industry does not necessarily imply growth in our segment. Our services focus on improving operating margins, and oil firms generally have good margins, making sales in this industry more difficult.

A21-24 We are ambivalent with regard to cooperation with Tri-Solutions. Petrobras asked us to contact them, and we did. but we have not heard anything from them after that. We feel that we have done our part, and will not do much unless Petrobras drags them to the table

A21-25 We have joined the Navigator project under the condition that we are not establishing a presence in Brazil. If we want to take out the full potential, the risk will naturally increase - this will require a new evaluation, probably involving more aspects than the current evaluation.

risk of the Brazil project, we made a budget and evaluated the cost related to the project with the available budget resources. We saw that we had the necessary resources; if we lose the money, we can afford it.

A21-26 When we evaluated the **A21-27** Brazil is a country that we have studied a little, and we had some contacts before the Navigator project contacted us. However, we regarded the participation as a way of performing much of the necessary knowledge gathering - which we would have had to do regardless - for a limited cost.

A21-28 We were skeptical towards an IRD agreement, but this eventually became the solution. I felt that Innovasjon Norge marketed the IRD solution in a way that blocked any chance of getting a real project in place. I still think so, but have learnt that an IRD agreement can be a natural first step due to Petrobras' circumstantial bureaucracy with an IRD agreement we choose a path with much less bureaucracy.

Appendices 11.8 A-Categories: Norske Ventiler

RQ1 – Norske Ventiler				
A12-01 In many cases we are both a supplier and a competitor to the valve trading companies; a strange constellation in terms of market relations.	A12-02 Our competitors cannot match us in terms of delivery time, but we cannot match them in terms of volume.	A12-03 A market trend is higher demands to both documentation and materials – most pressingly in the subsea segment. This raises the entry barriers, which is good. Nevertheless, it is incredibly resource demanding; we recertified a valve last year, paying more than 1 million just in document fees.	A12-04 One of the hardest things you do in a marked is to choose the right agent. There is a lot of interested actors – most with someone else in their portfolio as well.	
A12-05 It is very hard to rely on telephone contact across the globe. You have to have a relation that you can develop further.	A12-06 The biggest challenges to entering the Brazilian market are the local content regulations, and how the government handles them in the years to come.	A12-07 You can be copied, but then again they have to get their products approved. This is too resource demanding, time consuming and expensive – and you usually get very little in return.	A12-08 The largest risk if you establish a subsidiary in Brazil is the risk of losing money. A worker in Brazil is equally expensive as a Norwegian. Brazil is an industrialized country with regards to costs.	
A12-09 To establish an office in Brazil, with regard to our size, is not something I think is wise. It will imply a very high risk, so you will need very certain estimates on expected sales volumes.	A12-10 A Brazilian worker has the same employment protection as a Norwegian worker, so if you make a mistake here it is difficult to get out without losing a considerable amount of money.	A12-11 We have not done anything to map the competitive climate in Brazil. But if you look at the Gulf of Mexico, Brazil will probably look like that in about 5 years —every valve producer and valve trader will be present.	A12-12 We have not used any formal methods to evaluate risk, except what you might call normal reasoning; if you need an organization of 10 employees in Brazil, you need wages, office rent -you can use the multiplication table to find the exposure. Then you have to be able to relate this to your cost limit, and be very certain that you have a volume that can cover and defend such an investment.	
A12-13 We do not really see any risk factors related to the Brazilian market entry as long as we stick to their known customer constellation. These are customers we have served for a number of years, and we assume that their Brazilian subsidiaries have the same internal procedures as their Norwegian offices.	A12-14 Our resource base limits how thoroughly we can investigate the Brazilian market. We do not have an abundance of resources, and this is also a reason for the strategy we have chosen in Brazil.	market. I believe it is old fashione market and a foreign market. We Norway is a small country; if we market is global.	have to acknowledge that	
	RQ2 – Nor	ske Ventiler		
A22-01 We believe the margins in the subsea market are more promising, and there are fewer players. This gives us more room than in the conventional valve market.	A22-02 A combination of cultivating a specialist position in the conventional valve market, and a development of our subsea position, will be our main strategy over the next 5 years.	A22-03 As long as more oil is consumed than produced globally, a decrease in the oil price is unlikely. With an oil price at the current level, most of the projects considered by the large operators will offer attractive returns on investment – thus ensuring a high level of activity.	A22-04 We cannot travel these areas the traditional way as it is very tiresome to travel quarterly from Norway to Australia. Hence, we need someone acting as our extended arm - the further away you get, the more dependent you get on some kind of external representation.	

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A22-05 For us, billing and delivering the equipment to the Norwegian subsidiaries of international EPC companies is risk free, and far preferable to billing to an address in Angola.	A22-06 As it looks like now, with the local content restrictions, we will prioritize subsea valves in Brazil. There seems to be fewer challenges related to local content there than with the traditional valves.	A22-07 You have to evaluate whether agents have contacts, competence and necessary motivation. There has to be an agreement that they promote you, so obviously some numbers must be the basis of an agreement. This is like everything else, nothing comes for free.	A22-08 In the end, the choice of an agent is strongly correlated to gut feeling. In addition to traits that can be documented and information from third parties, the gut feeling is important; does it work, is there chemistry, are they ready to pull up their sleeves for us.
A22-09 We use the NCE Subsea cluster for meetings and relationship building. Even if we have decided upon a strategy, it is very comfortable to get feedback from people that have done what you want to do, or have successively established elsewhere. To get a confirmation that what you do seems somewhat right.	A22-10 You can analyse yourself to death, both considering costs and possible scenarios. However, in the end it balances on whether you really believe in it, if the organization believes in it, and if there is any substance to it.	A22-11 I usually say that there is nothing as underrated as good relationships. Being a cluster member, meeting firms you can identify yourself and your product with – it is usually free, and far preferable to paying for consultants that will tell you whatever you want to hear without much substance.	A22-12 We have kept a low profile; we have visited Brazil twice, talked to potential customers, but not undertaken any commitments besides answering potential RFQs.
A22-13 If a large request is getting more likely, we have to put more into it. Up until now we have just used a limited amount on travel and to evaluate the market. If things develop we have to put more money into it, but we do it in that order.	A22-14 We are following the activity level in the general oil market and were affected by the financial crisis, as well as an activity vacuum in the wake of Statoil renegotiating maintenance contracts.	A22-15 I have travelled the world, and have a very relaxed attitude towards cultural differences. There are cultural differences, but then again; smile to the world and the world will smile back. There is a lot of literature out there, but I have a relaxed attitude towards it.	A22-16 Innovasjon Norge and Intsok publish relatively detailed reports on the outlook of different markets, and this is our primary source of information for market evaluation
A22-17 After internal discussions of the possibility to enter Brazil, we did an evaluation of the Brazilian valve market using numbers from Innovasjon Norge and Intsok. It gave us a firm understanding of opportunities in this market for the next 10-15 years, and we evaluated the possibilities for establishing contacts via Innovasjon Norge, Intsok, or other governmental entities.	A22-18 Opening an office in Brazil is not something that we plan to do at this stage – I think it is too resource demanding and that we are too small. But that may change in 5-10 years' time.	A22-19 The large markets are, and will be Brazil and Australia, besides the Mexican Gulf. And if you are going to take part in what is about to happen there in the next 10 years, you have to get in position now	A22-20 I do not put any weight on the fact that we have sold valves to Brazil. I put much more weight on the presence of the larger engineering companies – Aker Solutions, FMC, Oceaneering, Subsea7 – which are all principally Norwegian companies, towards whom we are a qualified supplier.
A22-21 Although there probably are Brazilian engineering companies, they are probably not very large. When all the large Norwegian, or Western-European, engineering companies are established, I do not think there is much room for a small Brazilian company.	A22-22 As long as we do not have a strategy involving establishment, I find an exit strategy irrelevant.	A22-23 We do no longer consider the commodity valve market in Brazil as a feasible exploit. If we get a fee of 70 % on top of our already high prices, we will outcompete ourselves in any market.	A22-24 I think any competitors to our subsea valves in Brazil lies far ahead in time. There are large costs related to product development, and it is time consuming as well, so it will take years before other actors enter the Brazilian market offering similar products.
A22-25 Selling valves for use in Brazil through the large engineering companies makes it just like any other sale. This simplifies the process, and we avoid complicating the process through having to consider all criteria related to other entry forms.	A22-26 When we started the Navigator project, we had a much broader set of possible strategies for handling the Brazilian market. However, after getting more knowledge of the market, and taking our resources into account, we landed on a strategy of focusing on our Norwegian customers established in Brazil.	A22-27 When we chose to focus on the Marazil, which after all covers 60-7 strategy became significantly easied distributors, agents, or an eventual strategy less resource and cost dealternatives.	0 % of the market, the whole er. We did not have to consider all establishment, making the

Appendices 11.9 A-Categories: SafeClean

RQ1 – SafeClean				
A13-01 We saw that we needed more legs to support us, that is why we entered the oil industry	A13-02 The main challenge for us has been to get into position to make a thorough product presentation.	A13-03 There are many companies world-wide, but we have to admit that we know too little about the competitive environment outside Norway.	A13-04 Part of our main challenge is that we are never going to have a high predictability on future assignment. Regular maintenance shutdowns are possible to predict, but 80 % of our work is non-shutdown operations. The maintenance intervals are also subject to external factors; a high oil price will make the companies postpone maintenance.	
A13-05 We have used Alex Osterwalder's model to evaluate three different business models for market entry; a franchise, use of an agent and establishing a Brazilian entity. In a workshop, several employees have simulated the business models based on the currently available information.	A13-06 The size of our wallets is another reason that we cannot take any decision with the current information. We cannot risk locking up 5-10 millions in a Brazilian expansion without a certain payback.	A13-07 We try to uncover what is different between the Norwegian and Brazilian market. The customers' challenges are exactly the same, but doing business down there is completely different.	A13-08 It is important to evaluate our position in a partnership. If we have a too weak position, we risk being played over the side-line and losing a market. On the other hand, being too strongly represented increases the risk on our side as well.	
A13-09 The primary problem will be to get equipment through custom clearance – that is where things stop. If we have agreements with customers, and the equipment gets stuck in customs for two months, we will be out before we have really started.	A13-10 We are not exposed to cultural differences, corruption and bribes at home. Down there you will be exposed automatically, so you will have to think this through before you go.	A13-11 We have discovered a large difference in terms of prices on products and services. We thought the price level would be lower than at home, but the opposite is the case. This is of course also related to the cost of doing business there, and ultimately to which business model we choose.	A13-12 In Norway we have enjoyed loyal employees that have gained solid experience. A question in Brazil is whether the workforce will be equally loyal – an important factor with regards to the services we deliver.	
A13-13 We are very aware of the cultural differences, and have noticed some of the differences on the visits to Brazil. This is one of the challenges, everything is going great now in the sales phase, but the picture is guaranteed to change when we enter the operational phase.	A13-14 There is a very positive atmosphere in the meetings we have had. Some of the danger lies just here, they are always positive, and you seldom get to hear negative feedback.	A13-15 One of our biggest threats, a threat which we will try to deal with through the business model we choose, is unwanted technology leakage to partners or competitors. We are more worried about this in Brazil than in Norway.	A13-16 There are many elements of risk. We have been talking about leakage of technology, the economic impact, and then there is the possibility of making mistakes in Brazil – damaging reputation and that sort of things. There are many factors to evaluate.	
A13-17 We use both internal and external sources to identify risk factors. The communication and commitment of Innovasjon Norge has been very positive; they offer a huge commitment and short response time.	A13-18 It might sound wild, but the times where we get into position with the right persons, and get sufficient time to explain our concept, most often results in a test assignment. After a test assignment, we have a high resale factor through repeated assignments. If you break it down, the key to the whole sales process is getting in position to explain the effects of the concept.	A13-19 The degree to which risk assessment is systematic does of course have something to do with resources, but it is also difficult to have a theoretical approach to this up front, Then you have to make up scenarios based on inadequate information. ()We can always sit down and try to think about what will meet us, but we risk throwing it in the bin right afterwards	A13-20 Entering British sector of the North Sea has been discussed within the organization. But it has only been loosely discussed, as we feel that we touch such a small part of the Norwegian market that we have to put focus there.	

A13-21 If we were to enter another market in the North Sea instead of Brazil, I think we would have made the same considerations and gone through the same processes. But the distance is smaller, so I think it would have been easier to gain oversight of the market. Perhaps we could have made more rapid progress there.

A13-22 We had not evaluated neither Brazil nor internationalization in general when Innovasjon Norge invited us to join the Navigator project. We were uncertain in the beginning - thinking that we still had much undone in the home marked – but decided to join based on a feeling that we could always pull out of the project. However, we have received much information during the project breaching barriers and mental barriers – so it's really the process that makes us certain there is a potential that we want to spent time and resources on.

RQ2 - SafeClean

A23-01 The background for the second Brazil trip was a feeling that we lacked important information about our products' attractiveness in the Brazilian market. This made it difficult to sort out the right strategies for market entry. It was not beneficial to use time and resources on planning before this question was answered.

A23-02 Based on the information we have, we have made some drafts. We then have to get back to this as more information is available; make changes, adjustments until we reach a point where we can take the decision.

A23-03 We have to be careful, and then you will get to a point where you have to make a strategic decision – but the foundation for such a choice is not solid enough.

A23-04 We had thoughts when we started with this. Then the picture changes as you go along. In many ways we get more certain the further we go, but on the other hand we constantly get new information and there are many changes.

A23-05 We work a twofold strategy on the importation problem. Through Innovasjon Norge we try to get in contact with agents or companies in the business of facilitating importation to Brazil. At home we contact actors that have experience from transport and logistics in the offshore industry—actors that are established in Brazil and known the system from their side.

A23-06 We think working these two directions ought to make it possible to point to a practicable way through the custom clearance. Then we have to consolidate the information, and simulate a delivery. The simulation is likely to identify some fences that we have to evaluate further.

A23-07 We try to increase the cultural consciousness of the firm, and also the corporate social responsibility awareness – especially concerning corruption and bribes. We are running a process there now, wanting to be up-front with regards to establishing routines and increase awareness concerning these problems. We believe this can have a preventive effect.

A23-08 In a response to cultural differences, we have considered using Norwegian supervisors in a transition period, although the Brazilian's will be running the operations in the long term. We have also though about doing it the other way around; bringing Brazilians with us on assignments in Norway. We are very conscious concerning this subject, then time will show if we were conscious enough.

A23-09 We are very conscious about the limited negative feedback, and try to stimulate to questions to undercover underlying feelings. It is in these questions we feel there is a positive vibe towards the concept, and an interest.

A23-10 We have not done any formal evaluation of risk – it might not be according to the textbooks – but you get a picture of it in the process. This said, we have to go through more formal processes to draw the risks. Up until now, we have not done any formal evaluations, except the continuous evaluations of individual factors.

A23-11 You do a continuous evaluation of risk factors, discuss them and try to orient yourself – all the way comparing to the situation and home, and spotting differences.

A23-12 The most important element when it comes to balance, or manage the risk is to gather as much information as possible. It is by no means insurmountable, but as it is new, it is important to get necessary information in order to understand how it works.

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A23-13 We have considered	A23-14 The largest competitor	A23-15 We think we have a	A23-16 The actors in the
patenting both chemicals and	is the IKM. We know there are	great advantage being a young	home market are well known. In
technology. However, if we had	on the verge of establishing in	company, staffed by persons	Brazil, a preliminary
patented it, the technology	Brazil. Although they do not	that have no offshore	investigation suggests that there
would have been made visible to	have much presence there at	experience to begin with but are	are no actors in the market that
competitors. We think it would	present, we are certain they will	recruited from local heavy	can be compared to our
easy for a competitor to go	put efforts into establishing in	industry with a solid safety	solution.
around the patent by making	the market. However, they are a	philosophy. Operating offshore	
small adjustments.	large company delivering more	without offshore experience can	
	than chemical cleaning	be a strength as we are humble	
	solutions; the chemical cleaning	towards the offshore security	
	segment is likely not top	regime.	
	priority.		
A23-17 A general agreement	A23-18 What is a bit special	A23-19 Things we consider in	A23-20 The importation
with Statoil will not affect our	concerning our efforts in Brazil	the evaluation process include	regime is very different from
ability to handle a Brazilian	is that we have chosen a strategy	the cost structure, when we will	what we are used to - very
expansion. If anything, it will	solely based on what is working	get an income from the	bureaucratic and rigid systems.
lead to a greater predictability	at home; to get in position to	operations, how to build	The biggest showstopper seems
and an increased number of	perform an assignment.	customer relations, which sale	to be the importation of input
assignments. We believe the		channels to use All this is	factors needed for an offshore
increase will be gradual.		constantly evaluated.	pilot assignment.
A23-21 Sorting out the waste	A23-22 While many regard	A23-23 In relation to	A23-24 An advantage is our
disposal side of the process	local content with scepticism,	macroeconomic conditions, we	focus towards production
remains, there seems to be other	we turn it around and believe it	experience – and are told about	problems. We have solutions in
regulations in place, but it	will give a competitive edge. At	 relatively stable conditions, 	relation to aspects that threaten
should all be solvable.	least it is a strength looking at it	and they have entered a phase	the production, and money talks
	this way, and we will stimulate	of political stability.	also down there.
	as much as possible to raise the		
	local content.		
A23-25 Risk in the expansion	A23-26 We have a goal is that	A23-27 Innovasjon Norge has a	an extensive network. They know
process is a crucial factor; we	in the next 6-12 months, we will	who to go to, and then we can tal	k further with those contacts. It
basically cannot afford to fail. It	do a pilot project in Brazil,	has been of great help.	
is vital to draw the total risk	where we bring all resources		
image, to plot it, and to evaluate	from Norway. Our hope is that		
each single element.	the customer will be so		
	interested in our services that it		
	opens up for further expansion		
	opens up for further expansion		

11.10 A-Categories: Sperre

RQ1 – Sperre				
A14-01 We do not want to dip into the markets of our clients. When they have bought a ROV from us, we are not going to take their jobs. So we only do ROV assignments on special occasions, or rent out a ROV to existing or new clients that want to see how things work before buying an own.	A14-02 A drawback with being such a small firm is that we are not very good at standardizing the products, and that it is hard to keep oneself updated on technological trends – although we manage to do so. Things are happening very fast concerning TV and video, and you have to be updated to offer the best solutions to the customers.	A14-03 We have delivered some ROVs to offshore area vessels, but we probably should make an effort to make ourselves more known. However, it boils down to how much resources we can direct to it [marketing].	A14-04 We also buy components from MacArtney, so we are both a supplier to them and a client for them. However, they also make winches and cameras, so it is also a competitor in some areas.	
A14-05 We could have stayed in Norway, selling two ROVs a year and surviving on this and maintenance, but we have higher ambitions. We realize we might be a competitor to the larger actors, but we try to hang in there.	A14-06 The largest challenge operating or selling abroad must be to get equipment through customs clearance – with all the papers and commotion there. There is a lot to remember, what you should and should not do; and all these rules and regulations applicable in other countries.	A14-07 If a Brazilian customer wants to service his ROV, we cannot ask him to send it to Norway for repairs. So we will need some kind of presence in Brazil to deal with this.	A14-08 A challenge entering the Brazilian market is to get a dialogue going with clients that might think our ROVs are a good choice – Petrobras and Statoil for instance. Because, as of now, we do not have a large network down there.	
A14-09 We realize that knowing the language is an advantage, being able to speak Portuguese ok. When I visited Brazil I did not know a single word, and you do not get far with that.	A14-10 We are far too small to establish a sales office, or a subsidiary in Brazil.	A14-11 We have not really identified any particular risks tied to the Brazilian expansion. In order to get the Brazilian content we can deliver the electronics, and they can weld and finish the assembly in Brazil - maybe even machine something.	A14-12 We do not know what our competitors do in the Brazilian market. We have not managed to figure it out, although we have not used many resources on it.	
A14-13 We have to follow up MacArtney, back them up, we cannot just leave them all alone after signing an agreement. We have to consider it like a subsidiary down there, realizing that they need our support.	A14-14 With the internet it is easy to search for an ROV supplier and send them a mail. We often get RFQs from countries like Iran, Iraq and China, and we make budgets before answering them to see if they are really interested. However, you end up doing a certain amount of offers to customers that you are not really expecting to hear back from.	A14-15 MacArtney has been in Brazil for about three years, but it was not straight forward for them – I think they stumbled a bit in the beginning. They hired the wrong manager, but I think the new one is better – I have met him.	A14-16 To us risk would be to deliver faulty equipment, getting a bad reputation, but I cannot really remember any fatal faults.	
A14-17 They say that you have to have Brazilian content in Brazil, or pay full import fees – and that it is very expensive to get things into the country, meaning that you will have to charge double to have any profit. A14-21 When we do routine ass	A14-18 You have to adjust to the Brazilians, they are more polite while we are more direct, there seems to be more hierarchy down there – everyone is not buddies with the boss – and they are not as punctual as we are.	A14-19 We have been quite spoiled in our home market, always having a lot to do, so we do not have a specific business plan – although we subconsciously market ourselves at industry conventions and rely much on the word of mouth.	A14-20 We have not evaluated business risk up until now, but when we lose a tendering process we always ask why we did not succeed and put this into our quality system.	

risk, but in relation to foreign assignments we always perform a risk assessment prior to the job.

RQ2 – Sperre			
A24-01 We designed a new control system a couple of years ago, using the company Datarespons. We are able to do some C-programming ourselves, but on heavier programming tasks we have to outsource.	A24-02 We have been selling to Russia. While many ask us how we dare to do it, and how we do it, we have not really experienced any problems there.	A24-03 Concerning service in Brazil, we are planning to train MacArtney in Brazil to be equally good as the boys in our repair shop. Maybe bring them to Norway for training, so that they can be around our boys.	A24-04 We hope that Innovasjon Norge can open some doors for us, in order to get the first contacts. And then we will also have to work more with MacArtney, to convince them to be our dealer down there.
A24-05 It would be nice to figure out what our competitors think about Brazil. But it is really kind of like the 80s at home [the North Sea], so we have a good chance of succeeding if we get MacArtney interested in pushing our products.	A24-06 If some of our equipment malfunctions we can be humble, saying it should not have happened and repair it. We put a lot of effort into documentation, and made a video film to illustrate the maintenance process – knowing that many people do not consult the manual before things go really wrong.	A24-07 We have focused more on quality assurance lately; that we double check and routinely go over the equipment and components several times.	A24-08 There is a certain distance in, but after you have become friends with a Brazilian – from what I have understood – you are really good friends. It might be harder to establish relations, but a female in the oil and gas industry is so rare that I think it is possible.
A24-09 We have an open mind with regards to importation, we do not think it will be a huge problem. We just have to try and see how it goes, although I know there are special regulations in Brazil. We just have to cross the pitfalls when we get there, not taking the sorrows for granted.	A24-10 I think we are dependent on finding a Brazilian partner, to really understand how the Brazilians are behaving – it is quite different how business is done there compared to at home.	A24-11 Doing part of the production in Brazil should not be that hard. We can make the drawings, and they can do the machining.	A24-12 We are not really worried about technology theft. The persons that want to make a ROV are able to, there are not that many secrets.
A24-13 We cannot really say that the Brazilian navy chose us, because they did not actively choose us, but we can tell people that the Brazilian navy have our equipment on board. The navy holds a high status in Brazil; many Brazilians work in the navy.	A24-14 The equipment includes live circuits, and while everything is done correctly from our side things can go wrong. Thinking towards the US, you could get sued. However, there are no alarm bells ringing considering any high-risk equipment or components. We have delivered 70 ROV systems, so we have some experience.	A24-15 When it gets to Brazil, I think we will succeed if we manage to get some sales and a good reputation. With regard to corruption, it seems like they have managed to come a long way. However, I think the laws down there are a bit more complicated than in Russia.	A24-16 I have also heard stories about it going fine one time, but that equipment was stuck in the customs clearance for a long time the next time. There seem to be different interpretations of the law – and you do not really get to know why the equipment is held back.
A24-17 You have a certain risk of failing, but we will manage to repair the equipment – although it might get very expensive if something is returned under guarantee and we have to take the bill. A24-21 We do not plan to invest	have not really thought about any exit-strategy, we have to get started first and we are so motivated now that we should, or we have to try to make it work.	A24-19 We would never have been in the position we are in today with regard to Brazil had it not been for the request from Innovasjon Norge. IN has been an important door opener to us, and efforts like the Navigator program is very useful to smaller firms that cannot bear the cost of making such efforts alone	A24-20 We pay a fee, for travels and for the consultant in addition to spending our own time and energy on the effort, but it would have been much more had it not been for Innovasjon Norge's program. Sperre would never have done anything like this without the [Navigator] program

A24-21 We do not plan to invest much in Brazil, but we hope to train MacArtney technicians at our facilities so that maintenance of our ROVs can be done in Brazil

11.11 Analysis of evaluated risk factors

		Con	npany		
Risk factor	Cybernetica	Norske Ventiler	SafeClean	Sperre	# firms
Policy uncertainty	A11-14	A12-06, A22-06, A22-23	A23-22	A14-11, A14-17	4
Macro- economic uncertainties		A22-03, A22-14	A23-23		2
Cultural distance	A11-18	A22-15, A22-25	A13-07, A13-13, A13-14, A23-07, A23-08, A23-09	A14-18, A24-03, A24-08, A24-10	4
Administrative distance		A22-25	A13-09, A13-10, A23-20, A23-21	A14-06, A14-17, A24-09 A24-15, A24-16	3
Geographical distance		A12-05, A22-04, A22-25		A14-07, A14-13	2
Economic distance		A22-25	A13-11		2
Competitive uncertainties	A11-10, A21-03, A21-06	A12-11, A22-01, A22-02, A22-24	A13-03, A23-01, A23-14, A23-16, A23-18, A23-24	A14-04, A14-05, A14-12, A24-05	4
Input uncertainties			A13-09, A13-12, A23-05, A23-06, A23-20	A14-06	2
Product market uncertainty		A22-17, A22-19	A13-04, A23-01	A14-13	3
Industry uncertainties		A12-03, A22-20, A22-21			1
Technology uncertainties	A11-03, A21-03, A21-04, A21-12, A21-13, A21-14	A12-07	A13-15, A23-13	A14-16, A24-03, A24-06, A24-07, A24-12, A24-14, A24-17	4
Income stream uncertainty	A11-15, A11-16, A21-19, A21-20, A21-22	A12-09, A22-12	A13-06		3
Organizational slack	A21-15, A21-18	A12-08, A12-09, A12-10, A22-12, A22-18, A22-26, A22-27	A13-06, A23-25	A14-03, A14-10, A24-19	4
Newness, inexperience, size and foreignness	A11-03, A11-07, A11-08, A21-22	A12-04, A12-09, A12-14, A22-09, A22-26, A22-27	A13-06, A13-08, A23-05, A23-15	A14-02, A14-03, A14-08, A14-10, A14-19, A24-19	4
Psychic distance	A11-02, A11-18, A21-17	A22-05	A13-07, A23-08	A14-18	4
Product attractiveness uncertainty	A11-03, A11-05, A11-09, A21-22, A21-23	A22-17	A13-18, A23-24	A14-13	4
# risk factors evaluated	9	15	14	11	

11.12 Article overview

Risk research			
Author, topic,	Takeaways	Intended use	
methodology	Taxcawayo	intended disc	
Acedo & Jones (2007) How entrepreneurial cognition influences the speed of internationalization	International orientation, and a higher tolerance for ambiguity, lower the perception of risk. Lower risk perception leads to faster internationalization. 3 ways of lowering risk perceptions in firms	Support for Stages models' claim that risk perception moderates speed of internationalization. Argumentation for the	
Quantitative study of 216 Spanish SMEs		importance of risk perception	
Aven & Renn (2011)	Risk management describes the task to prevent, reduce or alter the consequences	Background on risk	
Risk management and governance	identified by the risk assessment through choosing appropriate actions. Complexity, uncertainty and ambiguity definitions. Risk assessment: (1) Identification of relevant sources, (2) Cause and consequence analysis, (3) Risk description	management. The multidimensional concept of risk	
Book on generic risk management			
Baird & Thomas (1985) Presentation of a model of strategic risk taking Theory building	Due to the nature of strategy, risk is embedded in most long range decisions. Wide definition of corporate strategic risk. Discusses risk perceptions among managers. Three aspects of risk handling are presented; identification, estimation, evaluation. Presentation of a contingency model of risk taking is presented, with environmental, industrial, organizational, decision maker and problem variables	Possible basis for further development of a model for risk evaluation. Variables affecting risk taking. Risk perceptions among managers. Wide risk definition	
Bromiley, Miller & Rau, 2005 (book chapter in Hitt, Freeman Harrison (2005)) Risk in strategic management research	Researchers of risk in the field of strategic refer to other academic disciplines such as economics, finance, and psychology. It is problematic to measure risk relative to industry competitors (assumption of clear industry boundaries, allow only for intraindustry comparison). Strategic risk is a multidimensional construct. Risk dimensions influence performance. Performance below aspirations appear to increase risk taking. Strong governance appears to mitigate managerial risk aversion.	Challenges of measuring risk. The multidisciplinary nature of risk	
Risk research overview			
Deilos & Henisz (2003) Political hazards and the impact of experience – a stage model extension to include political differences Quantitative study of 3,857 Japanese firms	Critique against the stages model's negligence towards political hazard. Experience in hazardous countries makes FDI in other hazardous countries more likely, although not as likely as experience in low-hazard countries makes entry into other low-hazard countries. The stages model of gradual commitment can be expanded to include political risk. Experience from manufacturing operations is more useful in hazardous countries, while distribution experience is more useful in low-hazard countries	The role of political hazard. How increased experience can reduce the barriers to entry in risky markets.	
Di Gregorio (2004)	Critique of ineffective country-risk measures (lagging indicators, low predictability).	Critique of country risk	
Applying entrepreneurship theory to country risk Argumentative paper	International environments are inherently unpredictable. Uncertainty is a function of endogenous (project, organizational level) and exogenous (industry, competition, external environment) uncertainty. Importance of not forgetting upside risk — maximizing upside risk while minimizing downside risk. Risk mitigation strategies: (1) Avoidance, (2) Financial hedging, (3) Transfer. Transfer strategies are more appropriate and more commonly used when the nature of risk is more ambiguous and when information asymmetries exist. (4) Diversification. Entrepreneurial strategies that exploits uncertainty: (1) Arbitrage/prediction, (2) Real options, (4) Adaption. Outlines 8 strategies for risk minimization and discuss their users (SMEs vs. larger firms).	measures like The Economist's. Upside/downside risk tradeoff. Strategies for risk reduction.	
Figueira-de-Lemos, Johanson & Vahlne (2011) Risk management in the	Firm internationalization is a process of aligning the firm to the environment. Lack of foreign market knowledge is the main obstacle to international expansion. Internationalization must be seen as the process outcome of adjustment to changes within a firm and the firm's environment. The Uppsala models risk formula does	Risk formula and risk frontier model from the Uppsala model. Separation of	

	Appendice	s
internationalization process: graphical Uppsala model Theory development	not seem to have been noted by researchers - neither criticized nor used in the internationalization analyses. Although risk appears to be widely present in internationalization discussion, few studies strictly focus on risk management in the internationalization process. Risk is the product of uncertainty and resource commitment. Separation between contingent uncertainty (reducible) and pure uncertainty (non-reducible)	contingent and pure uncertainty. Balance between knowledge and resource-commitment.
Forlani & Mullins (2000) Factors leading to perceiving ventures as risky, reasons for pursuing risky/non-risky new ventures Quantitative study with 78 entrepreneurs from the fastest growing public U. S. companies	Framework for understanding risk perception: (1) Risk perception (investment, outcome variations, potential loss), (2) Venture choice (risk perception, personality, context). Risk definition: reflects the degree of uncertainty and potential loss associated with the outcomes that may follow from a given behavior or set of behaviors. Differences in new venture choices were not only influenced by risk in anticipated outcomes, but also the entrepreneur's perception of risk and their propensity to take risk. Entrepreneurs in study more likely to choose high hazard than low hazard ventures. However, they overwhelmingly chose ventures of low variability Proven hypotheses: (1) Greater variability in predicted outcomes => greater perceived risk. (2) Greater magnitude of proposed largest loss => greater perceived risk, (3) Greater variability in predicted outcomes => less likely to be selected for funding, (4) Greater risk propensity of entrepreneur => less perceived risk associated with a particular venture (5) Greater risk propensity of entrepreneur => more likely to select ventures of higher risk levels.	Risk perception among managers. Factors influencing risk perception, and final choice.
George, Wiklund, Zahra (2005) The role of ownership in the internationalization of SMEs Quantitative study. Telephone interviews (1997 & 2000) and mail surveys with 889 Swedish firms.	SME reasoning concerning resources, international experience and internationalization efforts. Eclectic paradigm and agency theory used as internationalization theories. Factors influencing cost and perceived risk in internationalization efforts (scale & scope). Comparison of VCs against other institutional investors. Findings (faster with VC than inst.): (1) Higher level of CEO ownership negatively related to scale & scope, (2) Higher level of TMT ownership negatively related to scale and scope (3) Higher level of institutional/VC ownership positively related to scale (4) High CEO/TMT and institutional/VC ownership positively related to scale	Influence of external/internal ownership. External investors can overcome the risk aversion of CEO and TMT. SME argumentation in order to show how these firms differ from MNCs. Risk of internationalization, factors influencing perceived risk.
Harveston, Kedia, Davis (2000) Managerial impact on internationalization of firms Quantitative study with 60 BG and 146 gradual globalizing firms	BG managers have more geocentric mindsets than gradual globalizing firms. BG managers have more international experience. BG managers have a higher risk tolerance	Back-up for discussion of risk according to INV/BG and stages perspectives
HBR Analytic Services Report (2011) Success factors of enterprise risk management Survey of 1419 HBR readers. In-depth interviews of sub- sample	Risk assessments need to be done prior to project kickoff, rather than at the end (linking risk to strategy-making). It can be hard to gain top level approval of resource consuming risk management activities, as it is hard to value in financial terms. Identifying, analyzing and managing risk should be an ongoing activity rather than a periodic "review" process. Risk management should be decentralized, pushing decision making authority further out into the field for better risk management. Challenges: <i>managing</i> rather than <i>reporting</i> risk, Ensuring that decisions remain with the organization's risk tolerance, Driving risk mitigation activities, Proactively identifying current and emerging risks. Risks can build on each other to create more serious problems than might be expected individually – <i>sequential risk</i>	Best practices of risk management, definition of sequential risk term.

Henisz & Zelner (2010)

Limiting risks of entering emerging markets, focus on avoiding expropriation and using effective analytical tools

HBR article, limited referencing

Policy risk can seriously affect foreign investments. Policy risk is the risk that a government will discriminatorily change the laws, regulations, or contracts governing an investment – or will fail to enforce them – in a way that reduces an investor's financial return. Legal contracts, insurance and trade in financial instruments usually offer little protection against policy risk. The project – and firm-specific nature of political risk renders conventional hedging strategies infeasible. Foreign investors must accept responsibility for directly managing risk themselves, using analytic tools based on modern communications technology, , risk professionals and game theory (and not country risk ratings)

Analytical tools for risk identification and assessment than the norm of using business partners and supply chain partners, who are not trained in assessing risk.

Appendices		
Kahnemann, Lovallo (1993) A cognitive perspective on risk taking Literature review, proposes own view	IInside vs. outside view of problems; the outside view should complement the inside view in order to get a less biased evaluation. Decision makers tend to deal with one choice at the time. This coupled with risk aversion and near proportionality of gains and losses makes the risk aversion unjustified and incoherent when stakes are small/moderate relative to assets. Organizations and managers makes too bold (overly optimistic) forecasts, and timid (risk averse) choices	Risk aversion and optimistic forecasts dilemma.
Laitinen (1992) Prediction of failure of newly started firms A failure prediction model tested on 20 failed and 20 nonfailed small companies	Mortality rates among newly founded firms are very high. A failure prediction model, consisting of 8 financial factors is presented – showing that failure to some extent can be predicted. The risk to fail can be reduced by using less debt as initial financing and ensuring that sufficient revenue streams are coming early	Risks specific to newly started firms. Deals with the symptoms rather than the causes of failure. Limited usability: takes into account only financials
How decision makers tend to be over-optimistic and downplay the importance of unfavorable scenarios Article, unclear methodology	Underlying factors causing over-optimism and decision bias (psychological and organizational) Introduction of an "outside-view" to complement the ordinary "inside-view" (introduction of a reference class)	Might be an inspiration for critique against decision-making processes. However, the lack of references makes it difficult to apply directly.
March, Shapira (1987) Managerial perspectives on risk Review of earlier studies	Risk is viewed differently by managers than theoretical definitions, most show little inclination for reducing risk to a single quantifiable construct. The inclination to take risk depend on the context. Risk-taking is seen as a managerial expectation. Managers tend to avoid risk, or believe they can reduce risk. There is a danger of overlooking low probability, high impact events. Managerial decision-making is not holistic, normally one/two focus points are used. Risk is content dependent	The managerial impact on risk identification and evaluation
Mascarenhas (1982) Coping with uncertainty in international business (IB) Study of 10 MNCs, based on interviews, and their methods for coping with uncertainty	Environmental instability is affected by discontinuities in economic growth, energy supplies, currency exchange rates, government actions, technological breakthroughs, worker attitudes. Uncertainties in IB: foreign exchange risk, political risk, labor restrictions, different cultures, infrastructural problems. Methods to cope with business uncertainty: (1) Prediction, (2) Control, (3) Insurance, (4) Flexibility. Model for dealing systematically with uncertainty: (1) identification of uncertainty sources, (2) assessment of impact, (3) evaluation of uncertainty, (4) identification of protection methods, (5) assessment of protection methods, (6) selection of protection methods, (7) evaluation of uncertainty	Further development of framework for dealing with uncertainty. Development of methods of dealing with uncertainty (risk mitigation)
McNamara & Bromiley (1997) Decision-making in an organizational setting Qualitative study	Argumentation for observing decisions in a real-life context, rather than through experiments. Importance of cognitive heuristics and organizational context. Factors influencing decision makers: (1) Organizational, (2) Socio-cognitive. Literature reference support for low-level performance encouraging risk taking. The role of routines as a repository for organizational knowledge. Increased degree of standardization over time. The primary organizational effect came from informal practices	Method (real-life context). Factors influencing decision-makers, support of performance link to risk-taking behavior. Role of routines, standardization and informal practices.
Miller & Reuer (1996) Advocating the appropriateness of the term 'downside risk' Theory building	Downside risk conception – more managerially relevant than the variance concept. The suitability if downside risk from 3 perspectives – behavioral decision theory, finance theory, management theory	Very relevant in the risk definition part.
Miller (1992) A framework for risk management in international business Model presentation, literature references	A firm's strategy deals with the alignment of the organization to its uncertain environment. Organizational strategic choices determine a firm's exposure to uncertain environmental and organizational components that impact firm performance. Exposure refers to the sensitivity of a firm or project's cash flows to changes in any of a number of interrelated uncertain variables. Risk definition that focus on unpredictability in corporate outcome variables (leaving out uncertainty in environmental variables). Presents 3 main sources of uncertainty: General environment, Industry, Firm specific variables. Separates between financial and strategic responses to risk/uncertainty (avoidance, control, cooperation, imitation,	Model for risk classification, sources of risk, strategies for managing risk, idea of trade-off possibilities, the need to create an <i>integrated</i> risk exposure profile

Miller (1998)

Financial exposure and risk management

A multivariate approach to model corporate risk exposure Miller (1993)

Industry and country effect on managers' perceptions of environmental uncertainty

ANOVA test of uncertainty on 497 South American managers

Milliken (1987)

Three types of uncertainty about the environment; state, effect and response

Literature overview, theory building

Oviatt et al (2004)

Risk management model for internationalization of new ventures

Model presentations

Palmer & Wiseman (1999)

Managerial risk taking and organizational risk

Structural equations modeling, data from 235 firms representing 64 industries

COSO (2004) (report written by PwC)

Framework for enterprise risk management

Report

flexibility). Risk factors are complexly linked to each other. There are therefore important trade-offs and opportunities, and hence a need for a holistic treatment. An exposure profile should be constructed, not all risk can be reduced Breaking the risk construct into distinct exposures to multiple environmental contingencies allows for more precise specification of the relations between risks and strategies

Reductionist approach to risk analysis, splitting large analyses in smaller pieces.

The mgmt. teams

shared uncertainty

influential. Managers

associate uncertainty

components. Risk is

project/firm specific

perceptions is

with distinct

environmental

Managers operating in the international business context confront a variety of uncertain environmental factors. Industry, rather than country, as the relevant level of analysis for risk assessment. Uncertainty refers to the unpredictability of environmental or organizational variables that have an impact on corporate performance, encompassing input market, product market, competitive and technological uncertainties. Firm specific uncertainties includes uncertainties regarding operations, research and development, and management and employee actions. Firms make real changes in strategies to reduce risk. An obstacle to empirical research on perceived environmental uncertainties is the lack of wellestablished measurement instruments. Optimal risk management practices involve simultaneous consideration of the full spectrum of corporate exposures to environmental uncertainties. Country-level assessment need to be supplemented with firm-specific, or even investment-specific considerations Presents 3 types of environmental uncertainty: state, effect and response uncertainty. Treating uncertainty: Objective and perceived uncertainty is expected to differ, as perceptions vary as a

understand, make function of individual attributes. An individual express uncertainty because he lack sense of, respond to. sufficient information to predict accurately or feels unable to discriminate between identify, evaluate, mitigate. Distinct types

INV risk literature review. Present a risk model including: (1) General environment, (2) industry conditions, (3) venture entrepreneurs, (4) the venture.

relevant data and irrelevant data.

Risk model

of uncertainty

Confusion over risks multiple meanings have hindered the field's advancement. Defining and measuring the environment's influence is complex. Researchers of strategic management customarily assume that environments determine the 'playing field' on which rivals compete. Risk is disaggregated into two distinct components; managerial risk, organizational risk (income stream uncertainty). Distinguishing between managerial choices and organizational outcomes helps answer questions about the role managers pay in creating firm performance. Some researchers argue that top managers choose strategies (and presumably risk) that align their organizations with environmental conditions, others argue that environmental factors (market structure, turbulence) directly influence organizational outcomes. The authors failed to detect a direct influence of environmental characteristics on organizational risk that was independent on managerial risk taking

All entities face uncertainty, and the challenge for management is to determine how - Risk model much uncertainty to accepts while striving to grow stakeholder value. Enterprise risk management: aligning risk appetite and strategy, - enhancing risk response decisions, reducing operational surprises and losses, identifying and managing multiple and cross-enterprise risks, seizing opportunities, improving deployment of capital. Components of enterprise risk management: (1) Internal environment (2) objective setting, (3) event identification, (4) event assessment (5) risk response; (6) control activities, (7) information and communication, (8) monitoring and modification. The risk responses include avoiding, accepting, reducing or sharing risk – actions that align risks with the entity's risk tolerances and risk appetite.

- challenges of risk research
- Managerial risk mediated the influence of environment on organizational risk
- Effective risk management is intended to increase shareholder value, balancing opportunity and risk

Roth (1991)

Managerial decision-making characteristics regarding 1) risk-taking 2) openness in decision-making 3) group consensus

Quantitative study, based on questionnaire sent to managers of 82 international business units

- The strategy of a business and its managerial decision-making arguments are linked because managerial decision-making characteristics are:
- a) fundamental to effective implementation of a particular strategy choice
- b) reflected directly in that choice (bounded rationality)
- c) a direct source of competitive advantage

Managerial characteristics may become a source of competitive advantage. Bounded rationality result because complex decisions, such as strategic choices, are characterized by ambiguity, conflicting goals, and imperfect information. Strategic choices will in part reflect the "idiosyncrasies of decision makers"

- influence of managerial characteristics on decision-making

Shapira (1995)

The role of risk in managerial decision making

Study based on

- Interviews with 50 executives
- a questionnaire was designed based on the interviews, with results from 656 executives

With certainty each action is known, leading to a particular outcome. With risk, each action leads to a few known outcomes, occurring with a specific probability. Uncertainty reflects that each action may lead to a set of consequences, of which the probabilities are unknown. The satisficing principle (Simon) "people search through a limited set of alternatives until they find a good enough alternative". Managers view risk differently than the definition used in decision theory: (1) managers referred primarily to downside risk, (2) managers attended more to the magnitude of possible loss than to its probability, (3) a sharp distinction was made risk taking and gambling, (4) managers showed little desire to reduce risk to a single quantifiable construct. Risk is perceived as multidimensional. Organizations should take risks under conditions of success, but be very careful taking risk under conditions if stress and failure.

- managerial risk perception is influential - managers do not seek to quantify risk

- the possible

of collaboration

- apparent low impact

of transaction cost

evaluation in the

market entry

Shrader (2001)

When to collaborate in foreign markets relative to a transaction cost approach (bounded rationality, opportunism)

Quantitative approach with 70 firms with a joint total of 176 foreign market entries

Shrader, Oviatt and McDougall (2000)

How international risk factors can be traded off against each other

Quantitative study of 87 U.S firms with a joint total of 212 foreign market entries

Taleb et al. (2009)

Six mistakes often made by executives in risk management

HBR article, no references

Tversky & Kahneman (1992)

Extension of prospect theory towards a cumulative presentation of uncertainty

Model development with literature base

Collaboration is performance enhancing when marketing activities are important, but should be avoided if technological advantage is key. Not all INVs collaborate on advantages and pitfalls market entry. Outlines advantages of collaboration for INVS. Transaction costs does not seem to be evaluated in the market entry decision process

It is possible to trade of the 3 most common risk factors against each other (location, entry commitment, revenue share). Outlines strategies for managing risk. Most influential factors on SME internationalization is the top management team, firm-level conditions and strategies, and industry conditions. Evaluation of pros and cons of entrepreneurial managers

Risk factors, possibility of managing risk through trade-offs, risk management strategies, influential factors on **SME** internationalization.

Instead of trying to anticipate low-profitability, high-impact events, we should reduce our vulnerability to them. Six common misconceptions: (1)We think we can predict extreme events, (2) we are convinced that studying the past will help us manage risk, (3) we don't listen to advice about what we shouldn't do, (4) we assume unexpected events that risk can be measured by standard deviation, (5) we don't appreciate that what's mathematically equivalent isn't psychologically so, 6) we are taught that efficiency and maximizing shareholder value don't tolerate redundancy.

Critique against expected utility theory. 5 choice phenomena (influences in the decision process). Tendency to overweight small probabilities. Tendency to underweight high probabilities.

- Lesson for managers: prepare for the consequences of

Managerial characteristics influencing decision making

Annandicas

	Appendice	S
Ward & Chapman (2001) Transforming risk management into uncertainty management Argumentative paper with literature references	Transforming risk management to opportunity management induces an enhanced focus on opportunity management. Risk is associated to adversity, implying adverse effects on performance, thus it fails to consider the management of opportunities. Opportunities and threats can sometimes be treated separately, but are seldom independent. Uncertainty management encompasses more than threat/opportunity management. It implies exploring and understanding the origins of uncertainty before trying to manage it. Risk transfer as a mitigation strategy	Risk definition, sources of uncertainty, the importance of not neglecting opportunities arising from uncertainty. - Importance of articulating subjective estimates - Mitigation strategy – reduction/modification.
Weber & Hsee (1998) The influence of culture on risk perception and attitudes towards risk Quantitative study with sample groups from 4 countries	Perception of risk, rather than attitudes towards risk, varies between cultures. Cushion hypothesis introduced as an explanation. Mathematical formulation of risk $WTP(x) = V(x) - bR(x)$. WTP: Willigness to Pay, V: Value (expected value, R: Risk (variance), b: Risk-return tradeoff parameter. b>0. Risk seeking, b<0 risk averse	Support on the importance of risk perception in the decision-making process. The attitudes towards risk might be similar, but perceptions of risk in various situations might influence choices. Experience might reduce the perceived degree of risk
Werner et al (1996) International risk and perceived environmental uncertainty Testing Miller's (1993) uncertainty measure based on a sample of internationally operating Netherland-based firms.	How risk has been measured: (1) Political risk: management's opinion of the attitude of the host government toward the industry and toward foreign firms, management's opinion of the volatility of the political, social and economic conditions in the host country, symptoms of instability; protests, riot; risk ratings (EIU, International Country risk guide) (2) Exchange rate risk: actual rates, changes in exchange rates (devaluation), (3) Demand uncertainty: annual production growth, rate of change in production (4) Management perception of demand	- possible measures of political risk, exchange risk and demand uncertainty
Zahra and, Garvis (2000) Entrepreneurship, firm	International Corporate Entrepreneurship (ICE) positively related with performance. The relationship is of diminishing returns (adverse U-shaped). Environmental hostility has a moderating effect on ICE. Sources of hostility. 1st	Sources of hostility (risk) The disadvantage of

	Internationalization theory			
Author, topic,	Takeaways	Intended use		
methodology				
Aspelund, Madsen &	The INV concept is the broadest concept proposed in the literature. Slow gradual	Internationalization		
Moen (2007)	internationalization challenged by autonomous, innovative and risk taking entrepreneurs	process explanation.		
	allowed to make strategic choice – but some researchers find proof of an accelerated	Support for INV concept		
A review of INV	gradual process. Niche focus, lead markets – hiding from global players, preserving profit	as main concept.		
research from 1992-	opportunities. Markets may be selected for opportunities of growth, but the sequences are	Accelerated gradual		
2004	decided based on the founders' previous experience and network. The psychic distance	process explanation.		
	concept may serve well on an average industry level, but individual firm factors might	Need perspective.		
Literature review	weight more in the market selection process. Low commitment modes to overcome	Facilitators of		
	resource constraints and handle risk make FDI unrealistic. Factors driving	internationalization.		
	internationalization: Innovations' time window of opportunity , mobility of competitive	Niche focus in order to		
	advantages tied to intangibles, insufficient domestic market size - A need perspective	hide from global players.		

mover advantage discussion (oil industry)

Entrepreneurship, firm performance and the

Quantitative study of 149 companies (response rate of 26%). Three hypotheses

moderating factor of environmental hostility

tested.

not being 1st mover

Appendices		
Autio (2005) Discussing the impact of Oviatt & McDougall's 'towards a theory of INVs' Literature review	Tabulated comparison of the stages and BG perspective. Discusses the non-valid original assumptions of the Uppsala-model. Contrasting views of risk: (1) small risk is better than 'leapfrogging' as firms are more likely to survive small mistakes than larger (2) early internationalization may not be an option, but a necessity to ensure growth due to short opportunity windows	Comparison of the stages and BG perspective. Small risks may be preferable for some, while a risky internationalization process is a necessity for others
Bell (1995) Challenging the propositions of stages theories Quantitative studies of firms in Finland, Ireland and Norway	Support Uppsala's prominent position, arguments of similarities between stages models. The psychic distance concept unable to provide an adequate explanation of initial market selection. Proprietary knowledge concerns an influencing factor in entry mode decisions for HT companies. Firm size and age not important determinants of internationalization decision. Firms do not go through a complex analysis of geographic, cultural and political factors when initiating export activities	Support of Uppsala position, support of knowledge concerns influencing internationalization, support of simplified internationalization decision-process
Bell, McNaughton, Young, Crick (2003) Creating an integrative model of small firm internationalization Literature review	Born-again globals through critical incidents (most often a change in management, or client-followership). Tabulated comparison in internationalization behavior of traditionals, born globals and born-again globals Managerial implications for traditionals, born globals and born-again globals. Government export programs – goals & critique, challenges presented by born globals	Born-again globals concept, comparison of internationalization behaviors, government export program discussion (policy implications)
Crick & Jones (2000)	Model of important factors in the internationalization process. Non-exporters is not a general, homogenous category (as it is often used as). Important factors for SME internationalization: (1) Flexibility, (2) Responsiveness to change, (3) Innovativeness in business practice, (4) Technological capability. Managerial background (technical/business) affecting speed of internationalization. Internationalization usually planned rather than ad hoc – a need to balance resources against risk. Outside support – a substitute for managerial experience. Most firms adopt a risk-adverse strategy regarding commitment. Low psychic distance less important than global trends in technology markets and network relationships	Influences on the internationalization process, support of downplaying psychic distance, risk balancing and risk-aversion to commitment
Crick & Spence (2005) Strategy formulation in the internationalization process of high-tech SMEs Qualitative study – 12	HTSMEs may not have time to integrate prior knowledge and fully develop strategies before implementing them. In SMEs the entrepreneur or team's characteristics drive organizational strategy. Support of the need for more than one theory. Emergent strategies may be initiated by opportunity windows with short time frames —> opportunistic strategies may bring more value than systematic Serendipity term (Temporal, relational, analytical components) some firms commenced expansion for serendipitous, unplanned reasons Main triggers for pursuing an international strategy: (1) Availability of contacts, (2) Development & use of resources, (3) Serendipitous encounters.	Planned vs. unplanned strategy, serendipity/chance concept, the importance of a few persons in SMEs
in-depth interviews Knight & Cavusgil (2004) Explaining the organizational background if a born global firm Quantitative study of 203 firms	Most new firms characterized by scarce financial, human and tangible resources. Managers' global focus and commitment makes firms start with a global market view and develop capabilities to achieve international goals at/near founding. Early internationalization driven by 2 trends: (1) Globalization of markets, (2) Technological advances Drivers of superior international performance: (1) global technological competence (2) unique products development (3) leveraging foreign distributor competences. Smaller, young firms are more flexible, less bureaucratic – unlearning embedded routines become more difficult as the firm ages	New firm characterization, managerial influence on internationalization, trends driving early internationalization, characteristics of INVs
Madsen & Servais (1997) Comparing the born global process to the stages perspective	Defense of the Uppsala model. Changes in founder characteristics and market conditions make the "rings in the water" concept obsolete Factors attributing to the rise of BGs: (1) Market conditions, (2) Technological development, (3) Competences	Input in the discussion of the early internationalization perspective
Literature review		

	Appendic	es
McAuley (2010) SME research 1999- 2009 Literature review	There is a lack of practitioner application to the findings of the reviewed articles. The sheer variety of SME activity, still means that a single and unified theory of SME internationalization remains an illusion	Motivation for holistic theoretical approach (no single theory sufficient to describe int process)
McDougall & Oviatt (1996) INVs – strategic change and performance Quantitative study of 62 U.S. computer and communications manufacturing ventures	Internationalization may be a prerequisite for competing in some industries. Strategic change necessary as the environment changes – this is easier accomplished in new ventures w/o organizational inertia. No direct relationship between % of international sales and ROI. Niche focus - highly focused firms with an intangible knowledge based competitive advantage. Patented or secret knowledge that needs little local adaption may be embedded in the product technology and transferred to multiple locations at low marginal cost	Support of the need perspective, movability of knowledge-based products
McDougall, Shane & Oviatt (1994) Explaining INVs and why traditional internationalization theories cannot explain their internationalization Comparison of theories and case studies	INV definition. The formation process is not explained by existing theories from the field of international business. Founders of INVs are more alert to the possibilities of combining resources from different national markets because of the competencies that they have developed from their earlier activities. International entrepreneurs try to avoid domestic path-dependence. Under conditions of resource poverty, the internalization of transactions is limited and the INVs rely on hybrid structures for controlling many vital assets despite a threat of opportunism. Link to Eisenhardt: Random selection is neither necessary nor even preferable when one is extending theory	INV definition, claim of stage theory misfit, INV founder characteristics, hybrid structure preference. Random selection argument for method chapter.
Moen, Servais (2002) Export behavior of SMEs – questioning the concept of gradual development	Questions gradual development concept, challenging market knowledge's importance due to globalization. Explanations for rapid internationalization – lead market criterion downplaying the importance of psychic distance. Finds no relationship between year of foundation and export intensity, global orientation, distribution, psychic or geographic market distance, or the number of market served. Firms exporting for a long time exported to a larger number of countries	Critique of stages' gradua development concept, lead market criterion
Quantitative study with surveys from Norway, Denmark, France		
Oviatt & McDougall (2005) A theory for INVs Literature review and theory-building	INVs have existed for centuries. FDI not a requirement for INV classification. Large size may be both a cause and effect of multinational competitive advantage. Lists 4 INV characteristics. Resource scarcity leads to use of risky hybrid arrangements. Sources of foreign country transaction disadvantages. Need perspective of internationalization relative to protecting firm knowledge	INV characteristics, resource scarcity influencing risk taking, sources of disadvantages, need perspective
, ,	Use of 'early internationals' to cover BG and INV terms. A single theoretical framework for explaining early internationalization would be reductionist. Studies focusing on populations of HT firms in special sectors may provide a different and not fully comparable result with less context-dependent research. Support of multiple case studies. Lists 10 facilitating factors of internationalization. Lists 3 keys issues in the internationalization of a firm. Too little research has been devoted to the nature of managerial decision-making	Early internationals term, support of multiple frameworks, factors influencing INV internationalization, support on managerial decision-making
Zahra (2005) Reviewing the INV theory a decade later Literature review	There are both advantages and disadvantages with being a new firm Drivers of internationalization: (1) Prior founder experiences (2) Recognition of business opportunities, (3) Level of an industry's global integration. 3 common INV liabilities: (1) Newness, inexperience (2) Size (3) Foreignness. Critique against Oviatt and McDougall for overlooking the role if the institutional environment and economic geography. Not all learning is functional and beneficial as it might introduce rigidity as managers develop preferred ways of handling challenges	Support for evaluating the risk of the environment, support for internationalization drivers, risk/liabilities of INVs, firm age

11.13 Master contracts



MASTERKONTRAKT

- uttak av masteroppgave

1. Studentens personalia

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3. Masteroppgave

Oppstartsdato	Innleveringsfrist
16. jan 2012	11. jun 2012

Oppgavens (foreløpige) tittel

Identifying and Mitigating Risk in the Internationalization Process

Oppgavetekst/Problembeskrivelse

A high level of activity in the Brazilian petroleum sector increases the demand for products and services related to oil and gas extraction. The Brazilian petroleum sector is dependent on foreign competence, thus opening up for entry of Norwegian actors into the Brazilian petroleum market. Yet such a market entry is associated with considerable risk, making a thorough risk assessment an important component of the internationalization process. There is a multitude of factors to take into consideration in a risk assessment, and it can be both difficult to identify, and to evaluate the impact of, the different risk factors. This study examines identify and mitigate risk in the internationalization process through a qualitative study of a small sample of case firms.

Hovedveileder ved institutt Førsteamanuensis Arild Aspelund	Medveileder(e) ved institutt
Merknader 1 uke ekstra p.g.a påske.	

4. Underskrift

Student: Jeg erklærer herved at jeg har satt meg inn i gjeldende bestemmelser for mastergradsstudiet og at jeg oppfyller kravene for adgang til å påbegynne oppgaven, herunder eventuelle praksiskrav.

Partene er gjort kjent med avtalens vilkår, samt kapitlene i studiehåndboken om generelle regler og aktuell studieplan for masterstudiet.

Trondheim 12/01/12
Sted og dato

Hovedveileder

Originalen lagres i NTNUs elektroniske arkiv. Kopi av avtalen sendes til instituttet og studenten.

Side 2 av 2



MASTERKONTRAKT

- uttak av masteroppgave

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3. Masteroppgave

Oppstartsdato 16. jan 2012	Innleveringsfrist 11. jun 2012	
Oppgavens (foreløpige) tittel	ization Process	

Oppgavetekst/Problembeskrivelse

A high level of activity in the Brazilian petroleum sector increases the demand for products and services related to oil and gas extraction. The Brazilian petroleum sector is dependent on foreign competence, thus opening up for entry of Norwegian actors into the Brazilian petroleum market. Yet such a market entry is associated with considerable risk, making a thorough risk assessment an important component of the internationalization process. There is a multitude of factors to take into consideration in a risk assessment, and it can be both difficult to identify, and to evaluate the impact of, the different risk factors. This study examines identify and mitigate risk in the internationalization process through a qualitative study of a small sample of case firms.

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Merknader 1 uke ekstra p.g.a påske.	

Side 1 av 2

4. Underskrift

Student: Jeg erklærer herved at jeg har satt meg inn i gjeldende bestemmelser for mastergradsstudiet og at jeg oppfyller kravene for adgang til å påbegynne oppgaven, herunder eventuelle praksiskrav.

Partene er gjort kjent med avtalens vilkår, samt kapitlene i studiehåndboken om generelle regler og aktuell studieplan for masterstudiet.

Transleim, 1201,2012

Student

Originalen lagres i NTNUs elektroniske arkiv. Kopi av avtalen sendes til instituttet og studenten.

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