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Market Validation in Established Companies

A case study of DNV GL Oil & Gas

Master's thesis in Industrial Economics and Technology Management

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Abstract

Innovation is of great importance for a company's survival, and a challenge for many firms is to adopt the structures, processes and behaviors needed to continuously develop new ideas. One approach is through nurturing *intrapreneurship*, which can be defined as *entrepreneurship within existing organizations*. This approach has been found to contribute to company innovativeness and growth. A particularly important, yet often neglected, intrapreneurial activity is *market validation*, the purpose of which is to validate the existence of a sustainable market prior to making large investments. After investigating potential demand and establishing product attributes, the intrapreneur can choose whether to discard the idea, or to adjust the innovation correspondingly to fit market need.

Like many other companies, the global professional service provider DNV GL Oil & Gas has experienced lacking attention to market validation. This often results in ideas being funded long after they should have been terminated, causing loss of time, money and employee motivation. Hence, the research question of this master thesis is:

How can DNV GL Oil & Gas facilitate satisfactory market validation activities?

This is a qualitative, explanatory single-case study of the phenomena. In the thesis, a theoretical framework is developed, consisting of individual and organizational factors which affect market validation. The framework is used to understand and explain how market validation can be facilitated, and the study is based on interviews with employees, documents and observations. The collected data was analyzed with NVivo.

The findings of this study indicate that intrapreneurial competencies is a key driver for market validation. Professional networks and networking skills emerge as particularly important. A recommended starting point for increasing intrapreneurial competencies is the Key Account Managers, who have great power as gatekeepers towards customers, and can contribute by becoming promoters for market validation. Intrapreneurial competencies should however be balanced with the right type and amount of formal control, and the two seem to be complementary. Formal processes and structures can reduce the need for a professional network, reduce the risk of costly failures, and increase intrapreneur accountability.

Sammendrag

Innovasjon er svært viktig for at en bedrift skal overleve. En utfordring mange står overfor er å få på plass strukturer, prosesser og atferd som trengs for å utvikle nye ideer. Én tilnærming som har vist seg å kunne bidra til innovasjon og vekst er *intraprenørskap*, som kan defineres som *entreprenørskap i etablerte organisasjoner*. En ofte glemt, men viktig intraprenøriell aktivitet er *markedsvalidering*. Denne aktiviteten har som formål å bekrefte tilstedeværelsen av et marked før man foretar store investeringer. Etter å ha undersøkt potensiell etterspørsel og ønskede produktegenskaper, kan intraprenøren velge å enten forkaste ideen, eller å justere innovasjonen for å tilfredsstillende markedets behov.

Som mange andre selskaper, har det globale konsultentselskapet DNV GL Olje og Gass opplevd manglende oppmerksomhet på markedsvalidering. Dette resulterer ofte i at ideer blir finansiert lenge etter at de skulle vært forkastet, som igjen fører til tap av tid, penger og ansattes motivasjon. Forskningsspørsmålet i denne masteroppgaven er følgende:

Hvordan kan DNV GL Olje og Gass legge til rette for tilfredsstillende markedsvalidering?

I denne kvalitative case-studien utvikles et teoretisk rammeverk, som består av individuelle og organisasjonelle faktorer som kan tenkes å påvirke markedsvalidering. Rammeverket brukes for å forstå og forklare hvordan man kan legge til rette for slike aktiviteter, og studien er basert på intervjuer med ansatte, dokumenter og observasjoner. Den innsamlede dataen er analysert med NVivo.

Funnene i studien tyder på at intraprenøriell kompetanse er en viktig driver for markedsvalidering. Profesjonelle nettverk og nettverkinsferdigheter utmerker seg som spesielt viktige. Et anbefalt sted å starte for å øke intraprenøriell kompetanse, er kundekontaktene (Key Account Managers). Dette er fordi disse har stor makt i kraft av å være bindeleddet mellom selskapet og kundene, og de kan bidra gjennom å bli promotører for markedsvalidering. Intraprenøriell kompetanse bør likevel balanseres med formell kontroll, og disse to elementene ser ut til å være komplementære. Formelle prosesser og strukturer kan redusere behovet for profesjonelle nettverk, redusere risiko for dyre feiltrinn, og bidra til ansvarliggjøringen av intraprenører.

Preface

This master thesis concludes the end of a five-year integrated master study in Industrial Economics and Technology Management at the Norwegian University of Science and Technology. The thesis combines innovation, which is my specialization, with organizational management, which is a topic I find very interesting.

The thesis has been written in collaboration with DNV GL. I was acquainted with the company through my summer job in 2019, and since then I have come to appreciate the strong values, pleasant employees and exquisite kayaking opportunities just outside the office.

I would like to thank supervisor Arild Aspelund for timely responses and useful feedback, Venture Director Kaare Helle at DNV GL for interesting discussions, and all interviewees who have contributed to the study.

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1 Introduction

Innovation has become commonly accepted as a key source of competitive advantage (Dickinson, Thornton, & Graves, 2001; K. M. Eisenhardt & Martin, 2000; Lawson, Longhurst, & Ivey, 2006; Mcgrath, 2013). Organizations need to innovate in response to changing customer demands and lifestyles and in order to capitalize on opportunities offered by technology and changing marketplaces (Baregheh, Rowley, & Sambrook, 2009). Numerous long-lived established companies have succumbed to new entrants because they failed to keep up with customer expectations. This is demonstrated by the fact that the average life span of companies has reduced from 60 years in 1950, to under 20 years today (Viki, Toma, & Gons, 2017). Certainly, innovation is of great importance for a company's survival, and a challenge for many firms is to adopt the structures, processes and behaviors needed to continuously develop new ideas.

One approach to becoming more innovative is through *intrapreneurship*. The concept was first coined by Pinchot and Pinchot (1978), and it can be defined as *entrepreneurship within existing organizations* (Antoncic & Hisrich, 2001). It has been found to be a contributing factor to an organization's innovativeness and growth (Antoncic & Hisrich, 2001, 2004). An intrapreneur is an "employee who does for corporate innovation what an entrepreneur does for his or her start-up" (Pinchot, 2017). Hence intrapreneurs possess many of the qualities and competencies that entrepreneurs do, and a challenge for many firms is to nurture entrepreneurial activity inside the organization in order to exploit the potential that comes from being an established company with experience and resources. After all, the company does not perform innovation activities, the employees do (Strømsvåg & Osmundsen, 2017).

Market validation activities are particularly highlighted in literature as an often neglected intrapreneurial activity (Delbecq & Mills, 1985; Goldberg, 1997; Mackenzie & Cusworth, 2007; Ries, 2011). Such activities aim to investigate potential demand and establish product attributes. Their purpose is to validate the existence of a sustainable market, and market validation activities include in example customer interviews, surveys, piloting, co-creation and reviewing data from adjacent markets.

A common denominator for low-innovation firms is that they focus too little on validating the existence of a market, and that if they do, market research is often conducted as creative

speculation behind closed doors (Delbecq & Mills, 1985). On the other hand, market validation activities performed while maintaining a *search behavior*, namely searching for external information and interacting with potential customers, has been found to yield better results (Delbecq & Mills, 1985; Wennekers & De Jong, 2008). Early market validation and subsequent re-orientation or desertion of the business idea also serves as a cornerstone of popular methodologies such as Customer Development (Blank, 2020), Lean Startup (Ries, 2011), Design Thinking (Lewrick, Link, Leifer, & Langensand, 2018), and Sprint (Knapp, Zeratsky, & Kowitz, 2016). Furthermore, such activities are often emphasized in entrepreneurial education programs, which further demonstrates their importance (Onyesom & Okolocha, 2014). However, despite this inevitable importance, little research has been done on the antecedents of market validation (Chen & Zhang, 2017; Miles, Little, Brookes, & Morrish, 2014). This thesis will attempt to bridge some of this gap by investigating how a business can facilitate such activities.

The global professional service provider DNV GL is one of the companies which have experienced lacking attention to market validation. The company sells high-end quality assurance consultancy services, and is reliant on recruiting employees with considerable domain expertise. DNV GL experiences that these highly able employees produce many potentially valuable ideas. However, there are challenges related to stimulating the entrepreneurial activity that is necessary to bring these ideas to life. In particular, idea owners too seldom conduct satisfactory market validation activities. Lack of early market validation often results in ideas being funded long after they should have been terminated or adjusted, causing loss of time, money and employee motivation. Therefore, it is of the highest interest to understand which factors affect how and when employees conduct market validation activities. This thesis will investigate how market validation can be facilitated in DNV GL Oil & Gas, by studying how individual and organizational factors affect such activities.

1.1 Scope of the study

As DNV GL consists of 5 different business areas, DNV GL Oil & Gas (henceforward “Oil & Gas”) has been selected as the unit of analysis. Although there will be parallels to other business areas, the scope is selected based on availability of time and interviewees. Hence, generalizations to other business areas will be left for the reader to make. Theoretically, the scope of the thesis is limited by theory on market validation and intrapreneurship. The latter is chosen as market validation in this study is regarded as an intrapreneurial activity. Throughout the thesis, “DNV GL”

will be used for all information regarding DNV GL as a whole. “Oil & Gas” will be used if the information is specific to this particular business area.

1.2 Research question

The research question is the following:

How can DNV GL Oil & Gas facilitate satisfactory market validation activities?

The author has chosen to focus on market validation, because Oil & Gas reports that it is an activity that is particularly challenging to facilitate. Market validation is also at the core of many modern innovation methodologies, and the topic hence raises some interesting and relevant theoretical concerns. The thesis will be a single-case study, and the empirical data will mainly be acquired through semi-structured interviews with Oil & Gas employees and managers, as well as a few representatives from other business areas.

1.3 Structure of the thesis

After this introduction, chapter 2 provides the theory and a framework for analyzing the data. In chapter 3, a short description of the case company is provided to frame what will be investigated through the theoretical framework. Then, in chapter 4, the research method is described and the research quality considered. Chapter 5 presents the data acquired in the study, the results are analyzed and discussed in chapter 6, and the thesis finally ends with a conclusion. The structure is illustrated in Figure 1.

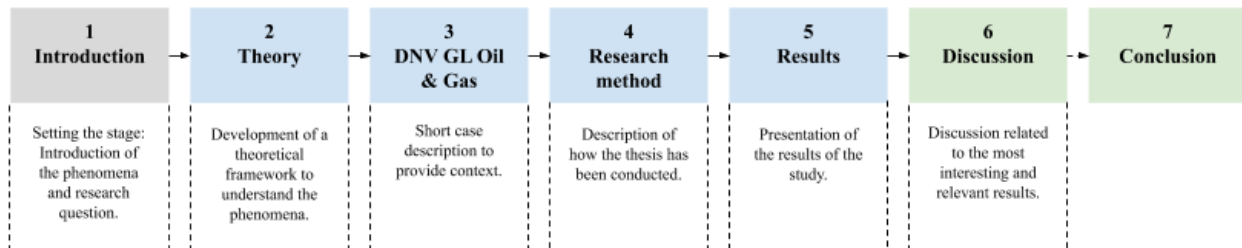


Figure 1: Structure of the thesis, by the author.

2 Theoretical framework

This chapter will present the literature which makes out the basis for the data collection and analysis in this thesis. First, central concepts and basic theory on innovation will be described. Secondly, the concepts *intrapreneurship* and *market validation* will be introduced. Finally, the presented theory will be synthesized in a theoretical framework comprising possible antecedents of successful market validation. Figure 2 provides an overview of the context in which market validation will be examined.

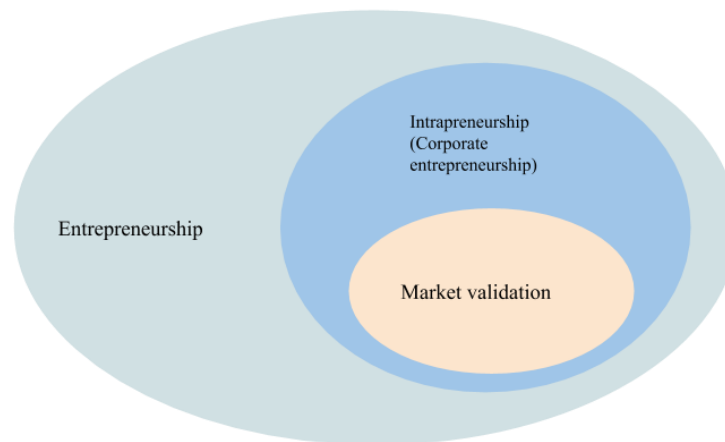


Figure 2: The topic in context, by the author.

2.1 Innovation

Innovation may be understood in several ways. It can be argued that each discipline (e.g. information technology, engineering, product design, etc.) requires its own discipline-specific definition. However, to enable the development of shared understanding of the various dimensions of innovation, there may be a need for a more generic definition. Nagji and Tuff (2012) defines innovation simply as *a novel creation that produces value*. A new creation can be as incremental as a new nail polish color or as revolutionizing as the smartphone. It needs not be entirely new, nor does it have to be very creative. It does, however, need to be useful. Similarly, Maranville (1992) states that *a product is innovative when it satisfies new market needs or existing market needs in a new way*, focusing on the *function* of the innovation (serving a market), rather than the innovation itself.

The context of this thesis is innovation as success factor for businesses. Hence a new creation in a business must generate some kind of value, most often in monetary terms. Here are some examples of companies which have adopted short, but general definitions:

Transforming new ideas into real business value. (Equinor)

Improving existing business and creating new revenue streams. (DNB)

DNV GL has no definition of its own. Therefore, the author chooses to undertake a Schumpeterian perspective on innovation, which is defined as: *A new or improved combination of knowledge that has a commercial application* (Kogut & Zander, 1992; Nelson & Winter, 1982; Schumpeter & Nichol, 1934).

Further, OECD and Eurostat (2019) define innovation activities:

Innovation activities include all developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm.

The above definitions do not focus on ingenious inventions, as some may associate with the term “innovation”. On the contrary, they revolve around *implementing changes*. The challenge of large organizations is often how to organize this change, and many ideas die not because they are poor, but because the organization fails to adopt them (W. M. Cohen & Levinthal, 1990). Hence it can be argued that *successful* innovation in a business is a product or service that is both *useful* and *successfully implemented*.

2.1.1 Why innovate?

It has become commonly accepted that innovation, as well as the capability of implementing new products and processes has become a key source of competitive advantage (Dickinson et al., 2001; K. M. Eisenhardt & Martin, 2000; Lawson et al., 2006; Mcgrath, 2013; Viki et al., 2017). As early as in 1912, Joseph A. Schumpeter argued that innovation is the main source of economic growth, and in 1942 he coined the term “creative destruction”, referring to the way old technology and companies are replaced due to swarms of innovative impulses (Ørstavik, 2019). This has become even more relevant as the rate of change in technology, social trends and economy is greatly increasing (Furr & Dyer, 2014). The fact that the average lifespan of companies has greatly diminished from about 60 years in 1950 to under 20 years today, and that the S&P 500 index is expected to be entirely replaced in 13 years demonstrates this change of pace (Viki et al., 2017).

Hence, creating new ideas and implementing them to serve constantly changing user needs is becoming more important by the day.

It may seem that being an established, successful company can be the Achille's heel of innovation, and that traditional corporate strategy no longer applies to a rapidly changing world (Bower & Christensen, 1995; Viki et al., 2017). Companies such as Kodak and Nokia are two much used examples on how big, successful companies can be overturned if they fail to innovate. Don Strickland, a former vice president of Kodak articulated: "*We developed the world's first consumer digital camera but we could not get approval to launch or sell it because of fear of the effects on the film market*" (Usborne, 2012). Likewise, Nokia was well positioned as the global leader in mobile phones in the early 2000s. However, management chose not to lead the change of mobile phone user experience in fear of alienating current users, and had no chance of catching up when Apple launched the iPhone in 2007. Stories like these are numerous.

On account of the case company DNV GL, rapid changes in society constitutes the need for changes in the company's offering to its clients. This is driven by megatrends such as electrification and digitalization, as well as increasing pressure over global warming. As a professional service provider and independent quality controller, DNV GL is expected to keep up with this development. Thus, in order to stay relevant, DNV GL constantly focuses on competence development and new products and processes to better fit the market. 5% of revenues, approximately NOK 1 Bn, are each year allocated for research and development. Needless to say, it is of the outmost importance to manage how this money is spent and to ensure the market validity of such innovations. On this note, theory on intrapreneurship may be helpful to understand how this can be achieved.

2.2 Intrapreneurship

Terms such as intra-corporate entrepreneurship (Pinchot & Pinchot, 1978), entrepreneurial employee behavior (Bosma, Wennekers, & Stam, 2010), corporate venturing (MacMillan, 1986) and internal corporate entrepreneurship (Jones & Butler, 1992) have all been used to describe the concept of intrapreneurship. A broad definition of the term is *entrepreneurship within existing organizations* (Antoncic & Hisrich, 2001). Hence the two terms *entrepreneurship* and *intrapreneurship* are separated by the context in which the entrepreneurial activities are performed, and they are therefore not particularly distinct. Intrapreneurship may be characterized as a sub-

field of entrepreneurship (Antoncic & Hisrich, 2003; Blanka, 2019; Veenker, Sijde, During, & Nijhof, 2008). This thesis will however base its understanding of the term by a somewhat more specific definition:

Intrapreneurship is the process of uncovering and developing an opportunity to create value through innovation and seizing that opportunity without regard to either resources or the location of the entrepreneur (Antoncic & Hisrich, 2001).

In other words, regardless of organizational position and responsibility, any employee can be an intrapreneur as long as he or she manages to identify *and* pursue (innovation)opportunities in the company's interest.

Intrapreneurship has been found to positively impact growth and innovativeness in a company (Antoncic & Hisrich, 2001; Veenker et al., 2008; Åmo, 2010). It can lead to new business ventures, as well as the development of new products, technologies, processes, strategies and competitive positions (Antoncic & Hisrich, 2001; Katz & Lumpkin, 2007). Additionally, it has been found to create knowledge that may be used later in the creation of future revenue streams (Katz & Lumpkin, 2007). Examples of companies which have succeeded with intrapreneurship are, among others, Google, known for allocating a portion of the employees' time to work on their own projects, and Lockheed Martin, known for *skunk works*, referring to groups within an organization with high degree of autonomy. What is common for both of these firms is that they have managed to nurture the entrepreneurial spirit of their employees, allowing the companies to extract the potential that comes from combining entrepreneurial thinking with being an established company with experience and resources. They have in other words managed to institutionalize entrepreneurial management principles.

Various studies on the topic of intrapreneurship has been performed with different perspectives. Blanka (2019) points out two main perspectives from which one can view intrapreneurship: the *organizational level* and the *individual level*. A third level which may be considered is the *team level*, however the former two will be the focus of this thesis. The three levels are presented in Figure 3 in what the author has chosen to denote as an *intrapreneurship hierarchy*.

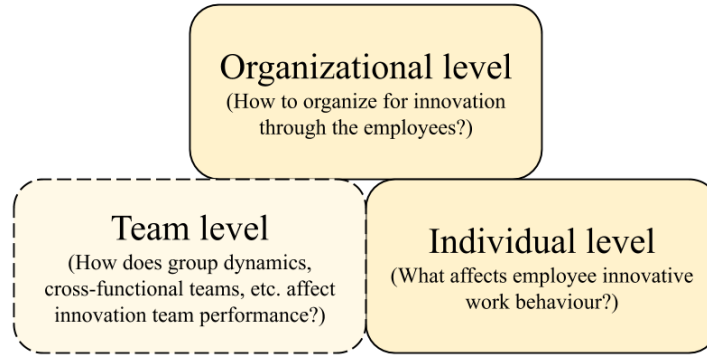


Figure 3: The intrapreneurship hierarchy, by the author.

2.2.1 The organizational level

The organizational level focuses on examining how organizational factors influence entrepreneurial behavior and the effect on company performance (Blanka, 2019). Such organizational factors may include formal structures and processes, innovation programs, organizational support, etc. This level investigates intrapreneurship as a strategy to enhance corporate innovation activities, and Antoncic and Hisrich (2003) synthesizes previous research on the corporate level of intrapreneurship in the following eight elements: Product innovativeness, self-renewal, new ventures, new businesses, risk-taking, competitive aggressiveness, and proactiveness. Wennekers and De Jong (2008) state that organizational control through business hierarchy and processes may impede the initiatives of an intrapreneur, but at the same time offer the support that follows with an established firm.

Literature highlights the importance of organizational factors for intrapreneurship (Antoncic & Hisrich, 2001; Turro, Alvarez, & Urbano, 2016; Veenker et al., 2008; Zahra, 1991). Some of these factors can also be seen as being more or less relevant for market validation activities, and they can be divided in 4 organizational antecedents:

1) Formal controls

Zahra (1991) emphasizes the impeding effect of excessive formal control. Kuratko, Hornsby, Naffziger, and Montagno (1993), however, state that controlling intrapreneurial activities may be a manager's key for developing entrepreneurial thinking in the organization. They also underline the need for the right type of control, promoting rewards and strong company recognition as opposed to strict rules or procedures. Furthermore, formal controls have been found to be

important in entrepreneurial projects selection (Kanter, 1990). Hence, the right type and amount of formal control is associated positively with intrapreneurship (Antoncic & Hisrich, 2001).

2) Organizational support

This factor is perhaps the broadest, and can be considered the most important antecedent of intrapreneurship (Antoncic & Hisrich, 2001, 2004). It includes characteristics such as management support, incentives, organizational structure, resources and willingness to take risk (Kuratko, Montagno, & Hornsby, 1990). Also, Stevenson and Jarillo (2007) emphasize the value of trusting and training the employee to identify opportunities and perform intrapreneurial activities on their own initiative. Organizational support is thus assumed to correlate positively with intrapreneurship.

3) Organizational values

The value drivers which are related to intrapreneurship are the characteristics, values/beliefs, and visions of strategic leaders (Guth & Ginsberg, 1990), attitude of employees (Stevenson & Jarillo, 2007), as well as individual and competition oriented organizational values (Zahra, 1991). Values are assumed to impact intrapreneurship due to their influence on implementation of strategy and processes (Guth & Ginsberg, 1990; Tushman & Romanelli, 1985).

4) Environmental scanning

Scanning for trends and market opportunities is essential for intrapreneurial activities, in particular innovativeness and the creation of new business ventures (Zahra, 1991). Furthermore, gathering feedback from customers is determining for an organization (Wei, Choy, & Yeow, 2006), and is also at the core of market validation.

2.2.2 The individual level

The individual level is more concerned with the importance of entrepreneurial employees. It focuses on human capital as a significant success factor of innovations and new ventures (Parker, 2011; Åmo, 2006). Pinchot (1985) phrases it like this: “Innovation almost never happens in large organizations without an individual or small group passionately dedicated to making it happen”. Blanka (2019), Park, Kim, and Krishna (2014), and Menzel, Aaltio, and Ulijn (2007), among others, also support the notion that the employees are central in successful intrapreneurship. It is not the company which performs innovation activities within the organization – the employees do (Strømsvåg & Osmundsen, 2017). Seen from the organization’s point of view, intrapreneurship at the individual level can be seen as the result of, or response to, corporate innovation strategy (Åmo,

2006). Hence, intrapreneurship largely revolves around, and is dependent on, the actions of employees. Strangely enough, there is relatively little research on the business effects of employee-driven innovation and intrapreneurship at the individual level (Amundsen, Gressgård, Hansen, & Aasen, 2011; Blanka, 2019; Åmo, 2006).

The intrapreneur

An intrapreneur takes “*hands-on responsibility for creating innovation of any kind within an organization. The intrapreneur may be the creator or inventor but is always the dreamer who figures out how to turn an idea into a profitable reality*” (Pinchot, 1985). This definition differentiates an intrapreneur from an inventor, which are terms that can otherwise easily be interchanged. Intrapreneurs *drive* innovations, and take responsibility for the innovation’s success. They closely resemble independent entrepreneurs, with which they share many competencies and personality traits (Menzel et al., 2007). These common competencies include among others opportunity recognition, idea generation (Menzel et al., 2007), networking skills, the ability to take initiative and willingness to take risk (Wennekers & De Jong, 2008). In addition, the ability to think outside the organizational boundaries (Pinchot, 1985), championing and active information search (Wennekers & De Jong, 2008) are promoted as important characteristics of the intrapreneur. Blanka (2019), however, highlights three main differences between intrapreneurs and independent entrepreneurs: (1) Intrapreneurs are able to make use of existing company resources, (2) they operate within the organizational context, and (3) they already have their own policies and bureaucracy. Hence, the successful intrapreneur manages to navigate in their given organizational environment, with the same drive and self-reliance as independent entrepreneurs. Katz and Lumpkin (2007) too emphasize that the intrapreneur is limited by the organization in which they operate. However they state that these limitations are also accompanied by considerable possibilities due to available resources and reduced risk.

Furthermore, intrapreneurs and independent entrepreneurs are motivated by somewhat different factors. The prospect of attaining personal wealth is important to many entrepreneurs, whilst intrapreneurs rarely benefit equally well from his or her innovations for the employer (Menzel et al., 2007). On the other hand, personal economic risk is often lower for an intrapreneur than the entrepreneur, and rarely results in considerable economic losses. Åmo (2006) suggests intrinsic

rewards, namely the positive feelings an employee gets from performing or mastering tasks, are important motivational factors for intrapreneurs.

The engineer-intrapreneur

A category of intrapreneurs of particular interest in this study is a group that may be labeled *knowledge-workers* (Åmo 2006), *knowledge entrepreneurs* (Murray, 2008) or *engineer-intrapreneurs* (Menzel et al., 2007). Worldwide, the engineer is a key driver for technological innovation and new venture creation, due to extensive domain knowledge (Menzel et al., 2007). Engineers have the ability to think conceptually, believe in the laws of physics, and have respect for technology, computations, materials and designs. Menzel et al. (2007) therefore state that their technical expertise provides an important source of ideas that may turn into entrepreneurial opportunities. A. R. Cohen (2002) states that innovation in organizations are often driven by people with *both* technical expertise and sufficient market knowledge to estimate potential demand. On this basis, one can argue that it is not efficient to separate the engineering and marketing functions and still be able to meet the challenge of a rapidly changing marketplace (Chang, 2014). Therefore, the 21st century engineer is often expected and to attain a more entrepreneurial orientation than what is typically associated with the engineering profession (Arora & Faraone, 2003; Chang, 2014; Rover, 2005).

Intrapreneurial competencies affecting market validation activities

Man, Lau, and Chan (2002) considers entrepreneurial competencies as a “*higher level characteristic encompassing personality traits, skills and knowledge, and can therefore be seen as the total ability of the entrepreneur to perform a job role successfully.*” As a special case of entrepreneurship, intrapreneurial activities also require the employee to hold the necessary personality traits, skills and knowledge to be successful in his or her job. Hence, intrapreneurial competencies may be assumed to affect the practice of market validation activities. Table 1 shows a selection of intrapreneurial competencies that may have an effect on the practice of market validation.

Table 1: Intrapreneurial competencies

Competence	Source
Opportunity recognition	Menzel et al. (2007)
Speaking with potential customers	(Fitzpatrick, 2013)
Manages to navigate in the organizational environment	Blanka (2019)
Networking skills	Kyndt and Baert (2015); Wennekers and De Jong (2008)
Taking initiative	Wennekers and De Jong (2008)
Ability to think outside organizational boundaries	Pinchot (1985)
Active information search	Emmerling, Boyatzis, Camuffo, Gerli, and Gubitta (2012); Wennekers and De Jong (2008)
General market and industry knowledge	Kyndt and Baert (2015)
Perceiving customer needs	Chandler and Hanks (1994)
Empathy	Emmerling et al. (2012)
Emotional intelligence	Omrane (2015)
Self-promotion	Baron and Tang (2009); Omrane (2015)

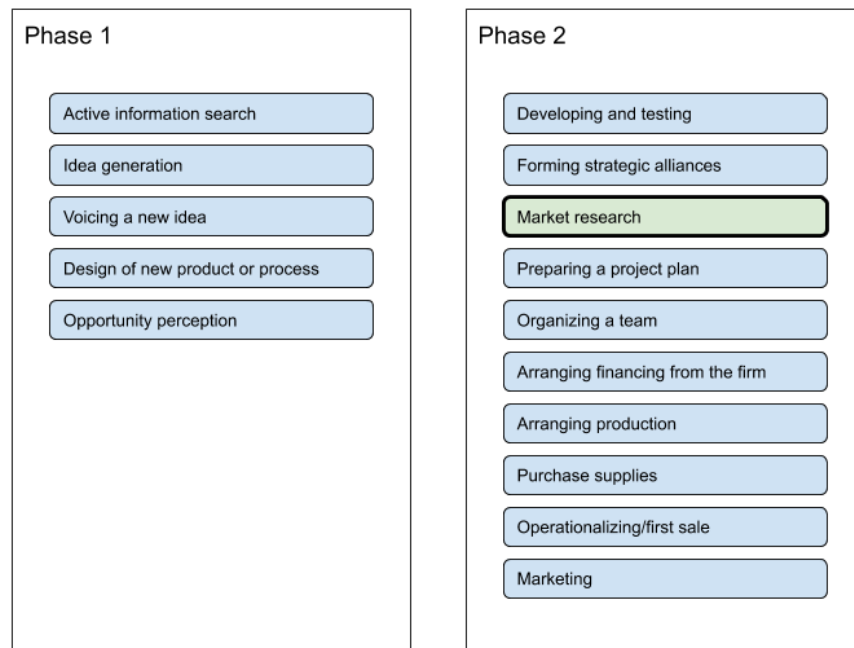


Figure 4: The two phases of intrapreneurship, adapted from Bosma et al., 2010.

2.2.3 The link between intrapreneurship and market validation

Market validation is an intrapreneurial activity. Hence, theory on intrapreneurship can contribute to understand the phenomena of market validation and how it may be facilitated. Intrapreneurship consists of many distinct activities, and Bosma et al. (2010) categorize these activities in two phases: (1) “Visioning and imagination” and (2) “preparation and emerging exploitation”. An overview of these activities, placed in their respective phase, is provided in Figure 4. Market validation is part of market research, placed under phase 2.

2.2.4 Summary of the theory on intrapreneurship

Intrapreneurship is a particular case of entrepreneurship. It is characterized by the pros and cons of innovating in a larger organization – there are more resources available, however, organizational complexity, politics and bureaucracy can represent hurdles. There are two levels of intrapreneurship discussed in this thesis. On the organizational level, factors which affect market validation are: Formal controls, organizational support, organizational values and external scanning. On the individual level, the factors are intrapreneurial competencies, personal preferences and motivation. Finally, as market validation is an intrapreneurial activity, it is natural to investigate the phenomena through theory on intrapreneurship.

2.3 Market validation

A study by Miles et al. (2014) states that experienced mentors report a frustrating inability among first time high-tech entrepreneurs to connect technologies to customers in new ventures. They report that these new entrepreneurs do not understand what “market validation” entails, and that they do not know how to usefully reduce market risk. As the concept may not be as straight forward as it may sound, the following will present what market validation is, what is considered “successful” market validation, and how such activities are typically conducted.

Market validation activities are often part of *feasibility studies*, which are particularly highlighted by several authors as being of great importance to intrapreneurial efforts (Delbecq & Mills, 1985; Hofstrand & Holz-Clause, 2009b; Mackenzie & Cusworth, 2007; Onyesom & Okolocha, 2014). As the name implies, a feasibility study aims to assess the feasibility of a business idea. It is a comprehensive pre-investment examination of all factors and matters surrounding an innovation, and it aims to estimate a project’s practicability and profitability (Onyesom & Okolocha, 2014). More specifically, a feasibility study may be split up in the following four sections: organizational,

technical, market and economic feasibility (Hofstrand & Holz-Clause, 2009a). *Organizational* feasibility refers to the assessment of whether the organization has the necessary resources to take on the project, *technical* feasibility is about determining whether the innovation actually can be physically made, and *market* feasibility is concerned with the potential demand and market requirements for the innovation. *Economic* feasibility is often based on the previous three assessments and provides the bottom line answer on whether the effort is likely to pay off. Put simply, organizational and technical feasibility answers the question “*Can it be done?*”, whereas market and economic feasibility answers the question “*Should it be done?*”. Determining early that a business idea will not work saves time, money and heartache later, and it is therefore of the highest interest to handle this uncertainty.

Of the four sections, *market* feasibility is an often neglected intrapreneurial activity (Delbecq & Mills, 1985; Goldberg, 1997; Mackenzie & Cusworth, 2007). Market feasibility studies aim to investigate potential demand and establish product attributes. Some authors also include industry assessments, competitive analyses and marketing strategies (Hofstrand & Holz-Clause, 2009a; Wolfe, 2020). This thesis will, however, study the antecedents of the *customer related* activities in market feasibility studies, namely *market validation activities*.

Market validation is a *process to probe, test and validate a market opportunity prior to investing a large amount of money into technology development* (Lees, 2014). It refers to the process of confirming or confuting assumptions that the innovator has about the market which he or she hopes to address with the innovation. By interacting with potential customers and performing market analyses, the innovator either confirms the current trajectory of the innovation, is motivated to pivot in other directions, or accepts that the idea is not worth pursuing. Examples of market validation activities are: Interviews with potential customers, surveys, piloting with first customers and analysis of data from adjacent markets. Such activities are critical to commercial success, and ensures that the innovation is entering a valid and sustainable market (Cespedes, Eisenmann, & Blank, 2012; Evers, Cunningham, & Hoholm, 2015). Market validation is hence conducted to effectively screen business concepts at an early stage to avoid costly mistakes that are caused by uninformed decisions (Eldin, 2012), and it is the first step in answering the important question “*should it be done?*”.

Market validation serves as a cornerstone of popular methodologies such as Customer Development (Blank, 2020), Lean Startup (Ries, 2011), Design Thinking (Lewrick et al., 2018), and Sprint (Knapp et al., 2016). Several of such methodologies have emerged in startup communities, and later diffused into corporate innovation strategies. In example, *The Corporate Startup* by Viki et al. (2017), introduces a holistic framework for developing an innovation strategy based more or less on startup methodologies. Hence, a lot of what applies to individual entrepreneurs, arguably also applies to an *intrapreneur* in a larger organization. A commonality of market validation methodologies is that they all focus on reducing risk. The base assumption of such methodologies is that it cannot be concluded whether a market exists or not, based on creative speculation behind closed doors. The answer is thus dependent on cycles of building, testing and learning. In its essence, Cespedes et al. (2012) proposes that the process of market validation requires (a) coherent and falsifiable hypotheses about potentially relevant variables and (b) timely and affordable means for investigating those hypotheses. The learnings are then used to create new hypotheses for testing and for refining or deserting the business idea.

2.3.1 What is successful market validation?

As stated previously, satisfactory market validation is determinant to innovation success. Yet, a recurring problem is that many innovators fail to perform such activities in a timely manner with sufficient quality to confidently state what the market needs are. The characteristics of successful market validation is therefore important to be aware of.

Taking point of departure in the above provided definition of market validation, success is achieved when there is a more or less confident answer to the question “*Should it be done?*”. In other words, the innovator can confidently clarify to a certain extent *who the customers are, how big this market is, and what attributes this market requires* for the product to be optimal (Cespedes et al., 2012; Goldberg, 1997). Hence, successful market validation is no one-time activity, it is a continual process which should begin early and last throughout the development of the idea (Behrens & Hawranek, 1991; Goldberg, 1997). Ultimately, the success of market validation is measured through reduced risk, which also tends to open doors with investors and other key decision makers.

2.3.2 How is market validation conducted?

As this thesis will investigate how successful market validation can be facilitated, it is necessary to understand what market validation can look like. As stated above, the course of a market validation process is dependent on the available information and the findings from customer experiments. However, to provide the reader with an impression of how such processes occur, three known methodologies will be presented: The Lean Methodology (Ries, 2011), Design Thinking (Lewrick et al., 2018) and the Stage-Gate system (R. G. Cooper, 2006). The two former are very iterative and dominate the startup-scene, while the latter is rather rigid and dominates the larger corporations (DelVecchio, White, & Phelan, 2013). This consequently results in the theoretical debate revolving which methodologies are best fit for market validation in larger organizations.

Market validation in the lean startup

Lean startup, or lean thinking, is not to be confused with lean manufacturing or lean management principles, which originated with Toyota's success as a car manufacturer. The definition of waste in the *lean startup*, is "everything that does not lead to validated learning", where the term "validated learning" refers to the type of learning that arises from experiments and observations, rather than speculation. Therefore, the starting point is, as stated above by Cespedes et al. (2012), a coherent and falsifiable hypothesis about potentially relevant variables. This hypothesis needs to be tested, and this is done through what is denoted a *minimum viable product* (MVP), the purpose of which is to enable learning. An MVP may be as simple as a one page sheet which describes the idea and what problem it solves, or it can be simple, static drawings of the user interface of a computer program. The point is that it should not be polished any more than necessary to prove or reject the hypotheses, and the illustrative horror example produced by Ries (2011), is that he once wrote 25000 lines of code which turned out to be unnecessary. By conducting experiments, entrepreneurs test their assumptions, learn and adjust their MVP to test it again and learn more. Hence, the core of the lean startup methodology is the build-test-learn cycle (Figure 5). The objective of such a process is to minimize risk in uncertain conditions.

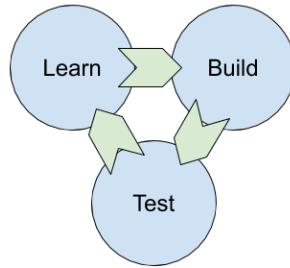


Figure 5: The build - test - learn cycle, adapted from Ries (2011).

After some time, the idea will converge towards some kind of ideal as it is refined through the build-test-learn process. At some point, the entrepreneur needs to choose whether to persevere, or to *pivot*. The *pivot* is an action that may be taken if an idea does not seem to have the desired payoff. An example is the *customer segment* pivot, which happens because the entrepreneur has realized that the intended customer segment was not as interesting as initially assumed. During the build-test-learn loop, perhaps another group has occurred as more interesting, which urges a shift in direction and focus. Another example of a type of pivot is the *value capture* pivot, in which the business model is changed. Perhaps the idea shows promise, but instead of selling the product once, a subscription model may be more suited.

Market validation in design thinking

Design thinking (Lewrick et al., 2018) is a somewhat more comprehensive method, because it does not start with a defined product. It is a bottom-up strategy which begins with interviews, of which the purpose is to *empathize* with the user (see Figure 6). By learning about a user's pain in certain situations, and learning about what characterizes those situations, the entrepreneur seeks to understand the different users and their needs. With this information, a problem is *defined*, and in the *ideation phase* the entrepreneur seeks to come up with a solution to this problem. After ideas are suggested, new interviews conducted and definitions revised, prototypes are made and tested. The design thinking method must not, however, be confused with being a rigid, sequential method. It is highly iterative, and inventors are free to jump between phases. In particular, the last 2-3 steps of design thinking are quite similar to that of the lean startup, and the two approaches are often combined. Both approaches are characterized by being iterative and driven by *learning*.

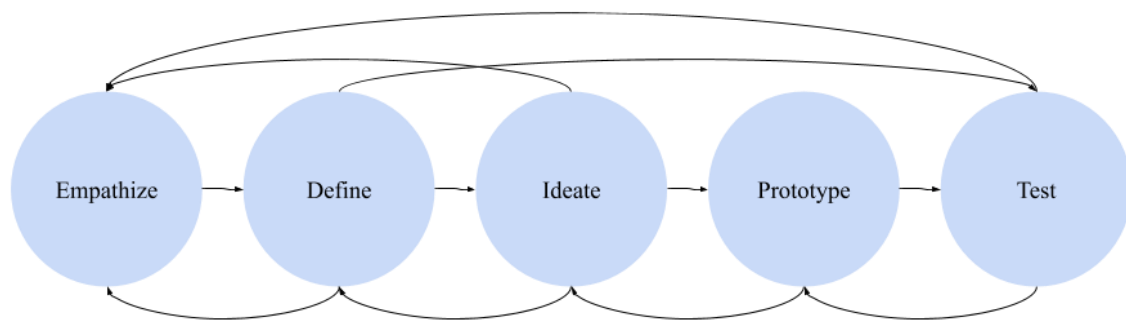


Figure 6: Design thinking, adapted from Lewrick et al. (2018).

The Stage-Gate system

The Stage-Gate system originated around 1990, and was developed by Robert Cooper based on his comprehensive studies on what makes organizations productive. This system represents the more rigid way of conducting innovation activities. Today, the official system consists of four stages, separated by gates with a certain “Go/Kill”-protocol which needs to be passed to proceed to the next stage. Originally, this system is highly sequential and rigid, however newer developments have softened it somewhat. In example, the NexGen Stage-Gate system (Figure 7) has added what Cooper denotes “spiral development”, referring to an iterative process of risk analysis, prototyping, and testing (R. G. Cooper, 2006). Nevertheless, this strategy remains notably more rigid than that of lean startup or design thinking, and thus represents a more conservative line of innovation strategy (DeIVecchio et al., 2013). While the Lean Startup methodology dominates in the startup community, the Stage-Gate system dominates in the corporate world. Thus, the ongoing debate is about how to best leverage on these methods to nurture intrapreneurship and thereby market validation.

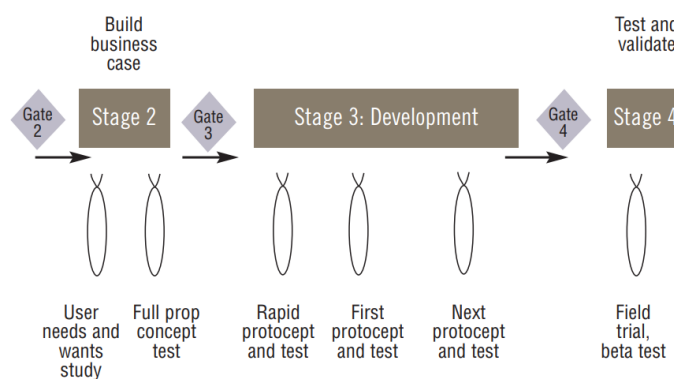


Figure 7: The NexGen Stage-Gate system, retrieved from R. G. Cooper (2006)

2.3.3 Summary of theory on market validation

Market validation is a *process to probe, test and validate a market opportunity prior to investing a large amount of money into technology development*. Successful market validation is achieved when it is possible to say, with a fair level of certainty, whether a demand for an innovation is present or not. It is often conducted through interactions with potential customers, with the aim of learning what matters to them. The innovation is later adjusted or discarded as a consequence of the findings from the market validation activities.

2.4 The framework

Based on the above presented theory, the theoretical framework in Figure 8 summarizes what factors affect intrapreneurs to performing market validation activities. These factors are organized in organizational and individual categories, in line with theory on intrapreneurship. Individual factors affect the intrapreneur directly, whereas organizational factors can affect the intrapreneur and market validation in two ways: First, they can affect directly, through formal control which reduces chances of failure, like standard review processes, standard criteria for going forward with an idea and so on. Secondly, they can have an indirect impact, through affecting individual factors which in turn affects the intrapreneur – this may typically be done through training, recruiting and value based management.

Moreover, the framework is also intended to provide a suggested strategy for improving how these activities are performed in an organization. It is constructed as a feedback loop, and if the intrapreneur does not perform satisfactory market validation activities, the organization then attempts to discover why, and subsequently adjusts organizational parameters. This approach is also based on a build – test – learn methodology which reduces creative speculation and rather encourages the organization to test their assumptions, much like the core of market validation.

Finally, if the employee performs satisfactory market validation activities, and the market is found to not exist, theory states that it is important to properly discard such ideas to maintain employee motivation, as well as to increase intrapreneurial competence by learning what makes ideas good (Moenkemeyer, Hoegl, & Weiss, 2012).

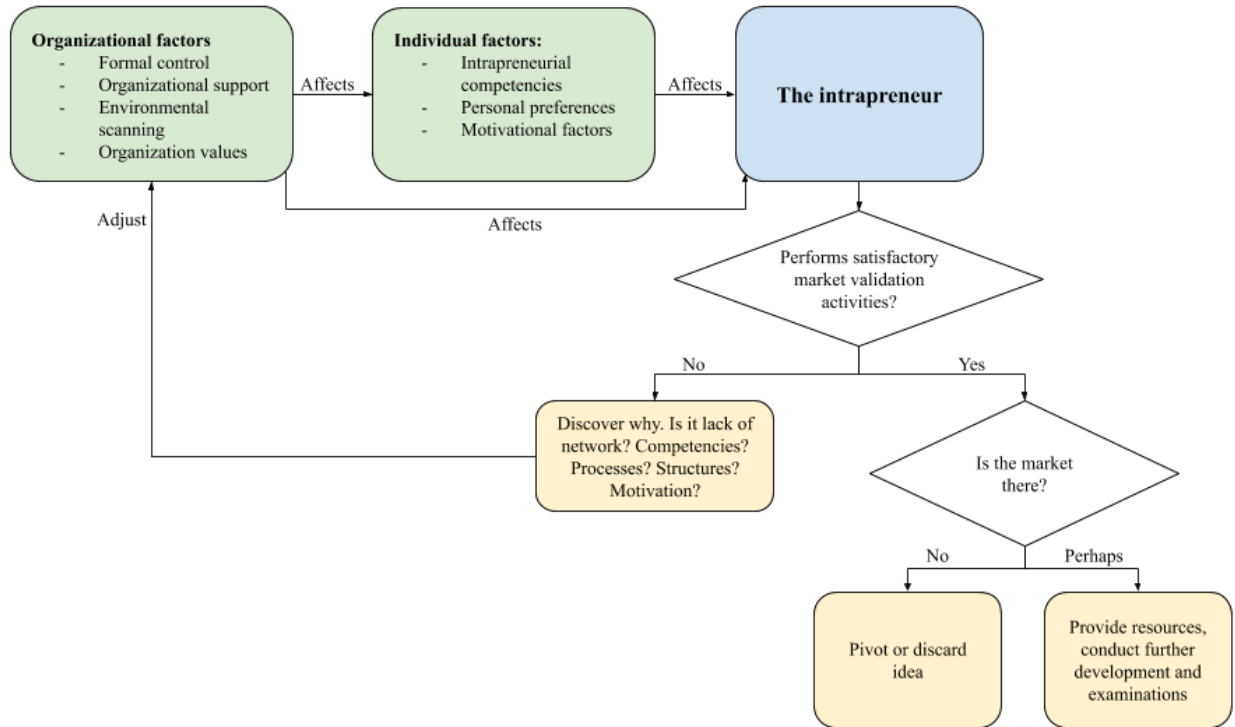


Figure 8: Theoretical framework. By the author.

3 DNV GL

This chapter provides a brief context which is necessary to understand and interpret the results of the study. First, the history of DNV GL as a company will be presented. This is relevant because DNV GL has strong traditions and values, which have great effect on operations today. Secondly, the structure of the company will be presented, followed by a general description of the unit of analysis, Oil and Gas.

DNV GL is an international company headquartered at Høvik, Norway, which provides independent risk management and quality assurance in various industries. The company was the result of a merger in 2013, between Det Norske Veritas (DNV) and Germanischer Lloyd (GL), both of which have roots back to the 1860s. DNV GL is today owned by the independent Det Norske Veritas foundation whose purpose is to safeguard life, property and the environment. The company has a global reach, with offices in over 100 countries, approximately 12000 employees and a revenue of 21,5 Bn NOK (2019).

3.1 History

During the mid-19th century, the market for maritime insurance flourished as the shipping industry grew. The demand for a more safe and standardized way of classifying and pricing vessels arose, paving the way for third-party quality assurers with technical expertise. As a result, GL, DNV, and their competitors Lloyd's Register (est. 1760), Bureau Veritas (est. 1828) and American Bureau of Shipping (est. 1868), all experienced significant growth. The network of *surveyors*, technical competent engineers inspecting vessels, grew rapidly. Further, as the industry transitioned to steam powered propulsion, competence requirements among ship surveyors changed drastically.

Society became an increasingly important stakeholder, and the implementation of load lines, limiting the load a ship was permitted to carry, saved many lives. Safety at sea became a matter of public interest after the Titanic disaster in 1912, and international classification societies were important contributors in discussions on safety at sea. This resulted in the first International Convention for the Safety of Life at Sea (SOLAS) which has been further developed and is still in use today. In modern times, the disaster of the oil rig Alexander Kielland in 1980 symbolizes a shift in safety attitude, resulting in significantly increased safety focus offshore.

In 1951, the newly appointed director in DNV, Georg Vedeler, introduced a new vision for the company. His vision was to build safer ships more efficiently, using more scientific approaches as opposed to traditional, overly conservative rules. This was the start of establishing a dedicated research department, which later would leave DNV well positioned to take market shares in the more demanding segments of shipbuilding, particularly as the first super tankers were developed. DNV was also well positioned in terms of technical competence and a recognized brand as commercial oil was discovered in the North Sea. The company served as advisor for both authorities and oil companies, and since the early 70's, DNV has been offered most of the supervision and inspection assignments on the Norwegian continental shelf. By extension, offshore floating rigs and supply ships also became an important segment.

As advances in technologies such as wind energy and information technology have been made, both DNV and GL have been important contributors to technology research and development. Today, 5% of annual revenues are dedicated to research and development, which helps fulfilling DNV GL's purpose of safeguarding life, property and the environment, as well as fueling brand trust and attractiveness. In recent years, alliances, acquisitions and mergers have been important strategic measures of growth. This has resulted in a relatively decentralized DNV GL due to its size, range of services and organizational complexity. Today, DNV GL offers consultancy services in the maritime, oil and gas, energy, health care industry, as well as a range of other industries.

3.2 Structure

DNV GL is governed by the parent company DNV GL Group, and is organized into five business areas: Maritime (the business area from which the company originated), Oil & Gas, Energy, Business Assurance and Digital Solutions (see Figure 9). As of 2020, Inspection was established as an additional independent business unit. The various business areas operate in different ways, however the essence is consistent: DNV GL acts as a trusted partner, with the aim of providing customers and their stakeholders with sound information so that they may make informed decisions. Furthermore, although the DNV GL Group headquarters resides at Høvik, the various geographical regions and business areas operate relatively independently.



Figure 9: Organizational structure of DNV GL. Retrieved from DNV GL (2019)

3.3 DNV GL Oil & Gas

Oil & Gas is the second largest business area, with revenues of 4,8 Bn NOK and 2186 employees (DNV GL, 2019). The business model is predominantly based on consultancy services, even more so than that of other business areas. Core services of Oil & Gas are risk assessments, technical advisory and offshore classification in the oil and gas industry.

Recent economic emergencies has forced Oil & Gas to work towards becoming more cost-effective. The company suffered significant losses during the financial crisis, which coincided with an already forecasted downturn in the market. Market conditions improved until the realities of the oil crisis affected the business area. The recent Covid-19 pandemic has also reduced income, and the whole of DNV GL has been forced to implement cost saving measures such as temporary salary reductions and recruitment freeze. Furthermore, the industry faces an increasing societal pressure over climate change. The above factors stress the need for more cost-effective services for Oil & Gas, which in turn challenges the traditional hourly based consultancy business model. New business models are gradually being introduced, either as supplements to, or replacements of, consultancy services.

4 Research methodology

This chapter will present the research methodology. It starts with an introduction to the research philosophy which lays the basis for the thesis. Further, it will present relevant research methodology theory, describing the case study as a method and defining research quality. Subsequently, the application of the method will be presented, along with an integrated discussion on how research quality has been affected along the course of the study. Finally, a section on some retrospective learnings will be provided, concluding the chapter.

4.1 Research philosophy

The choice of research paradigm is likely to affect how the study is conducted and how the results are analyzed and interpreted (Guba & Lincoln, 1994). Hence it is important to be aware of the ontological and epistemological assumptions which form the basis for the governing research paradigm. The author undertakes a post positivistic stance to this case study. The ontology of post positivism assumes that a reality exists, but, unlike positivists, that reality can be known only imperfectly. The epistemology of post positivism assumes that knowledge is based on human conjectures, and that this knowledge may at any time be adjusted as the evidence for these conjectures change. In terms of the study, the author hence recognizes the existence of biases, and that these are likely to affect the results of the study. Triangulation of information sources is typically one strategy to cope with this challenge.

Furthermore, the study will take a pragmatic approach. The research question is chosen based on the apparent need for more research on market validation in general, as well as the relevance of the topic for the case company. The results are aimed to provide useful insight, predominantly for the author and the case company. Thus, the results are conceived and interpreted accordingly, and this falls within what is described by Saunders, Lewis, and Thornhill (2009) as a pragmatic approach to research. Furthermore, the objective of this study is to understand and to some degree explain how an organization can nurture the activity of market validation, as such making the study rather descriptive and explanatory as opposed to generating new theory.

4.2 Research methodology theory

4.2.1 Choice of method

The form of the research question posed, the need to control behavioral events and the degree of focus on contemporary or historical events, are important factors which affect what social research method is suitable for a study (Yin, 2018). The *case study* is suitable to answer research questions with the form of “how” and “why”, it focuses on contemporary events, and it does not require control over behavioral events. However, elements from other research methods may be used as supplements (Bryman, 2016). In this study, the history analysis and the archival analysis methods have been used to understand how contemporary events have developed. Hence, the case study was selected as the primary method, while history analysis and archival analysis methods have been touched upon as supplementary methods.

The case study as a research method

Yin (2018) proposes a two-fold definition of the case study. The first part is concerned with the scope of the study, namely:

1. *A case study is an empirical method that investigates a contemporary phenomenon in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident.*

This definition helps separating the case study from other methods, in example experimental research, which deliberately separates a phenomenon from its context (Yin, 2018). Another example is historical research, which focuses on studying the phenomena in context, however it focuses on *noncontemporary* events, which separates it from case studies. Now, the second part of Yin’s definition concerns the features of the study, and it states:

2. *A case study*
 - a. *cope with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result*
 - b. *benefits from the prior development of theoretical propositions to guide design, data collection, and analysis, and as another result*
 - c. *relies on multiple sources of evidence, with data needing to converge in a triangulating fashion.*

Hence, the twofold definition of case studies reflects the wide extent of case studies. It reflects that case studies are more than simple data collection tactics, and that they encompass the entirety of the case – which is what makes the case study applicable in situations where the research question seeks to investigate how or why a certain phenomenon takes place. Yin (2018) further distinguishes three dimensions of studies: *exploratory*, *descriptive* and *explanatory*. These dimensions apply to all types of studies, not only case studies. Exploratory studies are used when the researcher seeks to understand more about the phenomena in question, descriptive when the aim is to describe the phenomena, and explanatory when the author seeks to understand more about the causality of the phenomena. All these three dimensions are somewhat overlapping. Nevertheless, the goal is that the researcher is aware of the distinctions and chooses the corresponding mode of inquiry.

4.2.2 Research quality

There are concerns related to case studies, two of which are related to the lack of scientific rigor (Zainal, 2007) and generalizability (Myers, 2000). However, many such concerns are often formulated as limitations of the method, as opposed to fundamental methodological flaws (Sarma, 2015). The research quality of this study will be considered through the terms *reliability* and *validity*, as proposed by Yin (2018).

Reliability

Reliability of case studies refers to the probability of whether a repeated study following the same procedures would yield the same results, even if conducted by a different researcher (Yin, 2018). In example, one of the biggest threats for reliability in observations is the observer bias (Saunders et al., 2009). As we are a part of the world we are studying, it is difficult to not let any common knowledge or life experience influence how we interpret our observations (Delbridge & Kirkpatrick, 1994). Hence, a reliable study minimizes such potential biases and seeks to control this risk. One way of handling the issue of reliability is to use a *case study protocol*, containing an overview of the case study, data collection procedures, protocol questions and a tentative outline for the case study report (Yin, 2018). In addition, Yin (2018) suggests a case study database, containing all collected data, is established to maintain overview.

Validity

Validity of case studies refers to the soundness of the conclusions. Yin (2018) proposes three facets: *construct validity*, *internal validity* and *external validity*.

Construct validity is about identifying operational measures for the studied concepts. In other words, if a study upholds proper construct validity, it has a sufficient operational set of measuring data, and subjective judgements of the researcher are mitigated. Two ways of handling this issue is (1) to acquire information from multiple sources, and (2) to have key informants review the draft of the study report.

Internal validity concerns causal relationships between events. In example, if the conclusion is that A leads to B, but in reality, B was caused by another event C, the conclusion weakens the internal validity of the study. It is in the analysis phase that internal validity is most affected. Techniques proposed by Yin (2018) to promote internal validity is therefore: (1) pattern matching, (2) explanation building, (3) addressing rival explanations, and (4) using logic models.

External validity deals with whether the study's findings are generalizable beyond the immediate study. This is often pointed out as a limitation of certain qualitative studies. Yin (2018) addresses this by comparing the case study with experiments, from which many scientific theories have emerged, and states that such experiments also vacillate enormously. The challenge for both case studies and experiments, however, remains to distinguish what is relevant and what is not in a jungle of contextual factors and phenomenon characteristics in order to extract what contributes to a better understanding and development of theory. Hence, external validity is a matter of extracting the generalizable elements of a study. To aid this process in single-case studies particularly, Yin (2018) emphasizes the importance of using theory.

4.3 Applying the research method

This section will present and discuss how the case study methodology was applied at the case company DNV GL Oil & Gas. It will follow the six-phase model developed by Yin (2018), which includes *planning*, *design*, *preparation*, *data collection*, *analysis and sharing*. Issues concerning reliability and validity will be discussed in relation to the respective phases.

4.3.1 The planning phase

The summer of 2019, the author was lucky to be student project manager for the DNV GL Summer Project. The project included 27 interviews with DNV GL employees regarding a new service that would affect the organization across all business areas, and these interviews provided the author with valuable learnings about the company. Subsequently, the author spent some time at the DNV GL Headquarters at Høvik while working on a project thesis investigating innovation portfolio selection methods. During this period, 3 exploratory interviews were conducted, as well as a lot of informal meetings and observations in order to probe what may be interesting to examine through the master thesis. After discussing the matter with NTNU supervisor Arild Aspelund, as well as DNV GL Venture Director Kaare Helle, the research question was formed: “*How can DNV GL Oil & Gas facilitate satisfactory market validation activities?*”. These preliminary activities contributed to framing a suitable research question, and therefore enabled further detailed planning and development of a research design.

4.3.2 The design phase

An explanatory study

As the research question asks how market validation activities can be facilitated in an organization, the quest for understanding causality is implied, and the study is thus explanatory. With this in mind, the research question can be split in 3 ways, and is illustrated in Figure 10:

1. Does any organizational or personal factors affect market validation activities at all?
2. If so, do the factors directly or indirectly affect market validation, if so how?
3. Are there any other factors not included in the study that affects market validation, which should be considered?

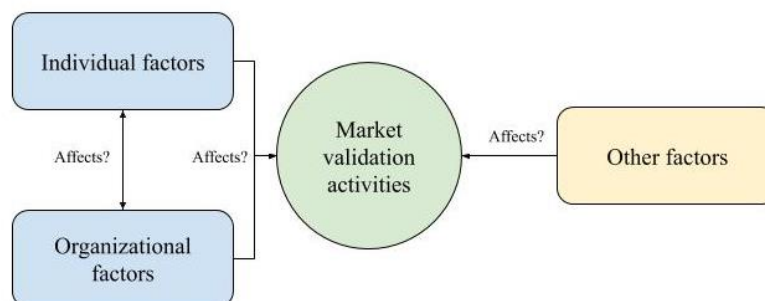


Figure 10: Decomposition of the research question, illustration by the author.

Stating and attempting to answer these questions strengthens the internal validity of the study. Moreover, construct validity is an important ingredient in ensuring that causalities are understood. By defining proper operational measures, and thereby mitigating some of the subjective judgement brought in by the researcher, consistent and reliable findings are more likely to be achieved. As such, the study has been designed to acquire information from a range of sources, which contributes to construct validity. In addition, relevant theory is presented in chapter 2, contributing to external validity (Yin, 2018).

Single-case vs. multiple-case study

The case study could be designed as either a single or multiple case study. The multiple case study would have provided the opportunity of conducting comparative analysis across industries, and therefore useful to derive knowledge from other companies back to DNV GL, as well as increasing external validity by replication logic. However, the author chose to conduct a single case study for two main reasons: First, the author aimed to provide DNV GL with a more detailed and arguably more accurate analysis of the phenomena, as opposed to a general analysis of the industry or DNV GL's practices compared to other businesses. Secondly, the single case study was chosen for pragmatic reasons, as limited time would reduce the amount of sufficient empirical findings in all case companies, limiting the construct validity of the findings.

Interactive research design

Figure 11 presents a model of the research design for this thesis, adapted from Maxwell (2008). The aim has been to produce a coherent research design that depicts the interactive process of qualitative studies. Thus, the model reflects the nature of this study: the activities of collecting and analyzing data, refocusing research questions and modifying theory have been conducted more or less simultaneously. The activities have affected each other, and such processes should therefore be described as interactive as opposed to sequential (Maxwell, 2008).

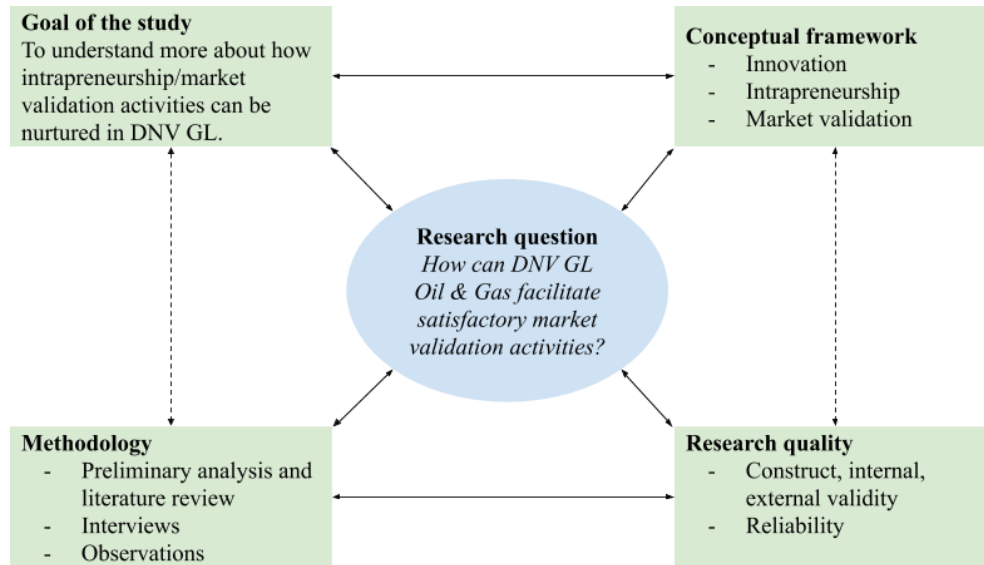


Figure 11: Research design, adapted from Maxwell (2008)

4.3.3 The preparation phase

The main activities of the preparation phase has been to find out how to collect and analyze the data. First, a literature search was initiated to get an overview of the relevant terms, concepts and the theoretical layout of the topic. Secondly, possible interviewees were identified and screened, after which interview guides were developed. The author has focused on semi-structured interviews as the main source of evidence, as the research question investigates *how* market validation can be facilitated. Interviews were thus deemed appropriate for such an explanatory study, in line with the suggestions by Yin (2018).

The literature search

The theoretical framework has mainly been developed iteratively, meaning that it has been developed in parallel with the preliminary analysis, discussions with supervisor Arild Aspelund and interviews with DNV GL employees. It has primarily been conducted through semi-structured literature searches in Oria and Google Scholar, with search terms such as “intrapreneurship”, “feasibility studies”, “customer validation” and “innovative work behavior”. This yielded a range of results, providing a broad basis to understand the phenomena. Through snow-balling (discovering literature in reference lists), a lot of additional relevant literature was discovered. This provided both new perspectives and new search phrases which in turn yielded new streams of literature.

Selection of interviewees

Prior to the interviews, candidates were identified and screened. There was no set requirement for the number of interviewees, and they were chosen using a pragmatic approach based on the research question and what information was unveiled during the process: what needed to be discovered, what is valuable, what has credibility, what could be done with the available time (Patton, 2002). With this approach, interviewees who were likely to provide useful information were selected. Furthermore, a diversity selection criteria was set to gather interviewees from various positions in Oil & Gas, as well as a few from Digital Solutions, Group and Maritime to provide different perspectives (K. Eisenhardt, 1989). As interviewees had varying experience depending on tenure, position and business area, several perspectives on market validation activities were represented. A list of interviewees is provided in Table 2.

A main distinction of two interviewee groups were made, namely *innovation workers* and *technical consultants*. Innovation workers are innovation leads, incubator leaders and other employees whose job is to facilitate innovation. These were assumed to be conscious about how market validation is affected by various factors, and were selected as they were likely to provide explanations to how certain factors are relevant. Technical consultants, on the other hand, are employees with a technical background, often working as consultants directly for customers. These were interviewed because after all, this is the group of employees who are likely to come up with new, technical innovations, and they also represent the main work force of DNV GL. The two groups of interviewees provided the author with valuable insight into both perspectives, which has arguably contributed to better internal validity. In hindsight, however, the author recognizes that the study would better capture the personal preferences of technical consultants if more than 5 were interviewed.

Table 2: Name and role of the selected interviewees.

Name	Role, Business Area	Category	# of interviews
<i>Kaare Helle</i>	Venture Director, O&G	Innovation Worker	2
<i>Ole-Bjørn Ellingsen Moe</i>	Engineer, Materials Advisory, O&G	Technical Consultant	1
<i>Matthew Longman</i>	Head of Digital Frameworks and Tools, Digital Solutions	Innovation Worker	1
<i>Wendy Maria Tan</i>	Manager – Assurance Incubator, O&G	Innovation Worker	1
<i>Nina Rygh</i>	Head of Section Business Processes, Maritime	Innovation Worker	1
<i>Amund Ulfsnes</i>	Principal Consultant – Environmental monitoring, O&G	Technical Consultant	1
<i>John Kristian Norheim Lindøe</i>	Communication manager, Group	Innovation Worker	1
<i>Knut Vedeld</i>	Principal Specialist – Pipeline Technology, O&G	Technical Consultant	1
<i>Christina Høysæter</i>	Innovation Process Manager, Maritime	Innovation Worker	1
<i>Ulf-André Nuth</i>	Portfolio Manager, Group Technology and Research	Innovation Worker	1
<i>Christoffer Grette</i>	Engineer, Pipeline Technology, O&G	Technical Consultant	1
<i>Morten Ro Helsem</i>	Senior Engineer, Materials Advisory, O&G	Technical Consultant	1

Development of the interview guides

To develop the interview guides, the research question was first elaborated with more granular questions. This is in accordance with Yin’s (2014) guide to producing good interview questions – first, a series of questions that needed answering were posed, followed by generation of more unbiased and open-ended questions meant for the interviewee. Some examples of more granular questions in need of answering were:

1. Is lack of entrepreneurial competence a reason for employees not performing market validation? If so, what competence is this a lack of?
2. Are there any cultural/social/structural hurdles that impede the employee from reaching out to the customer?
3. How easy is it to get in touch with customers?

Subsequently, questions for the interviews were produced and structured in one interview guide for innovation workers and one for technical consultants. The one for innovation workers included typically more explicit questions related to what factors affect market validation, while questions to technical consultants were directed to understand their attitudes, motivations and preferred practices when developing a new idea. Furthermore, the interview guides were further elaborated along the course of the study as new topics emerged, and this approach contributed to flexibility in terms of exploring the subject. However, this also means that not all interviewees were asked the same questions, as they would have been if the interviews were more formalized. This may have weakened the internal validity of the study. Nevertheless, this way of working yielded valuable information which may be leveraged in terms of providing good topics and questions if conducting a more formalized approach at a later point in time.

Interview guide extract – technical consultants

1. What is innovation to you?
(To discover eventual discrepancies in how the innovation concept is conceived by employees)
2. Have you ever had an idea that you have either pursued or not?
 - a. Who did you discuss your idea with?
(To discover whether it was speculation behind closed doors or they spoke with customers)
 - b. Did you ever get confirmation of demand, or a commitment from customers?
(To unveil if the consultant validated the market)
 - c. Why?/Why not?
(Investigates whether the employee was conscious of why it happened, as well as providing an explanation as to why or why not they had contact with potential customers)
 - d. How well did you know the market for your idea? Did you get to know the market better along the way?
(Investigates whether the consultant was aware of the market at all)
 - e. How did the structure, formal processes or management support affect how you worked with the idea?
(Investigates organizational factors from the perspective of the consultant)
3. Do you yourself think you have the required competencies to realize an idea as an employee in DNV GL? If so, what competencies?
(Investigates if the employee is conscious about what competencies are required, and if they perceive themselves to possess these competencies)
4. What is important to you if you are to drive your idea forward? In example the one you provided in your example?

(Investigates several factors depending on answer, such as motivation, management support, structure, etc.)

Interview guide extract – innovation workers

1. How would you describe the general intrapreneurial competencies of employees in DNV GL?
(Investigates the intrapreneurial competencies of DNV GL employees seen from an internal perspective)
2. For me as a young, inexperienced employee in DNV GL with an idea: Is it just straight forward for me to pick up the phone and call a customer?
(Investigates potential hurdles for customer contact)
3. Are clear requirements for market validation expressed to the intrapreneur?
(Investigates whether decision makers express how important market validation is to them)
4. Where and how do the intrapreneurs acquire funds to work on their projects?
(Investigates who are decision makers, and what requirements they set to the intrapreneur)

Preparing the data analysis

As a part of the preparation phase, a case study protocol and case study database were established, as recommended by (Yin, 2018). The protocol consisted of a One Drive folder with all procedures, interview guides and other relevant documents for the study. The database was established as an NVivo 12 Pro project, and the author placed effort in understanding the features of this software prior to the data collection in order to better organize the line of inquiry to fit the software capabilities. This significantly increased the reliability, as the author early understood the need for well organized, multiple sources of information if the qualitative analysis was to be reliable.

4.3.4 The data collection phase

In this section, acquisition and sources of the empirical data will be accounted for. Table 3 shows an overview of information sources.

Table 3: Overview of information sources

Source	Number	Description
<i>Semi-structured interviews</i>	13	Interviews of technical consultants and innovation workers in DNV GL
<i>Observation</i>	2	Observation in two sessions in the maritime incubator, as well as informal observations in the working environment at the DNV GL Headquarters.

<i>Documents</i>	4	Annual report 2019, ARC-memo, Innovation Framework 0.2, Vision and Values FAQ 2020
<i>Web</i>	1	DNV GL Intranet, for background information on interviewees.

Interviews

All interviews started with providing the interviewee with information regarding information safety, as recommended by Yin (2018), to ensure that they speak freely without fear of reprimands. They were informed that all collected data would only be stored throughout the duration of the study, and that it would be stored securely and not accessible to any third parties without their consent. They were informed that their name would be mentioned in the study as an interviewee, but not connected to any particular information or quote. Moreover, the issue of secrecy regarding business traits was addressed. Interviewees were informed that secrecy in terms of their contracts with DNV GL would be handled through DNV GLs normal routines for publications. This involves an employee (in this case Venture Director Kaare Helle) to assess and if need be, limit the information which is publicized to the outside world. Finally, the interviewees were asked if they had any objections to being recorded throughout the interview. All interviewees consented to all of the above terms. All interviews except the preliminary ones were conducted online and recorded through Microsoft Teams, as the DNV GL Offices were closed due to Covid-19.

Observation

The author conducted what Yin (2018) denotes as *participation observation*, namely participating in an activity with the aim of studying it from the perspective of an active party. This observation was conducted in a workshop session with a team in the maritime incubator. The author also joined a second session for passive observation, this time to catch eventual details that was difficult to observe as an active participant. These observations were conducted to gain insight into how certain designated innovation teams perform market validation – this has helped the author in defining what “satisfactory market validation” is in DNV GL, hence increasing construct validity. Furthermore, the author has spent many working days in the DNV GL offices the past year, resulting in several informal observations and conversations with employees.

Documents

An important source of information worth mentioning is the “ARC-memo”, a report which was the result of 61 interviews with DNV GL employees in 2017/18. This has contributed to the construct validity of the study, as it has confirmed many of the findings from interviews conducted by the author.

4.3.5 The analysis phase

The analysis phase can impact the internal validity of the study considerably. Hence, it has been important to structure all information as to discover eventual inconsistencies regarding causalities. In particular, the analysis indicated that there is a complex relation between how the organization is rigged, and how this affects the intrapreneurs and how these perform market validation. As such, proper information handling in this phase was paramount. All interviews were transcribed and imported to nVivo, along with all discovered relevant documents. NVivo is a powerful analysis and archival tool suitable for qualitative analysis from various sources. All information that seemed relevant was coded into different themes, which was later refined and re-coded in a second round. NVivo also provides the advantage of search functions and visualizations, which proved useful. Use of such a tool was determining to handle and analyze all the collected information.

4.3.6 The sharing phase

By spending a lot of time in the DNV GL offices, as well as maintaining communication with key innovation workers, facts were quality checked and adjusted along the course of the study. Finally, the draft was presented to a representative from DNV GL for factual quality assurance. This sharing of information has added to construct validity.

4.4 Learnings and improvement potential

In hindsight, the author recognizes that particularly the early interviews could have been better prepared. Although an open attitude towards the line of questioning can enable exploration of unknown aspects, it also leads to lack of conformity in the interviews – and thereby arguably weakening the internal validity as not all interviews can be compared.

Furthermore, the author recognizes that even more care could have been exercised in selecting interviewees. Innovation workers are well represented, and interviewees from other business areas

provide useful perspectives. However, as the study largely revolves around how technical consultants conduct market validation, it would be prudent to include a few more representatives of this group to better understand their attitudes and perceived hurdles for market validation.

Finally, an important note as this thesis is to be shared with other DNV GL employees, is that the number of interviewees does not provide sufficient information to really capture all nuances related to market validation activities. It does not comprise the individual or organizational view from all sections and stakeholders in Oil & Gas. However, it is the author's belief that the findings are valid at some level, and that many are generalizable to other parts of DNV GL as well. An important quality control here has been the ARC-memo, supporting several of the findings from interviews.

In summary, a structured approach to information gathering has proved determining to a sensible and reliable study. The data could always be more extensive and well selected, yet it is found reasonable to assume that the findings are adequately reliable and valid. As relatively new to the format of qualitative studies, the author acknowledges that a certain level of practice and skills are required to become successful in such endeavors.

5 Results

In this chapter, the data collected in the study will be presented. They will follow the same categorization as in the theoretical framework, namely individual and organizational factors which are expected to affect market validation. The presented data will be followed by some relevant quotes from the interviews. All quotes are translated by the author from Norwegian. A summary containing the most interesting findings will be provided at the end of each section. It is worth noting that all 7 innovation workers interviewed confirm lacking market validation as a problem that applies to DNV GL, however they also report improvement in recent years.

Some of the findings refer to the “ARC-memo” which, as noted in chapter 4, is an internal document which resulted from 61 interviews with employees, regarding digital transformation and innovation.

5.1 Individual factors

Individual factors comprise intrapreneurial competencies, motivational factors and personal preferences of the employees that may affect how market validation activities are conducted.

Entrepreneurship courses

The participation of some 1500 employees in the 8 week INSEAD-course “Architecture, Routines and Culture” is referred to by 4 of the interviewees as a big step towards becoming a more innovative company. The course was relatively extensive, and resulted in what interviewees describe as a “good self-assessment” and “very useful”. The course also sparked a larger survey with the aim of assessing how innovation is done in DNV GL. Later, an e-course module was developed for other employees. 4 interviewees further state that the general competence and language for innovation has improved the last 5-8 years.

“So we got an enormously good self-assessment from the top 500 leaders in DNV GL about what affects our ability to innovate. So it’s a gold mine of data [...] and people were like ‘shit, we will not be able to do this’”. – Innovation worker

“In the wake [of the INSEAD course] we did a survey to find out how good we are at innovation. We make stuff based on our own knowledge and take it to market afterwards.”- innovation worker

“We started taking some courses and working with lean and design thinking and that kind of stuff, we took a lot of courses.” – innovation worker

“Now I finally feel we speak the same language. There is no way back here, we see that this is the way you do it.” – innovation worker

Technical case thinking vs. business case thinking

The vast majority of DNV GL workers have an academic background and have their main interests in technical development. Interviewees emphasize the importance of maintaining technical expertise and balancing it with commercial focus, as the DNV GL brand (and success) is built on the notion that their employees provide high-end technical products and services. 4 interviewees, as well as the ARC-memo states that the ability to talk the same technical language of their customers is a competitive advantage. On this note, 51% of existing customers found deep technical expertise to be the most favored attribute, according to the 2018 DNV GL brand survey.

The ARC-memo states that DNV GL has strong domain expertise and industry knowledge, however it also states that this contributes to reducing commercial focus. Likewise, 6 interviewees describe there is a general lack of business case thinking among employees. In addition, all innovation workers stated that market validation has been a problem, but that the conditions have improved in recent years. However, 5 interviewees state that there are considerable individual differences in employee focus on market validation as well as on general commercial thinking.

“DNV GL is quite reliant on account managers and sales people. There is an air gap to the tech savvy people. Therefore, these should learn to talk to customers and be encouraged to do so.” – innovation worker

“When it comes to other kind of stuff like business model stuff, which is kind of “soft”, there is more skepticism around.” – innovation worker

“There are unbelievably many with us that think technology development is very much fun. [...] perhaps too much, right, that the customer is forgotten.” – innovation worker

“I have developed deep domain expertise. It is a means for selling.” - technical consultant

“...we are a very technologically driven and technology strong organization, and that’s also how we have conducted R&D, in which we have a long history...” – innovation worker

“...[the slowing of] our rate of experimentation and testing with customers [...] is further enhanced by our strong technical focus (feasibility), which reduces the commercial focus (both desirability and viability).” – ARC-report

Networking skills are important

Networking skills are identified by 10 interviewees as determining for being able to drive an idea forward in the organization. 5 interviewees also stated that performing market validation through informal personal networks is favorable. Moreover, the fact that DNV GL is rather decentralized, and that employees often have very distinct expertise, further adds complexity to the organizational environment in which the employee must navigate.

“I have a good relationship with [X], it’s easy to talk to him. It’s important to know who to talk to.”
– technical consultant

“...call someone you know, someone you have an informal tone with [...] don’t call a business where you don’t know anyone and you don’t have a good relation with.” – innovation worker

“I had to find the entire way by myself.”
– technical consultant

“You can’t do a cold call [to the customer]. You or your colleague need to have had a project with the customer you are trying to reach. Or the key account manager needs to introduce you. You need a way in. I find that way heavy.” – technical consultant

Motivation

According to the ARC memo, innovation workers seem more motivated by interesting and challenging projects, than monetary rewards (Figure 12). Furthermore, a consistent finding in the ARC memo is that employees have a strong commitment to DNV GL. The interviews with technical experts, as well as the author’s general impression from observing and working in DNV GL, reveal the same findings for technical consultants (Yin, 2018).

“They [the employees] are driven by acquiring new competencies, new technology, by finding new solutions.” – innovation worker

“I did it because it’s fun.” – technical consultant

“There are probably stronger incentives than bonuses. [In example] to have access to resources that others do not, like sparring partners. And I guess it’s that feeling of accomplishing something yourself...” – technical consultant

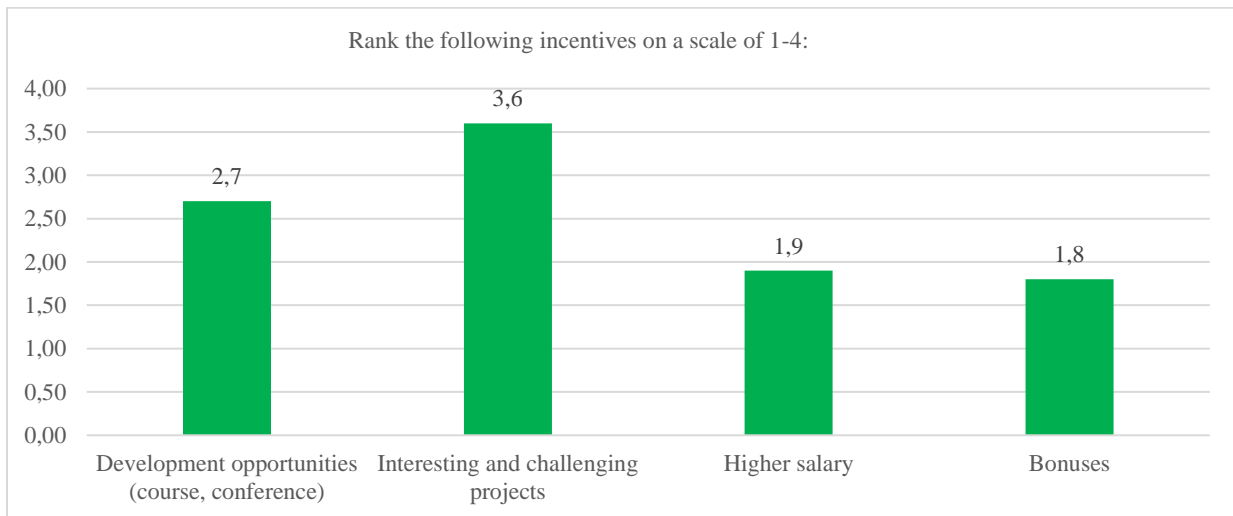


Figure 12: Incentives of innovation workers in DNV GL. Reused from the ARC memo with permission.

Entrepreneurial energy

6 interviewees state that there is ample initiative and abundance of ideas in Oil & Gas. Employees think for themselves and are encouraged to do so. There is also a common conception that DNV GL employees have many opinions, which they often share. The 5 interviewees who were asked the question “Do you think there is ample initiative and abundance of ideas, but the entrepreneurial energy needs to be directed?”, all answered “yes”.

5.1.1 Summary of individual factors

The INSEAD course is often referred to by interviewees as a turning point in terms of innovation focus. There is a high level of technical interest among employees, and a relatively low interest in business case thinking. Interviewees state the importance of balancing the two. Furthermore, networking skills are characterized as important, both for market validation and for building internal support. Finally, employees are motivated by exciting work rather than monetary awards, and there is a perceived high level of entrepreneurial energy and initiative among employees.

5.2 Organizational factors

The organizational level focuses on examining how organizational factors influence entrepreneurial behavior and the effect on company performance.

Key performance indexes gravitate the business away from radical innovations

The various departments, sections and individual employees are measured by a range of KPIs, many of which revolve around number of billable hours. This creates an incentive to allocate efforts towards delivering existing products to customers, as opposed to investing in innovation activities with potential long term wins. Interviewees point to this as a natural paradox for a consultancy business. 5 interviewees perceive key performance indexes (KPIs) as a hurdle for innovative activity in general, including market validation. The ARC-memo has also identified this as a key pain point in the organization, in particular for employees who split their time between innovation and execution.

Furthermore, according to interviews, such KPIs create the incentive that popular technical consultants, for which the customer is willing to pay high rates, is unavailable to internally funded development projects. Internal projects are required to pay a fixed, low price for the required in-house expertise, and are therefore unable to compete with external rates.

“You’re doomed when you work with innovation, as 9 of 10 projects fail. So it looks pretty bad when you measure KPIs.” – innovation worker

“KPIs definitely poses a problem for innovation.” – innovation worker

Key account managers can be perceived as a hurdle for market validation

Important clients have a designated Key Account Manager (KAM), which serves as the client’s main point of contact with DNV GL. Some interviewees state that the KAM may be perceived as a hurdle for an idea owner seeking to validate an idea with customers. Interviewees however also state that this varies with the KAM’s personal preferences, and that some KAMs are open to work experimentally with customers.

“It may often take a lot more time to call the KAM and things often become more formal. You want that informal tone so that you get real feedback and not a formal, conscientious answer [from the customer]” – innovation worker

“The KAM may be a bit annoyed with you if you get directly in touch with their customers.” – innovation worker

“It is expected that if you are to contact a customer, you should inform the KAM. This must not become a hurdle. I guess some idea owners have experienced this when they have talked to customers. [...] [KAMs] think it’s really weird when we say we will experiment with the customer” - innovation worker

5.2.1 Formal controls

Interviewees have varying conceptions of the presence and importance of formal controls. In general, innovation workers promote formal processes, in particular the need for governance of the innovation process. On the other hand, 3 of 5 technical consultants state that bureaucracy and process rigidity associated with formal controls are barriers for them to promote their ideas.

To cope with the managerial issues of innovation activities, in particular market validation, DNV GL Group has during the past 2 years led the work of developing an “Innovation Framework” (Figure 13), which is currently being implemented in some areas of DNV GL. The framework is basically a Stage-Gate system with defined criteria for progressing to the next stage, accompanied with a toolbox of various techniques that the innovator may use in the course of the development. A “Venture Board” of managers and innovation workers guide the idea owners, and decide whether they are to progress to the next stage. The Venture Board also award resources and help with networking. According to innovation workers, the purpose of the framework is to help the innovator follow market validation and innovation best-practices. According to interviews, the Maritime business area has come furthest along with implementing the framework, and so far

reports are that it is reasonably successful. However, some technical consultants also state their skepticism towards the Innovation Framework, claiming that it builds a motivational hurdle.

“I want a coach, not a manager. I feel it’s too much structuring.” – technical consultant

“I experienced it as too bureaucratic.” – technical consultant about a project following the Innovation Framework.

DNV GL innovation framework 0.2 - stage gate model w/ metered funding

	Customer insight	Viability	Proof of concept	Build	Scale	Sustain
Outcome	<ul style="list-style-type: none"> Validated customer problem Ideas connected to strategy 	<ul style="list-style-type: none"> Customer buy-in (time, money, reputation, data) Draft business model 	<ul style="list-style-type: none"> First proof of feasibility Estimated cost of the next phases 	<ul style="list-style-type: none"> Proven business model Clear scaling plan 	<ul style="list-style-type: none"> Clear sustain plan Transfer to line organization 	<ul style="list-style-type: none"> Sustainable business model
Criteria	<ul style="list-style-type: none"> Evidence of the customer problem/opportunity Evidence of strategic fit Accountable idea owner 	<ul style="list-style-type: none"> Evidence of need/intent (the customer wants the solution) Identified Product Owner 	<ul style="list-style-type: none"> Evidence that we can build it Hard evidence that we can sell the solution and customers buy it Evidence of market size 	<ul style="list-style-type: none"> Evidence that we can scale Evidence of ROI or cost savings 	<ul style="list-style-type: none"> Evidence of sustained business model Evidence of favourable market conditions 	
Key activities	<ul style="list-style-type: none"> Map customer personas and journey Define vital assumptions Conduct customer interviews 	<ul style="list-style-type: none"> Define the problem/opportunity Validate core assumptions with customers Build and test simple prototypes Draft the business model canvas 	<ul style="list-style-type: none"> Business model prototyping (incl. draft revenue and cost model) Build and test prototypes Run business experiments with customers 	<ul style="list-style-type: none"> Validate business model (incl. revenue and cost model) Define growth tactics Build MVP Build – measure - learn Determine commercial and technical readiness 	<ul style="list-style-type: none"> Revise growth tactics Marketing and sales campaigns Design operating model Competence and resource planning 	<ul style="list-style-type: none"> Monitor customer satisfaction Product improvements/sustaining innovation/retire Business model exploration
	SG1		SG2	SG3	SG4	SG5

Figure 13: DNV GL's preliminary innovation framework, reused with permission.

5.2.2 Organizational values

DNV GL traditionally has strong organizational values, which have manifested themselves in the actions and attitudes of employees, the perhaps most often mentioned (based on informal observations) being the phrase “we never compromise on quality or integrity”. However, these values have recently been changed as of 2020, see Table 4. There were several reasons for this change, but according to the internal document “The Vision and Values FAQ 2020”, one reason was to check whether the old values still resonated with employees, and another was to assess if something was needed to make DNV GL more “future proof”. Interviews did not cover the reactions to these changes. However, the implementation of the new values have been clearly visible through top management communication.

Table 4: Values of DNV GL - previous and current.

Previous values

We build trust and confidence
We never compromise on quality or integrity
We are committed to teamwork and innovation
We care for our customers and each other
We embrace change and deliver results

Current values

We care for each other, our customers, our planet, and we take care of ourselves.
We dare to explore, to experiment, to be different, and to be courageous, curious and creative.
We share our experience and knowledge. We collaborate with each other and our customers, and we continue to grow and develop as a result.

5.2.3 Environmental scanning

As is the nature of being a competence based consultancy service provider, DNV GL has close, continuous contact with customers. Hence, the company is up to date on what customers perceive as the greatest challenges, and current trends are well known to consultants. Interviewees state that the environmental scanning by DNV GL most often result in incremental innovations, and that it is a welcomed and natural driver of such innovation. Furthermore, DNV GL also publishes various extensive reports on current trends, challenges and solutions in several industries, including the oil & gas industry. One reason for this is to signal to the market that DNV GL is a high-end provider which is at the forefront of technological and environmental trends. In conclusion, DNV GL benefits well from being a consultancy service provider with close contact with the industry, and it is a natural part of their strategy.

5.2.4 Summary of organizational factors

KPIs gravitating the business away from innovation activities, as well as the reluctance of some key account managers to support market validation activities with customers, are both perceived as hurdles for market validation. In an effort to cope with the challenges, DNV GL is developing an Innovation Framework together with an innovation toolbox and a Venture Board, which addresses certain issues such as lack of portfolio governance, dependence on networks, guidance of intrapreneurs, etc. The change of values can be seen as an effort to nurture the intrapreneurial mindset of the work force. Finally, environmental scanning is a natural process for a consultancy firm, and thus supports market validation.

6 Discussion

There is a variety of factors affecting market validation in a company, and there is no obvious best strategy for a large organization to facilitate such activities. Strangely enough, scholars state that there is relatively little research focusing on business effects of the individual level in intrapreneurship (Amundsen et al., 2011; Blanka, 2019; Åmo, 2006). This is interesting, as most theory supports notion that employees are central in successful intrapreneurship. It is, after all, the employees that perform innovation – not the company itself (Strømsvåg & Osmundsen, 2017). Consequently, one would expect more research focus on individual antecedents, as well as their interconnection with organizational factors.

As an attempt to bridge some of this gap, this study has taken point of departure in the role of the employee, as well as the implications for management. Findings of this study indicate that individual and organizational factors are interconnected, and that one can rarely consider just one factor in isolation. Hence, understanding how market validation activities can be facilitated requires a holistic view, comprising both the individual and the organizational aspects. The theoretical framework (Figure 14) is intended to illustrate this interconnection. It shows how organizational factors affect the intrapreneur both directly, through in example formal controls, and indirectly, through affecting the individual factors.

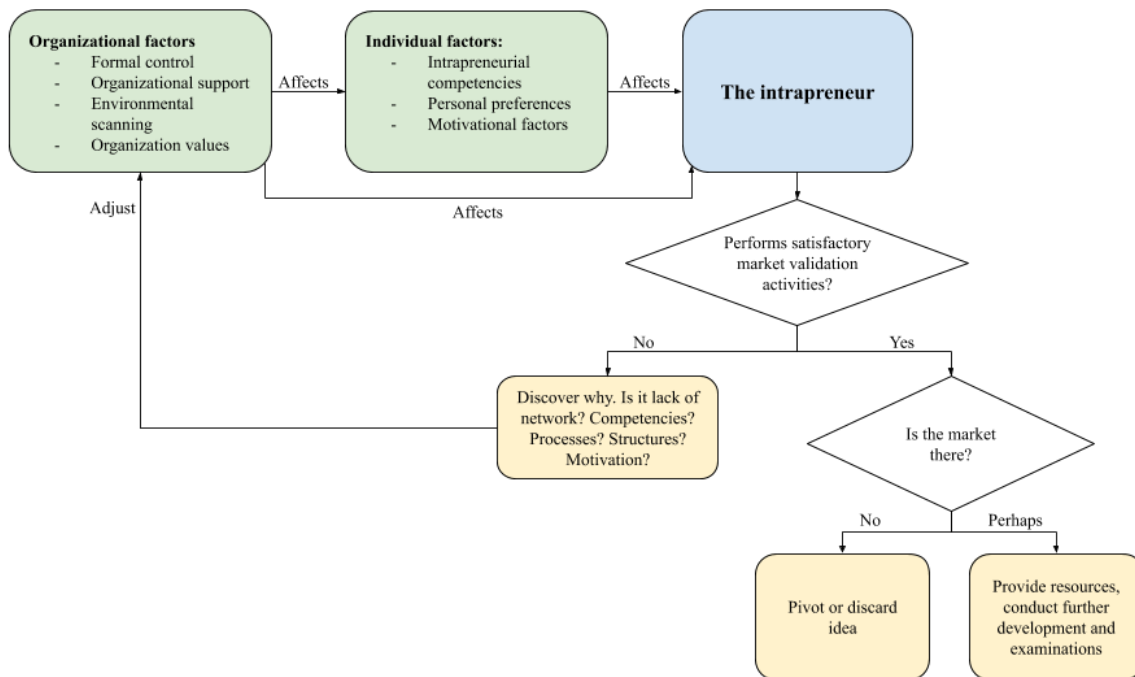


Figure 14: The theoretical framework, as presented in Chapter 2.

This chapter begins by discussing how intrapreneurial competencies can be seen as a driver of market validation. Subsequently, some organizational factors will be discussed, along with how these interact with individual factors, and how market validation activities consequently may be facilitated. In addition, the importance and power of KPIs will be considered. Finally, the chapter ends with a summary of the discussion and managerial recommendations for Oil & Gas.

6.1 Intrapreneurial competencies as a driver for market validation

Findings of this study indicate that the general level of intrapreneurial competencies of employees in Oil & Gas is low, but that it has improved significantly through the past 5-8 years. Particularly, the INSEAD entrepreneurship course, involving some 1500 participants, seems to have created a sense of urgency and a willingness to adopt new innovation practices. This demonstrates the importance of intrapreneurial competencies as a determinant, and possibly a *driver*, for successful innovation and market validation. As such, an interesting view on market validation emerges, through the *individual level* of intrapreneurship. This level focuses on human capital, and the notion that employees are central in successful corporate innovation (Blanka, 2019). The view is also represented on the organizational level by the factor *organizational support*, which endorses the value of trusting and training the employee to identify opportunities and perform intrapreneurial activities on their own initiative (Stevenson & Jarillo, 2007).

As the majority of DNV GL employees are characterized as being independent and resourceful, and because entrepreneurship courses have proven successful in the past, there may be much to gain by increasing efforts in raising employee intrapreneurial competencies. This is also supported by A. R. Cohen (2002), who states that innovation in organizations are often driven by people with both technical expertise *and* sufficient market knowledge to estimate potential demand. Such a strategy of training and trusting employees to make their own choices would coincide with the implementation strategy which is already chosen for the Innovation Framework: Through proving to employees that it actually makes the user more successful, the aim is that the user will perform market validation on their own initiative. Moreover, this would perhaps also correspond well with the knowledge worker's general ability to trust facts and figures.

6.1.1 Key account managers as market validation champions

In the work of increasing intrapreneurial competencies, the Key Account Managers (KAMs) could be a sensible group to start with. The findings of this study indicate that some KAMs may represent

hurdles for informal market validation with customers, and that the KAM's individual preferences and characteristics sometimes determine whether they are likely to support the intrapreneur in contacting customers. The phrase "Experimenting with customers" does not resonate well with all KAMs, according to interviewees. Given the extensive power the KAM has as gatekeeper, changing this trend could be beneficial for market validation. By increasing their intrapreneurial competencies, and thereby their understanding of the importance of market validation, the KAM could turn into the champion of market validation, and key player in the further nurturing of the intrapreneurial spirit in Oil & Gas.

6.1.2 The importance of networks

While general theoretical knowledge about market validation might be acquirable relatively easily, certain skills may require more time and training. Findings of the study indicate that *networking skills* stand out as particularly important to market validation in Oil & Gas. It is important to know the right people and leverage on social capital in order to get in touch with potential customers in the desired, informal way which yields the honest and direct answers. Such skills, as well as a wide network, takes time to develop. This need for networks may have both positive and negative effects for Oil & Gas. On the positive side, the fact that employees typically have high tenure can mean that they also have a wide network on which they can leverage. As experienced consultants have worked for many customers, they may have acquired strong professional relations, which eases informal market validation. On the other hand, findings of the study indicates that such reliance on networks may pose a challenge for younger professionals. This is worth noting, because general labor turnover in society is increasing, and the intrapreneur's personal network will arguably become a less reliable source of customers for informal market validation in the future. Assuming this trend will grow, one may call for a more structured approach to securing that the absence of networks does not impede satisfactory market validation. This takes us to the next topic – how formal controls can be leveraged to mitigate the effect of some missing links and catch what intrapreneurial competencies do not.

6.2 Organizational control vs. intrapreneurial competencies

Findings indicate that entrepreneurial courses can only take the organization so far, and that the challenge of actually implementing the right variant of the desired innovation practices remains. Hence, it is reasonable to expect a shift in focus from the general corporate innovation syllabus,

towards organizational change – which calls for a complementary set of capabilities, namely change management. Findings of the study indicate that DNV GL is currently doing just that, through various initiatives, but the perhaps most prominent being the development of the Innovation Framework.

The Innovation Framework (Figure 13) can be seen as the very symbol of DNV GL's efforts to increase innovation success, and is therefore of particular interest. It is based on a Stage-Gate system, where a Venture board of stakeholders and innovation workers make the Go/Kill gate decisions, and guide idea owners through the innovation process. It is also accompanied by a toolbox of various selected market validation techniques that the employees are urged to use. Hence, the Innovation Framework can be described as consisting of three main components: the Stage-Gate structure, the Venture Board and the toolbox.

As stated in Section 3, there are two poles of product development strategies when it comes to market validation. On one hand, methodologies such as the lean startup represent the fluid, iterative methods in which it is appreciated to head on and fail fast. On the other hand, there is the more rigid Stage-Gate system, with Go/Kill decisions, a higher level of formal control, and a more conservative way of looking at risk. Despite their differences, they both have the same goal, which is to efficiently develop new products (DelVecchio et al., 2013).

The advantage of the lean startup is that it allows the intrapreneur to focus almost solely on testing and learning about the core assumptions of an idea. The point is that the learning itself drives informed choices along the way, as a strategy for avoiding costly mistakes. There are, however, at least two issues with this flexibility: It requires a certain level of (1) *intrapreneurial competency*, and (2) *accountability*. As for the former, methodologies such as the lean startup greatly rely on the intrapreneur's own ability to assess the acquired information and turn it into learning. There are several fall pits related to testing assumptions in a market, and satisfactory market validation hence requires a certain level of skill (Fitzpatrick, 2013). Findings of this study indicate that the majority of the general work force in Oil & Gas does not possess the entrepreneurial skills required for relying solely on lean startup based approaches. As for *accountability*, the lean startup methodology originates from the startup environment, and in many ways it can be seen as intended for the bootstrapped entrepreneur. Reducing waste of already scarce resources is obviously important to the financially accountable entrepreneur, while it is not necessarily as important to

intrapreneurs with fixed salaries. Hence, apparent lack of entrepreneurial competencies in the DNV GL workforce, and the lack of accountability for intrapreneurs in general may limit the power of lean startup-inspired market validation methodologies for use in Oil & Gas.

Conversely, the above may serve as arguments to implement a more formal way of control, such as the Stage-Gate system. It was designed for corporations to spend less money, through imposing more objective Go/Kill decisions (DelVecchio et al., 2013). Such systems dominate the corporate world, and is by many seen as an important means of handling innovation portfolios in large organizations. In particular, it may catch failing projects at an earlier point, and it may contribute to make the intrapreneur more accountable for the project's progress.

However, the author sees at least three issues with this Stage-Gate model in the case of Oil & Gas. First, as findings of this study indicate, it may be perceived as too bureaucratic and cumbersome, resulting in fewer ideas being brought forward. This is supported by Bessant, Öberg, and Trifilova (2014), who mention the risk of creating an organizational “immune system” which rejects particularly radical ideas and results in an “not invented here”-effect. Secondly, firms in general typically find it challenging to cope with the balance of rigidity and discipline vs. flexibility and adaptability (O'Connor, 1994). Finally, the Stage-Gate system in itself is critiqued for not including satisfactory market validation (DelVecchio et al., 2013). This concurs with observations in the study, which indicates that the desired way of performing market validation in DNV GL is closer to the lean startup approach than the more rigid, sequential nature of a Stage-Gate system.

Based on the above, the author stipulates that in an ideal world, the intrapreneurial competencies and accountability of employees were so high that they themselves would pivot their ideas in the right directions, and that formal controls such as the Stage-Gate system would be redundant. This is, however, hardly the situation in any large firm due to a number of reasons. As such, the right type and amount of formal control can be determining to market validation and innovation success, as argued by scholars (R. Cooper, Edgett, & Kleinschmidt, 2002; DelVecchio et al., 2013; Henriksen & Traynor, 1999; Meifort, 2016). This raises the question:

What is the connection between the level of formal control and level of intrapreneurial competencies?

Given the logic of “a perfect world” mentioned above, a higher level of intrapreneurial competence would constitute a correspondingly lower level of formal controls, and vice versa, for satisfactory

market validation to take place. In the case of Oil & Gas, if *competence* is low, the Stage-Gate system, a Venture Board or an innovation toolbox would guide the employee in the right direction. If *formal control* is low, as it has been until recently, a correspondingly high level of intrapreneurial competence is required to conduct the same quality of market validation. Hence, it may be argued that the two can be viewed as being inversely proportional to one another, as illustrated in Figure 15. Furthermore, one may also argue that some minimum level of formal controls are necessary for other purposes than market validation, such as portfolio governance, prioritization of projects, and so forth. And, as already mentioned, a minimum of intrapreneurial competencies would also be necessary as the employees need certain skills to perform market validation. These two parameters and limitations thus form a “tolerance range” in which a company should be positioned if satisfactory market validation is to take place.

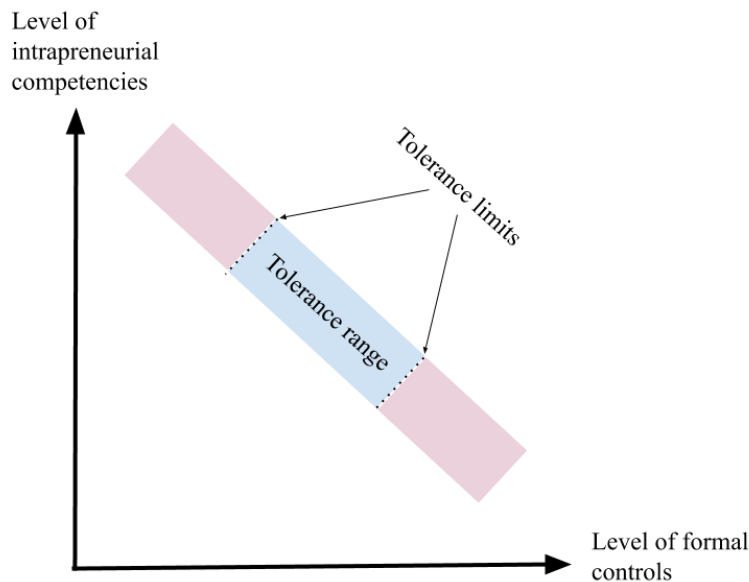


Figure 15: The possible connection between level of intrapreneurial competencies and level of formal controls. By the author.

In summary, in order to facilitate market validation, one needs to continually balance the need for formal controls according to the level of intrapreneurial competencies and employee accountability. For DNV GL, this means that as competencies increase, some formal control may be softened, and employees may be allowed to operate more freely with the trust of the employer. The Innovation Framework may seem a sensible way to go about this, as it is a sort of hybrid Stage-Gate/lean approach, which addresses many of the current challenges. In particular, it increases accountability

and intrapreneurial competencies, which are important to achieve more satisfactory market validation.

6.3 KPIs gravitating the business towards short term wins

Finally, the structural hurdle represented by the Key Performance Indicators (KPIs) deserves some consideration. It may not specifically affect market validation, however it is certainly found to affect innovation in general. Several interviewees, as well as the ARC-memo, state that success is often measured in “the wrong way”, and that KPIs gravitate the business away from innovation activities and towards short term sales. This issue is part of a much larger, often recurring topic in research which is denoted the *paradox of exploitation and exploration* (De Wit & Meyer, 2010). This paradox revolves around the desire to exploit already successful business models and products, and at the same time explore markets, technology and business models to catch the next wave. The two desires are thus often in conflict, and challenging to balance.

Ambidexterity refers to the ability of an organization to both explore and exploit, and the aim is thus to make DNV GL more *ambidextrous* (O'Reilly III & Tushman, 2013). KPIs are seen as one way of promoting ambidexterity. However, early phase innovation is particularly hard to measure, because its value may be unknown or very uncertain, and often connected to some point in the future. Therefore, Bot (2012) suggests using *predictive indicators* as innovation KPIs, meaning indicators which have statistically been found to predict desired outcomes. Examples can be measuring the number of ideas entered into a development funnel, or the number of experiments conducted in a market validation process. Indeed, KPIs greatly affect how the organization seeks to achieve its objectives, and the findings of this study indicate that efforts in creating KPIs which help balance this paradox will be worthwhile.

6.4 Managerial recommendations

Based on the above presented results and discussion, the following recommendations are provided:

- **Oil & Gas should allocate resources for increasing intrapreneurial competencies.**

This is the single factor which arguably affects market validation activities the most. By increasing competencies, employees are expected to adopt a more intrapreneurial way of thinking. Ways of increasing intrapreneurial competencies can be entrepreneurship courses, new hires and using experienced intrapreneurs as mentors. Starting with increasing intrapreneurial competencies of key account managers may provide considerable benefits.

- **Oil & Gas should continue to follow up on the implementation of the Innovation Framework.**

Refining the framework to fit the organization may be determining to its acceptance and success. The framework appears as a means of both maintaining portfolio governance and reducing costly failures, but arguably equally important as a learning tool for innovation and as a common reference for precise communication. Furthermore, it can prove useful for mitigating the negative effects of lacking personal networks.

- **Oil & Gas should continually assess the balance between formal controls and operational freedom.**

As competencies increase and innovation culture is nurtured, there may be potential in reducing the presence of rigid innovation systems and trust employees to make their own decisions. This is dependent on the general level of intrapreneurial competencies and intrapreneur accountability.

- **Oil & Gas should allocate efforts in adjusting their KPIs.**

To better handle the balance between innovation and execution, well-engineered KPIs may be powerful. As innovation may be hard to measure directly, *predictive indicators* may prove useful to measure innovation efforts.

6.5 Limitations and further research

This study has some limitations as well as potential for further research. First, the fact that it is a single-case study, as opposed to a multi-case study, reduces its generalizability to other companies. Secondly, DNV GL Oil & Gas is a highly diverse organization, in terms of technical domains, markets, geography, etc. The fact that all interviewees work at the DNV GL Headquarters in Oslo may therefore result in a narrow view of the company which does not reflect all the nuances that probably exist. Thirdly, as the company has only been investigated over the course of a few months, the interviewees can be biased by the situation they are currently in (Covid-19, poor market conditions, etc.), which may have affected their answers. Moreover, as changes in innovation processes is currently under implementation, it is hard to capture the effects of these changes in this study.

This thesis may have provided some useful insight which can be leveraged when developing further studies. In particular, studies which investigate the attitudes, motivation and personal preferences of the work force more closely can further help indicate how certain organizational parameters should be tweaked. Both this thesis and the ARC-memo are based mostly on information from innovation workers and managers, which motivates for further efforts towards understanding the perspective of technical consultants. More research should also be done on the effects on market validation of various specific intrapreneurial competencies, as well as how these can best be taught to the work force.

7 Conclusion

This study has investigated market validation in Oil & Gas through the research question:

How can DNV GL Oil & Gas facilitate satisfactory market validation activities?

The findings of the study indicate that intrapreneurial competencies are a key driver for market validation, in particular because DNV GL is a knowledge based organization with autonomous and highly competent employees. Professional networks and networking skills emerge as particularly important. A starting point for increasing intrapreneurial competencies can be the Key Account Managers, who have great power as gatekeepers towards customers, and can contribute by becoming promoters for market validation.

Intrapreneurial competencies should however be balanced with the right type and amount of formal control, and the two seem to be complementary. Formal processes and structures can reduce the need for a professional network, reduce the risk of costly failures, and increase intrapreneur accountability. Such controls can however often be associated with unnecessary bureaucracy, which implies that they must be carefully implemented and adjusted.

8 References

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