

# Technologies on travel

*What promote/hamper transfer of risk governance systems from Norway to Uganda?*

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## Abstract

Several less industrialized countries lack prioritization in terms of safety and security in operations. This can, in the worst-case scenario, result in major accidents or disasters. Technology transfer between countries is seen as an opportunity to construct more robust systems. However, technology transfer is a complex task, and it is not possible to transfer the whole “technology package”.

This study is based on the idea that transfer of technologies from industrialized countries can be used as a tool to create robust risk governance systems in developing countries. Norway has over forty years of experience in the petroleum industry, with well-functioning systems and an emphasis on safety. The Norwegian Government has initiated a program aiming to share this experience with developing countries. Uganda is used as case for this study, as they are one of the receivers of the program, and soon starting petroleum production. The research problem is *“What promote/hamper the transfer of risk governance systems from the Norwegian petroleum sector to Uganda?”*

Technology transfer is presented through the iceberg model, illustrating the difficulties with transferring technology due to actors’ understandings and deeply integrated underlying conditions. Following, the risk governance system in its social construction is portrayed. These theories make the basis for the interpretation of the collected data.

The data is gathered based on a qualitative method. The main data is collected through interviews with key actors involved in the cooperation and actors in the Ugandan petroleum industry. A five-week fieldwork was conducted in Uganda, including three days of observation in the oil fields. Literature study, social media and informal talks were conducted to gain a more in-depth understanding.

In order to identify the parameters hampering or promoting the transfer, the data is analyzed through three research questions. These questions emphasize the actors focus areas within transfer of risk governance systems from Norway to Uganda. Furthermore, a study on the impact the present capacity can have on implementation of new technology, and in what way trust is present in the Ugandan risk governance system.

Through this study, four central parameters are found to promote and/or hamper the transfer of risk governance systems. The findings are not divided into “hamper” and “promotes” as the outcomes are dependent on the conditions, and could be both hampering and promoting the transfer.

The promoting and/or hampering parameters found are “*interplay*” and “*characteristics*” among the involved actors in the transfer process, “*time*” and “*preconditions*” in the system. The *interplay* among involved actors highlights the importance of understanding the different actors involved, their background and local context. It is important with *inclusion and involvement* between and within all levels. *Characteristics* of the actors involved are reflected through *motivation, willingness* and *knowledge* and will affect the transfer process. *Time* prioritized to increase capacity in the system promotes the transfer process, if prioritized and used correctly, in accordance to the “receivers” local context. The *preconditions* present in the receiving country will shape how the elements need to be contextualized to their local context. The preconditions can challenge the *capacity* if there is a lack of *know-why* understanding of these preconditions and the transferred elements.

## Preface

This thesis work is handed in as partial fulfillment for MSc degrees in *Risk Management and Societal Safety*, and *Change Management*, at University of Stavanger, Norway. The work with the thesis is stipulated to be twenty weeks, or one semesters load.

The last six months, while writing this paper, has included hard work, a lot of laughter, talks with enthusiastic people, and a steep learning curve. Writing two students together has exclusively been a positive experience. Being able to discuss, and trigger ideas and thoughts has made this an interesting and exciting process, with many discussions going way off track. As our thesis is based around fieldwork in Africa, it was also beneficial with a travelling partner in such a different culture.

We chose to write across two different courses. It was valuable to have different academic backgrounds and foundations. This is due to using a risk management and societal safety topic, seen from an organizational point of view.

It has been extra rewarding to write this thesis due to the assistance, interest and help we have received from our informants – thank you. We will always remember the fieldwork and the people we met along the way.

A special thank to Professor Odd Einar Olsen, for always accepting us into his office with enthusiasm, impressive stories and constructive supervision. You have challenged our thoughts, and encouraged independent choices. We want to thank Professor Ole Andreas Engen, for including us in the project “*Robust Regulatory Regimes. Defenses against Major Accident?*”, financially supported through NFR Program Petromax II. We would also like to thank everyone that has helped us unwind: the “Stavanger family”, volleyball lunch friends, classmates, and the mountains, wind and waves.

We hope this thesis generates some thoughts towards creating more robust systems, and share knowledge across borders in order to improve the position of developing countries.

*“You cannot still the waves, but you can learn how to surf”.*

Ida Øwre Lundby

Oda Cecilie Nareid Omre

*Stavanger, 10th June, 2014*

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## List of abbreviations

HSE	Health, Safety and Environment
MEMD	Ministry of Energy and Mineral Development
NGO	Non-Governmental Organization
NMPE	Norwegian Ministry of Petroleum and Energy
NOC	National Oil Company
NORAD	Norwegian Agency for Development Cooperation
NPD	Norwegian Petroleum Directorate
NPSA	Norwegian Petroleum Safety Authority
OfD	Oil for Development
PA	Petroleum Authority
PD	Petroleum Directorate
PEPD	Petroleum Exploration and Production Department
PSA	Product Sharing Agreement
RNNP	Risk level for Norwegian Petroleum Activity

# 1. Introduction

International requirements for safe operations provide motivation and drive for the idea of transfer technologies. International standards and procedures are required in all industries in order to compete in the international market, and in order to minimize the possibilities for major accidents. There is, however, a lack of focus on safety and security in operations in several less industrialized countries (Khan, 2013).

This year on May 13<sup>th</sup>, a coal mine exploded and caused a fire that killed over 450 workers in Turkey. Turkey has not agreed to the International Labor organization's Safety and Health in Mines Convention, and is just one example of less industrialized countries not adopting international standards (Gloystein, 2014). One of the lessons to be learned from this disaster is that standards need to be integrated into a local context (Henderson, 2014). Technology transfer provides an opportunity to improve the robustness and safety focus in a complex technological activity.

The potential in technology transfer for development of emerging societies can hardly be overstated. This type of transfer is in focus at universities, international companies, and aid organizations. A lot of research is conducted on the topic, not only to improve technologies, but also to use the technology to prevent disasters and to create technological capacity in organizations and society as a whole.

Since technology transfer was introduced as a term, the concept has been heavily debated. Whenever technology is taken to new and vulnerable areas, or is transferred to other cultures and regimes, one should expect that risks will appear in new forms (Olsen & Lindøe, 2009). Moreover, a simply ratification of international standards will not reduce the likelihood of undesired events. These standards need to be understood, and the capacity in the new context needs to be able to adapt these requirements. Therefore, this study seeks to address the importance of the transfer process and the underlying interactions that shapes the process.

Knowledge transfer, technology transfer and capacity development are important terms that must be defined and understood. Knowledge transfer is a part of technology transfer. Knowledge is one part of technology, while technology also involves other aspects, which will

be explained later in the theoretical section. Technology transfer is a tool within the capacity development process. Capacity development is a process that supports organizations to identify and to find solutions to its own challenges.

## **1.1 Background for choice of topic**

The petroleum industry involves highly technological systems, and it is a vulnerable sector, as experienced through the years. Mumbai High North (2005), Hebei Spirit oil spill (2007) and Deepwater Horizon explosion (2010) are just few examples of accidents from this century that display the vulnerability within complex technological systems. It causes danger to humans, environment, economies and the society. Complex technological systems operate in a dynamic environment and risk governance is a complex task, which must be considered at numerous levels in the society (Rasmussen, 1997).

On the Norwegian Continental Shelf there is a strong focus on health, safety and environment (HSE) management (Engen et al., 2013). The risk governance system in the Norwegian petroleum industry is known for its focus on safe operations. The system is created and customized to the Norwegian culture and social environment, which is characterized by the cooperation between the industry, unions and the government, and is based on trust and transparency (Lindøe, Baram, & Renn, 2014). This experience with HSE management gives an opportunity to share a well-functioning system.

The Oil for Development (OfD) program, operated by Norad is based on this idea. The Norwegian Government introduced the program aiming to assist and support countries entering the petroleum industry. Uganda is one of the countries included in this program and the current cooperation with Norway started in July 2009. This OfD program is the first using a structure built on three pillars: environment, revenue and resources. The HSE activity is included in the OfD program is a tool in the resource pillar. The purpose of the new program is “*to put in place institutional arrangements and capacities to ensure well-coordinated and results oriented Resource management, Revenue management, Environmental management and HSE management in the oil and gas sector in order to contribute to the achievement of the objectives of the National Oil and Gas Policy*” (MEMD, 2010).

Uganda is a particular interesting country. Lack of energy and electricity has been, and still is, a major obstacle to industrial development in the country (Brandal, 2013). The country will now venture into petroleum activities and it seems to have a great opportunity for development. In light of this, the cooperation and creation of robust risk governance system is therefore interesting to study.

## **1.2 Relevant research within the topic**

Large amount of research is completed on the topic for this thesis. Olsen and Lindøe (2009) argue that the main challenge with technology transfer is in the adjustments required to make the technology work in other contexts, and the effects are largely unknown. In Olsen (1996) similar arguments are forwarded and the challenges with technology being a social construction and tacit knowledge is highlighted. This point of view is the basis for the iceberg model discussed later.

Technology transfer is a broad discipline. In recent years, it has appeared in job titles and firms dealing exclusively with transfer of technology (Argote & Ingram, 2000; Branstad, 2009). Moreover, International Journal of Technology Transfer and Commercialisation (InderScience Publishers, 2014), and The Journal of Technology Transfer (Siegel, Bozeman, & Mosey, 2014) are examples of journals that have been dedicated to this topic. The term is widely used in recent publications (Hoekman & Javorcik, 2006). The topic is discussed both in theoretical settings and in international politics.

The first to highlight the importance of international technology transfer was by the United Nations Secretary General. In 1961, he mentioned the use of international technology transfer as a tool to assist developing countries (Sampath & Roffe, 2012). This initiated the technology transfer trend and numerous theoretical aspects are developed since. Røvik (2007) developed a knowledge transfer model outlining an idea of knowledge transfer through a standardized process. Normally there is resistance to change and Jacobsen (2004) discuss how this will affect the transfer process and how it can be managed. Several researchers have studied why some organizations are better at learning than others (Argote & Epple, 1990; Edmondson, Pisano, Bohmer, & Winsow, 2003). Other researchers measures the importance of culture in the change processes (Alvesson & Sveningsson, 2008).

Clarke (2012), Eggen and Roland (2014), Olsen (1996) and Nygaard (1987) has studied technology transfer as development aid. However, the conclusions differ. Eggen and Roland (2014) emphasize the need for industrial countries to be more humble and to end being paternal towards the developing countries. Focus of development aid is currently on activities that reconstruct government, culture, institutions and political systems, and it is not focusing on smaller achievable tasks (Eggen & Roland, 2014). Clarke (2012) describes different cultures and the learning aspect as the main problems with technology transfer and capacity building.

Hardin (2002) writes about trust in relation to the public life and politics. He argues that trust is crucial in a system, both in terms of formation and maintenance. Olsen (2008), Earle (2010) and Kerkhof, Winder, and Klandermans (2003) have studied trust and its relevance to risk and risk management. Singh and Premarajan (2007) have studied trust in light of knowledge transfer. Therefore, we study trust as a precondition in the Norwegian risk governance system, and thereby a part of the technology transfer.

“Risk Governance of Offshore Oil and Gas Operations” edited by Lindøe et al. (2014) covers the risk regulations and safety management in US, UK and Norway. The Norwegian risk governance system is thoroughly analyzed. The report “Tilsynsstrategi og HMS-regelverk i Norsk Petroleumsvirksomhet” (Engen et al., 2013), presents and discuss the risk governance in the Norwegian petroleum industry.

Further research on this topic is being undertaken at the University of Stavanger, Norway in the project “*Robust Regulatory Regimes. Defenses against Major Accidents?*”. The focus of the research is on the risk governance systems in Norway, UK and US. These are well-established and well-functioning regulatory systems. Their results show that all systems are highly integrated into their local context. Hence, it is interesting to study the effects of transferring a Norwegian risk governance system to a developing country, like Uganda.

### **1.3 Research purpose and problem**

It seems clear that technology transfer is of great importance in today's operations, to ensure robust systems. The Norwegian risk governance system is complex and strongly integrated into the Norwegian petroleum industry. Transfer of risk governance systems is not expected to be a simple task. The purpose of this study is to discover and describe how risk governance systems can be shared between different contexts, and to identify what parameters will affect this transfer.

We define the following research problem:

*“What promote/hamper the transfer of risk governance systems from the Norwegian petroleum sector to Uganda?”*

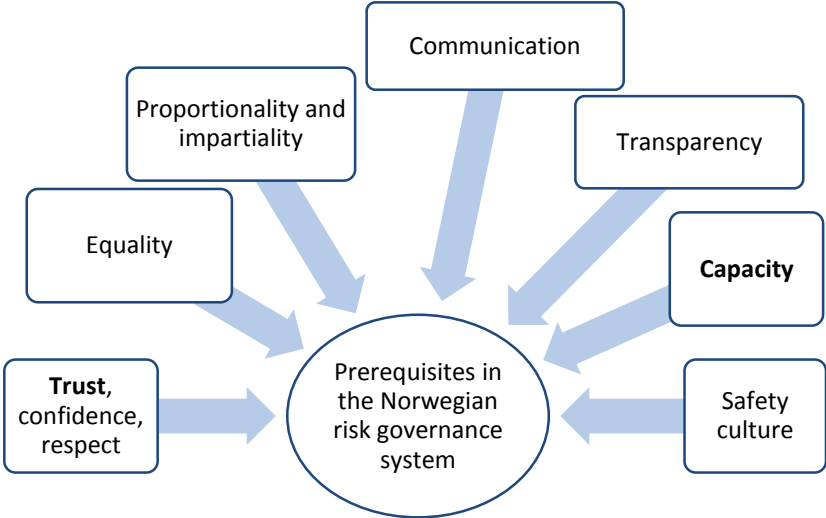
Focus is on the risk governance system in the Norwegian petroleum industry and in the Ugandan petroleum industry. By studying these systems, we will identify what promote and/or hamper the transfer of well-established risk governance systems in an industrialized country to a developing country.

### **1.4 Limitations**

The topic for this study is complex and comprehensive. There are several parameters that possibly will promote and/or hamper the transfer of risk governance systems. Some limitations are therefore necessary. The study is limited to the OfD cooperation between Norway and Uganda, and this project is used as a case (Blaikie, 2010).

We will only consider technology transfer, in terms of transfer of risk governance systems, in the OfD program. Moreover, only the transfer in terms of HSE management will be studied. This captures only some parameters that hamper and/or promote the transfer. The terms promote and/or hamper covers parameters that affects the possibility to create a robust risk governance system through a transfer.

Some conditions are perceived as a requirement for the Norwegian risk governance system and these must be considered when transferring the system (Lindøe et al., 2014).



**Figure 1: Prerequisites in the Norwegian risk governance system**

There are several prerequisites needed to make the Norwegian risk governance system function. These are presented in Figure 1. This study has limited the focus on two of the prerequisites: capacity and trust. Capacity development is seen as the key factor for technology transfer to developing countries. Therefore, we consider capacity as a natural focus. Trust among involved parties is a main characteristic of the Norwegian risk governance system. This justifies our focus on trust.

Lastly, the study is limited to include the changes that have occurred in the past. This includes actors’ focus in the transfer process, the precautions taken and the present status regarding capacity and trust. Uganda has still four years left before production starts, and is therefore still in a planning process. The effect the technology transfer will have after production starts is not being speculated in.

Further limitations and explanations of key terms are discussed in the theoretical section in chapter three. Limitation regarding data collection and framing through design will be explained in the design and methodology section in chapter four.

# 1.5 Structure

Figure 2 displays an outline of the components of this study.

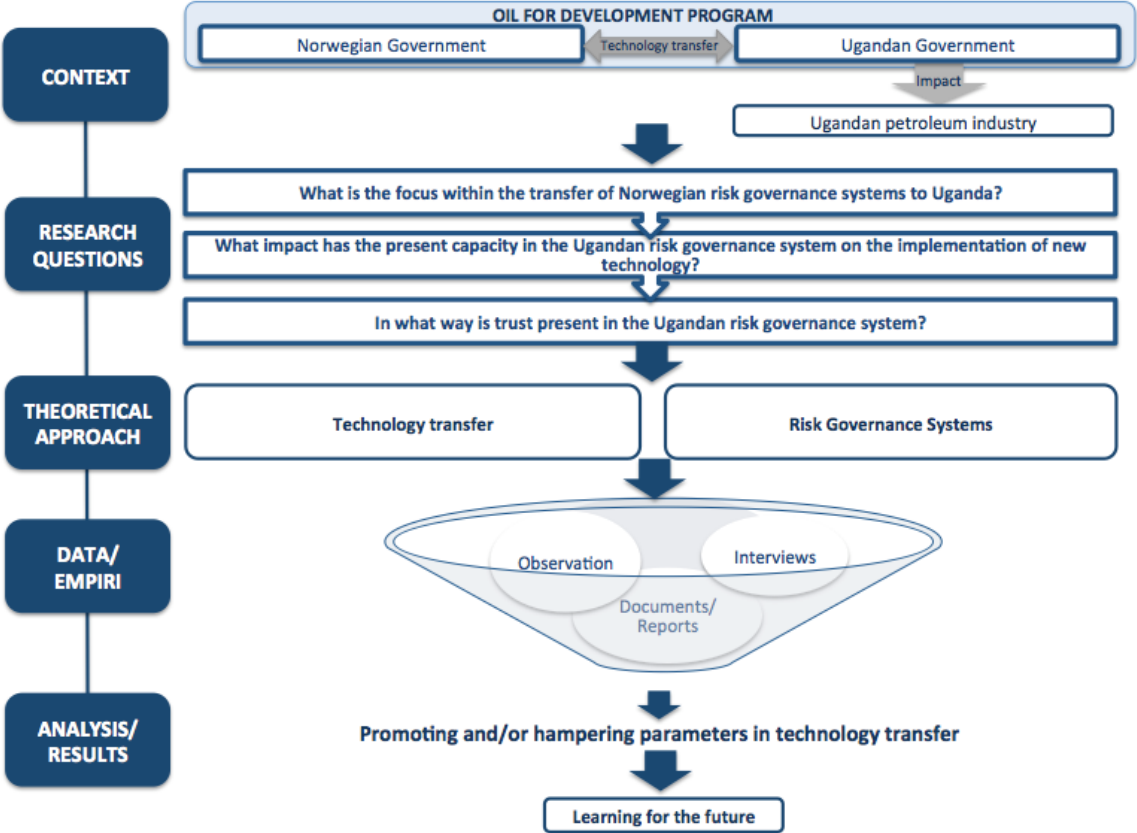


Figure 2: Structure of study

As displayed in Figure 2, this study is based on the cooperation between Norway and Uganda in relation to the OfD program. The three research questions are related to the cooperation between the two countries, and preconditions affecting the transfer. These questions are assessed in terms of a theoretical approach and collected data.

The thesis is organized as follows: Chapter two contains a description of the context of the study. An explanation of the risk governance systems within the petroleum industry in Norway and Uganda is given. We look closer at choices of regulations regarding risk governance, actors involved and the opportunities and challenges regarding choice of risk governance systems for the two countries. Further, the transfer of risk governance systems, as a cooperation between Norway and Uganda, is explained.



Chapter three contains the theoretical approach. The iceberg theory as the framework for the study is presented. Thereafter, the next part explains risk governance systems in its social construction. Risk governance systems are deeply integrated into its local context, meaning its capacity, interplay, and trust. Lastly, the important aspects in terms of the transfer process are outlined through involved actors, knowledge, and contextualization. The research questions are also presented and described in this section.

In chapter four, the choices made concerning design and methodology will be presented along with the research strategy. The data collection method is outlined and each category is explained. The analysis of the data along with validity and reliability is discussed. We justify the choices we have made in the development of the study and cover the strengths and weaknesses with the design.

The results are presented in chapter five and further analyzed in chapter six. Both chapters are divided into the three research questions. The results are not exclusively discussed within one research question, as they are relevant for various discussions. For example findings presented in research question two about sharing information internally and externally are interesting to study in all research questions.

In conclusion, the most important findings concerning parameters that hamper and/or promote the transfer of risk governance systems are presented. We explain the main contributions of the study and list interesting topics for further research.

## 2. Transfer of risk governance systems from Norway to Uganda: contexts, systems, cooperation

*This chapter presents the context of this study. The chapter describes petroleum activity and risk governance systems within the two different social constructions. Lastly, the cooperation, in light of transfer of risk governance systems is presented.*

### 2.1 The Norwegian petroleum industry

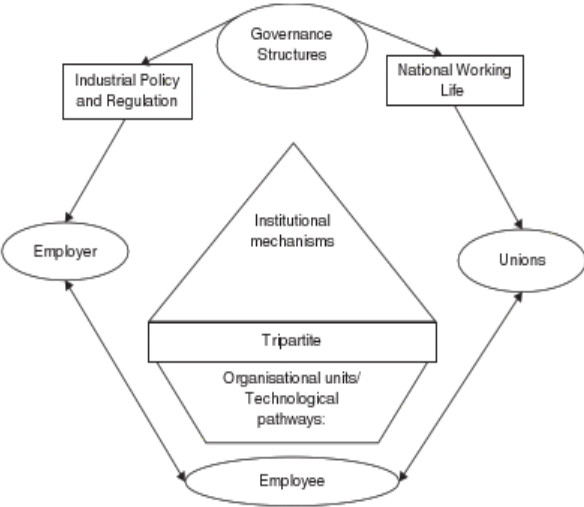
The petroleum industry is by far the largest industry in Norway. In 2012, 23% of the total value creation came from this industry (Norwegian Petroleum Directorate, 2014). The system and structure around the industry are unique to Norway, as it has developed over the last forty years. Table 1 displays phases of technological development in the Norwegian petroleum industry, as well as its major accidents and the regulations that followed.

Phase	Characteristics	Major accidents	Regulations	Elements under pressure
I Entrepreneurial 1970-1976	Uncertainty regarding technological solutions. Emerging environmental consciousness. International companies and key personnel dominating		Practical do's and don'ts directed to the industry carrying out the activities	Humanware, Orgware, Infoware and Technoware
II First consolidation 1977-1980	Big integrated production units and huge organizations mainly occupied with documentation and control. Norwegian actors gradually included through an active national "infant industry" policy.	<i>Ekofisk Bravo</i> Blow out 1977, <i>Alexander</i> <i>Kielland</i> disaster 1980	Internal control was introduced, Division of NPD and NMPE, Working Environmental Act (1977), Safety and Offshore research program (1978)	Orgware, Humanware and Infoware
III Maturation 1981-1988	Consolidation the integrated production units. Dramatic reduction of contractors. Limited competition from abroad. Oil price drop 1986. Norwegian actors dominating in some technological segments, but still lacking the overall system competence.		Paradigm shift (1985): first Petroleum Activities Act, Development of tripartite collaboration, Principles of internal control (Lord Cullin report)	Humanware and Orgware
IV Reorganizing 1989-1996	New economic realities enforce new technological and organizational solutions. NORSOK cooperation. Norwegian actors dominating in most segments. A reopening for international competition.		New rules of risk analysis (1990), and emergency preparedness (1992), Petroleum Act (1996)	Humanware, Orgware, Infoware and Technoware
V Second consolidation	Controversies among oil companies and sub contractors about risk level. New trust building and safety efforts. A mixture of international and national actors.	Helicopter crash, <i>Norne</i> 1997, Offshore worker killed, <i>Oseberg Øst</i> 2000	Establishment of Safety Forum (2000), RNNP launched (2001), Working environment Act (2005), Regulations with high focus on functional based regulations (2010),	Humanware and Orgware

**Table 1: Technological development in terms of risk governance in the Norwegian Petroleum Industry (Inspired by Lindøe and Olsen, 2008)**

As the table illustrates, an increased focus on risk governance occurred in the late 1970s. The start of this new focus was the development of the Norwegian Work Environment Act in 1977. Following, the tripartite collaboration was developed and Norway established a tough labor legislation with strengthening of unions in the offshore industry (Lindøe, 2013). Around the same time, two major accidents, Bravo and Aleksander Kielland, ensured an improved focus towards the risks involved for the environment, and the people working in this industry (Lindøe, 2013). Bravo was the first uncontrolled blow out accident on the Norwegian continental shelf. Three years later, the Aleksander Kielland accident caused the death of 123 workers when an oilrig collapsed in the North Sea. A new safety regime, adopted in 1985, was developed as a result of these accidents (Lindøe, 2013). Following, the Lord Cullen report introduced the term “safety case”, which also had an impact on the current HSE focus and safety regime in Norway (Lindøe, 2013). The report addressed the importance of developing a strategy on the risks, consequences and safety of installations, and procedures to handle this.

As a result, the structure in organizations has moved from hierarchy towards a more flat structure. In addition, these strategies and focus was developed through different phases along with increased interplay between actors. Development of a strengthened safety regime included a reorganization of government regulatory responsibilities, which will be further outlined in the next section (Petroleumstilsynet, 2013).



**Figure 3: The Norwegian risk governance system and its social construction (Engen, 2014, p. 342)**

### 2.1.1 The Norwegian risk governance system

Figure 3 pictures the Norwegian risk governance system in its social construction. The system is shaped by institutional structures and arrangements, as well as social processes (Engen, 2014)

Figure 3 conveys a broad institutional perspective on the Norwegian risk governance systems industrial policy, regulation, working life and technological pathways (Engen, 2014). The tripartite collaboration, functional-based regulations, structure at governmental level and supervision strategy based on trust and capacity is part of what is unique with this system. These features constitute the foundation for the Norwegian risk governance system. Risk regulation as a practice derived from the tripartite collaboration is considered to be shaped by institutional procedures, principles, expectations and norms encountered in cultural and historical framework (Engen, 2014, p. 342). The relationship and the building of trust between the stakeholders are mainly performed in forums where the different actors have different roles. The two most important forums are the Regulatory Forum and the Safety Forum. This relationship is also strongly influenced by organizational capacity where the forums and collaborations emphasize learning and improvement (Bang & Thunestad, 2014). The risk level in the Norwegian petroleum industry is measured yearly and is called RNNP (risk level for Norwegian petroleum activity). This is an instrument for measuring the impact of the overall HSE work in the industry.

There are a number of actors involved in the Norwegian risk governance system. The government departments involved are few with clear roles and responsibilities and do not duplicate expertise. The government agency primarily responsible for the petroleum industry is the Norwegian Petroleum Directorate (NPD). They have an overarching role to assess the safety and working environment, and designing the regulations for the industry (Bang & Thunestad, 2014). NPD arrange for the coordination between all the government agencies and ensure this is appropriate and communicated clearly to the industry.

The Norwegian Petroleum Safety Authority (NPSA) is a separate administrative agency. They set the standards and ensure the operators in the industry maintain the required level of safety, emergency preparedness and the working environment in the industry (Engen et al., 2013).

NPSA is established as an independent body and are perceived as the guarantor of the functionality of the Norwegian safety regime (Engen et al., 2013).

Other stakeholders in the risk governance system are the employers and the trade unions. The employers include all the companies involved in the petroleum industry, both offshore, on-shore and the suppliers. The unions represent the interest of the workers in the industry. These actors help monitor and observe the working environment and the safety of the workers in the industry (Bang & Thunestad, 2014). The tripartite collaboration is defined by interaction between the regulatory authorities (government), unions and employers. This collaboration is based on trust between all stakeholders and it remains the cornerstone in the Norwegian risk governance system (Engen et al., 2013).

The Norwegian petroleum industry is regulated by five central laws: Petroleum Act, Working Environment Act, Maritime Safety Act, Seamen's Act and Pollution Control Act (Engen et al., 2013). The main Act the industry must comply with is the Petroleum Act. This Act was introduced in 1985 and enforced major changes in the way the petroleum operations are performed in Norway. The previous regulations were revised after the fatal accidents outlined above. The previous system, with clear boundaries of each activity and detailed rules, was obviously not working in such a complex industry (Bang & Thunestad, 2014). The new Petroleum Act is built on a different logic with greater cooperation between the actors involved and it is based on self-regulation. This approach relies on the capability of the industry to manage their own risk according to accepted norms and standards (Lindøe, Baram, & Braut, 2011).

Along with the emergence of functional based regulations, the regulators focus on supervising the quality of the industry's internal control system (Kaasen, 2014, p. 129). The functional based regulations are goal based. The responsibility for how to achieve these goals is given to the regulated companies and the regulator needs to trust the companies to meet these goals (Bang & Thunestad, 2014). The supervision strategy is also built on trust with supervision known and planned in advance. This regime is called a known system audits. The government trusts the operators and entrepreneurs to relate to the submitted plans (Bang & Thunestad, 2014).

### **2.1.2 Strength and weaknesses**

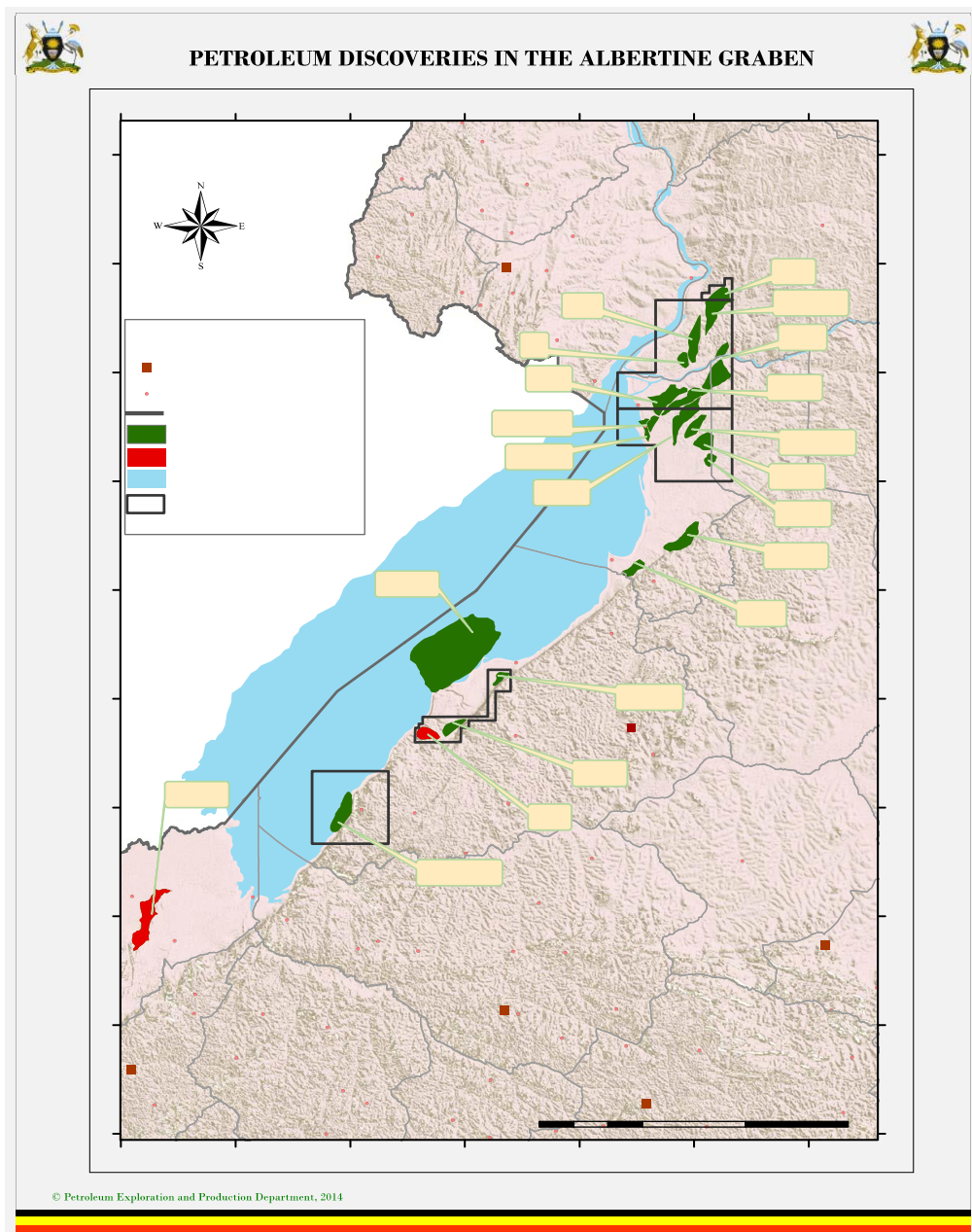
The Norwegian risk governance system appears as a thoroughly analyzed system. A number of strengths and weaknesses are identified in the Norwegian practice of risk governance (Lindøe, Baram et al., 2014).

High trust and legitimacy is a strength in the Norwegian system, it is present between all stakeholders, and it is restored when threatened. The forums created include all stakeholders and are seen as a fair place that contributes to adjust perceptions and to engage the risk maker. Following, the capacity is an appreciated strength in the system. This is observed through the system's emphasis on learning and improvement, with increasing competence of all parties. This emphasis provides long-term effectiveness.

Several uncertainties and challenges are identified in the Norwegian risk governance system. The system has a lack of clearly identifiable requirements and appears with a too open-ended structure. These factors are leading to high uncertainty and sometimes cause laws to be made by negotiation. Following, the choice of supervision strategies frequently causes few inspections, unclear objectives and soft enforcement.

## **2.2 The Ugandan petroleum industry**

Uganda's petroleum history dates back to the early 1920s. However, it was not until 2002 that Heritage Oil drilled the first exploratory well. As of March 2013, the blocks in Albertine Graben were estimated to contain at least 3,5 billion barrels, of which 1 billion barrels are classified as recoverable (MEMD, 2013). These numbers entails that Uganda stands to join the ranks of mid-sized oil producers in the world (Norad, 2013). A total of 32 out of 34 wells drilled since 2002 have encountered petroleum, which is an impressive success ratio (MEMD, 2010). The location of petroleum fields is presented in Figure 4.



**Figure 4: Map of Albertine Graben, Western Uganda (PEPD, 2014)**

The petroleum fields are located in the Albertine Graben, an inland area in the middle of one of the national parks in the Western part of Uganda. The 500 km long, and 45 km wide area is situated along Lake Albert, on the Ugandan-Congolese border, and stretches north to Uganda's border with South Sudan. Lake Albert is divided almost equally between Congo and Uganda in terms of utilization of the petroleum. Lake Albert, is one of the African Great Lakes, and thereby an important site for the conservation of biodiversity (Tullow Oil Plc, 2014). There are permanent local communities around the oil operations. Northern Uganda (Block 1), where Total has licenses the military is fighting against rebels in the Lords Resistance Army. Ugandan

People Defense Force has declared 80 percent of the northern area safe (Biryabarema, 2013), but there are still numerous uncertainties and large unstable areas.

Hydrocarbon production is expected to begin in 2018. The Ugandan Government has decided that there is a need to strengthen the capacity in the industry before they start producing. A refinery is developed on the government’s initiative, and it will be completed when production start in 2018. There are also several ongoing projects related to construction of a pipeline for export of oil to the Indian Ocean (Total, 2014).

**2.2.1 Ugandan risk governance system**

The Ugandan risk governance system is in an early developing phase. Safety results collected from the petroleum companies, in Figure 5, shows that there is significant room for improvement in the industry followed by more consistent supervision. The working hours tripled in 2013 due to increased seismic and drilling activities. However, there are limited oil and gas experience among national contractors (PEPD, personal communication, May 26, 2014). Therefore, most work is performed without the required HSE knowledge.

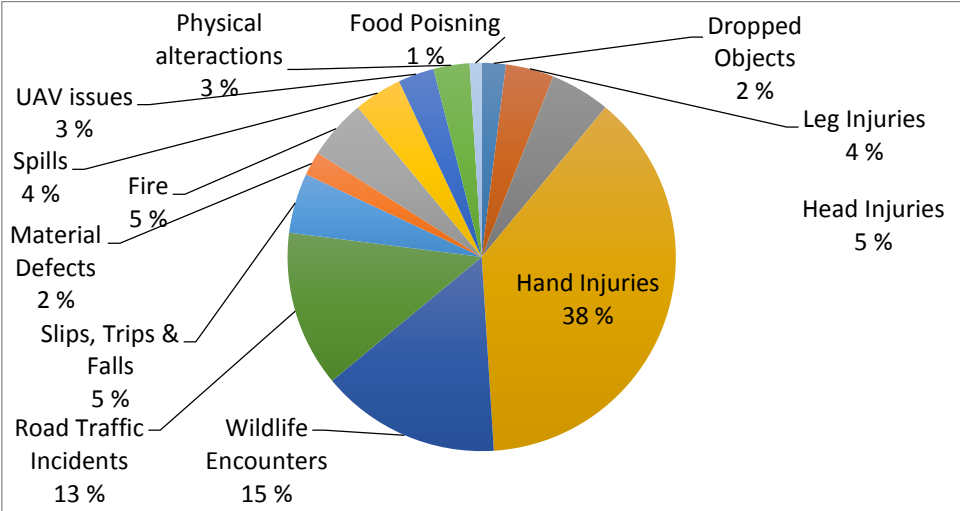


Figure 5: Incidents reports from 2013 (PEPD, personal communication, May 26, 2014)

Figure 5 illustrates safety results for 2013 conducted by the petroleum companies. All operators keep track on undesired events and near incidents. Following, with analysis of the conditions for the outcome. The Ugandan petroleum sector has not experienced any major accidents so far. Thereby, their risk governance choices are proactive, since these choices are not based on previous accidents. Most accidents have been minor and related to operations, such as “marine line cutter cut his ankle with machete opening seismic line on papyrus environment” (PEPD,



personal communication, May 26, 2014). Incidents concerning vehicle, air transport, and environmental harm are also reported. The root causes of the main events are related to the behavior of workers due to lack of skills or knowledge. Organizational factors such as lack of preparation, poor maintenance and arbitrary inspection processes, are also causing accidents (PEPD, personal communication, May 26, 2014). Moreover, it is expected that when production starts in 2018 the potential for major accidents will dramatically increase.

The involvement of the Ugandan Government in the risk governance system is through the Ministry of Energy and Mineral Development (MEMD) and Petroleum Exploration and Production Department (PEPD). PEPD, under MEMD, have the responsibility to prepare laws and regulations for safe exploration of petroleum resources and to supervise the organizations within Uganda (MEMD, 2010). The Occupational Safety and Health Department under the Ministry of Labor is responsible for workers safety.

The petroleum companies in Uganda include three main operators; Total (France), Tullow (Ireland), and CNOOC (China). All three petroleum companies operate from Uganda. Ownership and operation responsibilities within the exploration areas are divided equally between the operators.

The Ugandan petroleum industry also includes 22 national and 42 international registered contractors (PEPD, personal communication, April 28, 2014). Uganda is estimated to have around 9,000 registered non-governmental organizations (NGO), although the exact number of active NGOs is difficult to determine. Most of the NGO's are not working specifically towards the petroleum industry. However, since they focus on specific areas like environmental issues or human rights their work embraces the petroleum sector.

Only 6% of Uganda's labor force is unionized (Mujuni, 2014). Low unionization is due to many self-employed workers, which are not organized through formal employment. Following, unions in Uganda are poorly organized, with lack of good governance and poor leadership. Some industry leaders and politicians work actively against the interest of the unions (Eggen & Raha, 2012).

Product sharing agreements (PSA) is a contract between state and operators. PSA provides for an advisory committee, which comprises of both stakeholders. Four formal interactions are

established between government and operators. These have different objectives, and are performed either monthly or quarterly. The formal interactions are advisory committee meeting, operations meeting, technical committee meeting and financial technical meeting.

After recent reforms, Uganda has relatively good national laws and regulations, which measure up to international standards. The Petroleum, Exploration, Development and Production Act 2013 were commenced April 5th 2013 and the Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act was commenced on July 26th 2013. The Occupational Safety and Health Act, of 2006 is the main law that regulates HSE activities in the country. Other relevant Act's regarding risk management is the Access to Information Act, of 2005, Labor Unions Act, of 2006, The National Employment Policy Act, of 2011 and the Companies Act, of 2012.

### **2.2.2 Strength and weaknesses**

The stakeholder in the Ugandan risk governance system is competent and serious. The three operators in Uganda are international companies, recognized for their capacity. Following, development of robust regulations is given priority. Reported achievements related to the risk governance system concern a HSE management system, and the internal audit process that is formalized and implemented within the operators. There is also ongoing training in HSE, management of contractors, coaching and on the job skills (PEPD, personal communication, May 26, 2014).

Weaknesses found in the Ugandan petroleum industry and risk governance system includes the increased risk of corruption and hence spoiling long-term benefits for the Ugandan people. The HSE culture and the management of contractors and their performance are seen as a weakness within the system (PEPD, personal communication, May 26, 2014). There is also challenges for the system to be able to implement the Acts involving international standards (Shepherd, 2013). This is due to the lack of capacity and understanding of the system.

### 2.3 Transfer of risk governance systems

The Norwegian and the Ugandan risk governance systems as presented above include several social components. Table 2 contains a brief summary of some central characteristics and prerequisites of the two systems, which is seen as interesting in this study. The Norwegian characteristics are obtained from Lindøe et al. (2014) and the characteristics for Uganda is found through our own data.

Norway	Uganda
<p><b>Risk governance structure:</b></p> <ul style="list-style-type: none"> <li>- Functional-based regulations</li> <li>- Tripartite collaboration (strength of parties are equally balanced)</li> <li>- RNNP sets baselines and establishes trends.</li> <li>- PSA requires to be informed (but does not approve plans)</li> <li>- Much left to discretion of the regulated</li> </ul> <p><b>Capacity:</b></p> <ul style="list-style-type: none"> <li>- Skills in negotiation needed</li> <li>- Use of industry competence to train inspectors</li> <li>- High competence of inspectors and unions reps needed</li> </ul> <p><b>Interplay of actors:</b></p> <ul style="list-style-type: none"> <li>- Forums for debate needed to ‘regulate’ Social controls and participation</li> </ul> <p><b>Social climate:</b></p> <ul style="list-style-type: none"> <li>- High trust between parties needed</li> <li>- Regulators needs high legitimacy</li> </ul>	<p><b>Risk governance structure:</b></p> <ul style="list-style-type: none"> <li>- PEPD monitors and regulates licensees undertaking exploration and production</li> <li>- Operators are required to update PEPD on operations on a daily basis</li> <li>- 24/7 monitoring in fields when drilling</li> <li>- PSA as a contract between state and operators</li> <li>- Functional-based regulations</li> <li>- Laws established in accordance to international standards</li> </ul> <p><b>Interplay of actors:</b></p> <ul style="list-style-type: none"> <li>- Formal interactions between government and operators</li> </ul>

**Table 2: Characteristics of the Norwegian and Ugandan risk governance system**

There are great contrasts between the Norwegian and the Ugandan risk governance systems, as displayed in Table 2, in terms of experience, structures, locations and traditions. The systems are at two different stages in the petroleum development: one with forty years experience and several phases of development, and one moving towards production start. The objective of the OfD program is to exchange technologies based on the Norwegian experience, to develop a robust risk governance system in Uganda. The description of the situation in the two contexts and the cooperation defines a foundation for the rest of this study.

### **2.3.1 Cooperation between Uganda and Norway**

The OfD program provides support to governments and government agencies in the cooperation countries. “*Our mission is to empower the government to make reasonable decisions*” (Rasen, 2012, p. 18). It is important to note that export of a blueprint of “the Norwegian model” is not the goal for the program.

Uganda is the largest recipient of support from the OfD program. A three-year cooperation was completed in 2009. A new project for five more years was signed in July 2009. The current project is allocated a total funding of NOK 147 million for this five-year duration. The first nine months in 2013 the funding was frozen due to claims of corruption in the Ugandan President’s Office. This conflict is solved, and the program is continuing as planned, with completion at the end of 2014.

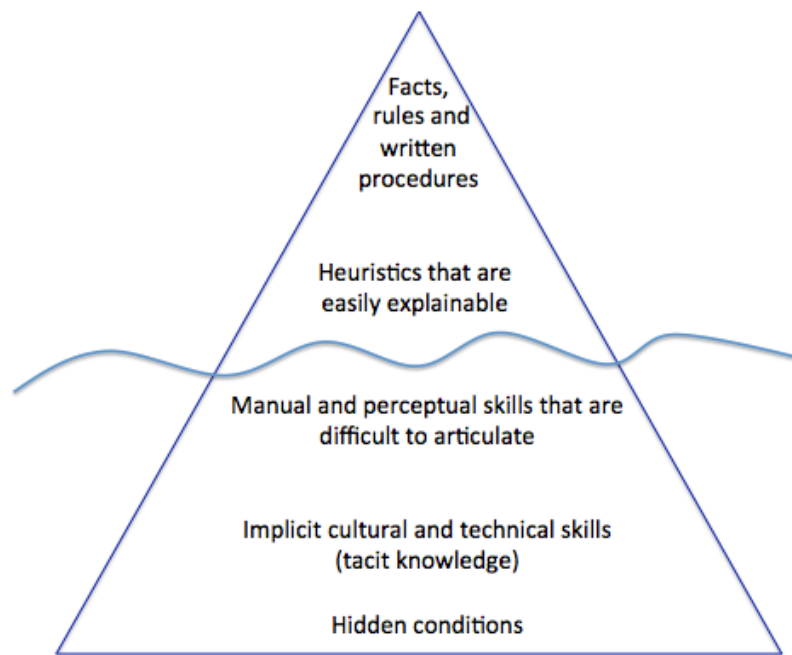
The central actors of the OfD program regarding the resource pillar are the NPD, NPSA, PEPD and MEMD. Appendix 1 presents an overview of all involved actors, and their role in the cooperation.

The intentions of the OfD program regarding the transfer of risk governance systems include a review of policies in a legal and regulatory framework. The aim of the review is to ensure that it is in accordance with national requirements. The program also aims at developing supervisory strategies and a plan for HSE matters in the operations. Following, the transfer includes development of tools for the performance of HSE audits, along with the HSE standards and monitoring mechanisms (MEMD, 2010).

In 2011, NPSA presented a report regarding development of HSE regulations for the oil and gas sector in Uganda (Petroleumstilsynet, 2011). They recommended that the Ugandan Government developed a clear understanding of the important aspects relating to HSE. “*To do so it might be necessary to create a new understanding of how to develop an integrated set of regulations stipulated and enforced by the involved authorities*” (Petroleumstilsynet, 2011).

### 3. Theoretical approach

*This chapter establishes a theoretical basis for the study. The theoretical chapter is divided into two main parts; risk governance systems and transfer of risk governance systems. The framework for the work is the iceberg model. The model illustrates aspects in a risk governance system as well as transfer of such a complex system. However, the model is overarching, and should not be regarded as comprehensive.*



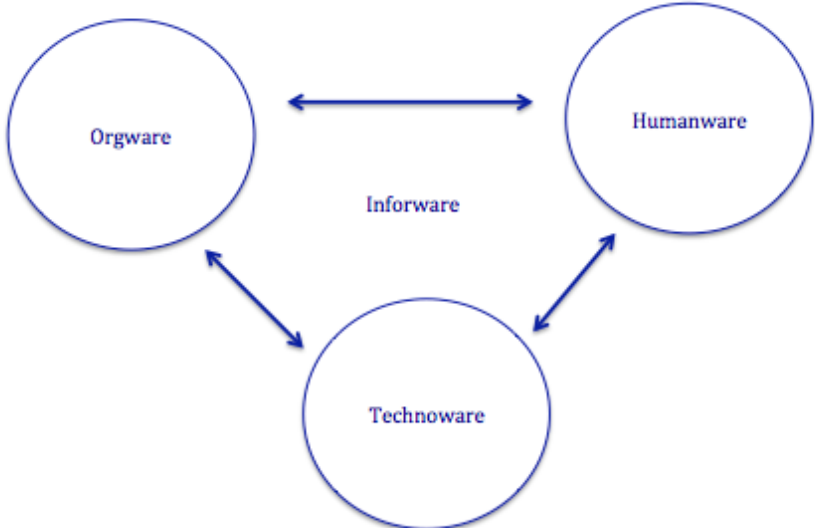
**Figure 6: Transfer of risk governance systems (Inspired by Olsen, 1996)**

The iceberg model is presented in Figure 6. The visible part of the iceberg, above the surface, represents the more formal part of a risk governance system, which is easier to see and control. The parts of technology that consists of easily explainable aspects such as laws and regulations, procedures, supervision strategies and/or defined actors, is just the “tip of the iceberg”. Important aspects in technological systems could be hidden as long as it is in the environment where it is in use (Olsen & Lindøe, 2009).

The part of the iceberg that is below the surface illustrates aspects that are invisible and deeply integrated into a system. Examples of these aspects are heuristics, ”rules of thumb”, knowledge that are gained through years of experience, and hidden conditions in a system, for example

values, power, politics and trust. These aspects present a greater challenge to transfer and are seen as the invisible part of the iceberg because the aspects may not be identified before it is adopted in a new context. This challenge is important to recognize when looking to transfer systems, in order to select, implement and adapt risk governance systems to a new environment.

According to Hughes (1987), technological systems, such as the risk governance system, include “*technical devices, the organizational routines and procedures, legislative artifacts and scientific and other knowledge elements such as skills, rules of thumb and norms for the handling of the technology*” (Engen, 2014, p. 341). This definition means that one must see the technological system in light of technoware, inforware, humanware and orgware (Cohen, 2004).



**Figure 7: Elements in a technological system (Inspired by Cohen, 2014)**

Figure 7 presents elements in a technological system and is inspired by the elements presented by Cohen (2004). The technoware is the object-embodied technology. In this study this means laws and regulations, as well as structures such as NPSA, NPD and Unions. Inforware includes technology information and codified descriptions, for example information of a supervision procedure. The inforware is in the middle of the figure. This is because this element is critically dependent on others and requires knowledge of these to be understood.

In order to describe and understand the technologies, we must also include the social structures that make technology work in the context where it is in use. This means we must have a cognitive understanding that allows activities to be meaningful to the participants (Olsen &

Lindøe, 2009). Humanware includes knowledge, skills and motivation. Knowledge is essential in the transfer process. Technoware is not a tool unless there is somebody who can handle it. It would be difficult to surf with only a surfboard but no surfer. According to Bhatt (2002) *knowledge* is an organized combination of ideas, rules, procedures, and information.

Orgware is the organizational arrangements needed to successfully integrate the other components and must also be seen within the social structure. The social structure is essential as it consists of mechanisms generating behavior, such as trust. All four components explained by Cohen (2004) are required simultaneously for achieving successful transfer of technology. Thus, these aspects “*form a seamless web that constitutes technological pathways*” (Engen, 2014, p. 342).

### **3.1 Risk governance systems**

Risk and risk governance are broad terms. *Risk* is viewed in this study as a combination of uncertainty and consequence of a given outcome (Aven, Boyesen, Njå, Olsen, & Sandve, 2004). Uncertainty is highly relevant in risk governance as risk is not objective, and therefore an important aspect to take into account (Njå & Solberg, 2012). Risk has to be managed, however, we can never predict with reasonable certainty what will happen (Aven et al., 2004).

*Risk governance* is a way to anticipate and mitigate for undesired events. Undesired events means events that can represent a risk for individuals, environment, economical values and important functions in the society (Aven et al., 2004). Aven and Renn (2010, p. 49) present a definition of the term governance where “*governance describes structures and processes for collective decision making involving all stakeholders*”. With this approach governing choices is seen as interplay between governmental institutions, economic forces and civil society actors, for example NGOs.

Rasmussen (1997) emphasizes the complexity of risk governance system on the basis of seeing it as a socio-technical system where all the elements presented in Figure 7 needs to be considered. Risk governance is not a unilateral process where the only focus is on the chosen elements in the industry. It is crucial to consider what is required to make the elements function as intended. The risk governance system concerns a large number of stakeholders. For the

Ugandan risk governance system the stakeholders include the government, petroleum companies, NGOs, unions, contractors, workers and society at large.

Risk governance also include structure, capacity, social climate and interaction with different stakeholders that manage risks, in line with the definition of a technological system by Hughes (1987).

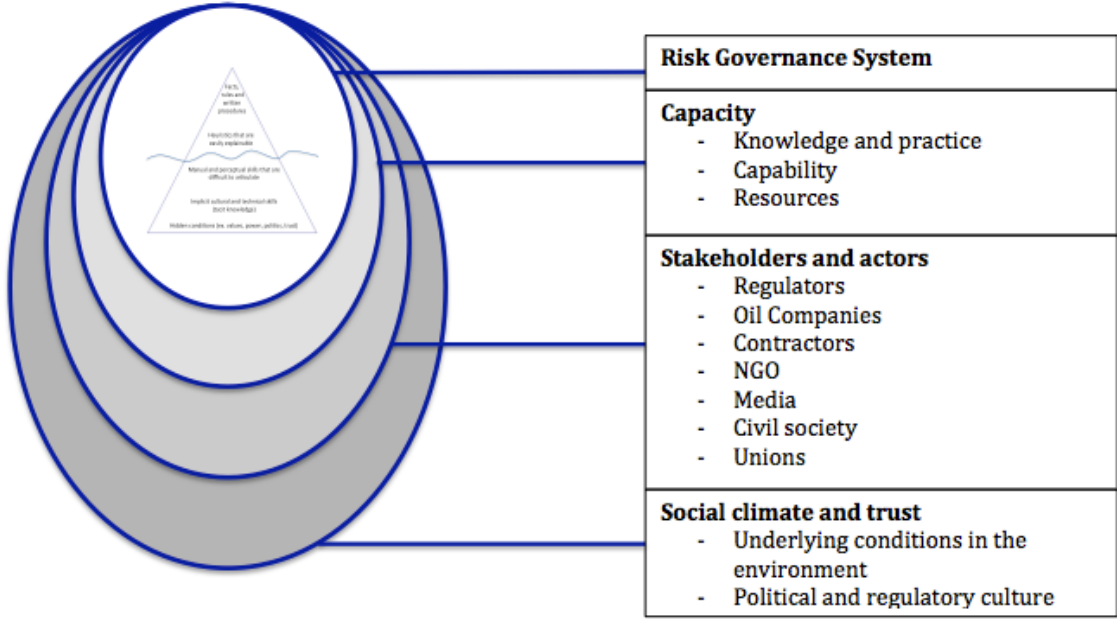


Figure 8: Risk governance system in its social construction (Inspired by Aven & Renn, 2010)

As Figure 8 pictures, the risk governance system must be seen within its social construction. “A system is more than the sum of its elements” (Rasmussen, 1997, p. 184). In line with the view of Cohen (2004) on a technological system, the whole system needs to be taken into account.

The relevant layers of the risk governance system will be discussed further in the sub-chapters below.

**3.1.1 Capacity**

Capacity means the ability of people, organizations and society as a whole to manage their affairs successfully (Pultar & Rabitsch, 2011). This definition considers both the capacity in the risk governance system, as well as the individual capacity of the different stakeholders. Capacity may reflect the interplay between the stakeholders and their capability to fulfill their role in the risk governance system (Aven & Renn, 2010).



Aven and Renn (2010) highlight two main aspects of capacity. The first part consists of the importance of using the best available knowledge and practice in the industry. Uganda looks to Norway to obtain knowledge about their risk governance system since Norway has experiences from the petroleum industry. Obtaining the best knowledge for the situation and ensuring the individuals involved gain the practice necessary is important in risk governance and in order to avoid major accidents. Thereby, this will affect the capacity to select which technologies to transfer.

The second part of capacity referred to by Aven and Renn (2010, p. 63) is “*institutions and organizations have to be strengthened so that they are empowered and have the resources to perform their tasks in the most possible effective, efficient and fair manner*”. The second part highlights the capability and the importance of strengthening the stakeholders included in the industry. The OfD program looks at strengthening the industry from the governmental level. This ensures that the structure of PEPD is appropriate and the laws and regulations are in place as a framework for the industry.

The resources referred to in the second part by Aven and Renn (2010) refers to the ability to implement the new technology to be transferred. This new technology requires the infrastructure to be appropriate. Furthermore, the technology requires access to information and the ability to process and apply this information to the Ugandan situation.

The effective, efficient and fair manner stresses the importance of getting the industry to perform the work in the best possible way, and in a way that is fair and acceptable. For this step to be performed it is necessary that the organizations have the knowledge and practice experience needed along with the required resources.

### **3.1.2 Interplay of stakeholders**

Capacity must be seen together with the interplay of all relevant actors (Aven & Renn, 2010). To ensure control over the system, it is important to gain an understanding of the structure and the actors that make up the system (Rasmussen, 1997).

Man-made disaster theory argues that undesired events occurs as a result of a failure in existing cultural values and norms around hazards, how to deal with them and the impact of them

(Pidgeon & O'Leary, 2000). It is important to include all stakeholders in the processes of establishing a risk governance system, and to ensure they are informed. However the decisions on procedures and regulations need to be limited to stakeholders with the capacity and resources (Aven & Renn, 2010).

Different actors from different levels contribute in the process with knowledge or values (Aven & Renn, 2010). The OfD program has its focus on the governmental level. However, the companies perform the risk activities and their daily operations are affected by the changes and framework conditions that the Ugandan Government implements. For example, new regulations regarding drilling procedures prepared by the Ugandan Government constitute a regulatory framework for petroleum companies in Uganda and a tool for the government.

It is important to ensure that all stakeholders understand the rationality of a risk-based decision. As well as to gain enough insight to take valid and reflective decisions, based on the information and personal preferences (Aven & Renn, 2010). In other words, inclusion and communication with stakeholders is important as this affect stakeholders understanding and concern of risks. Following, in order to ensure the functioning of such a complex and interdependent formation as the stakeholder network, some general principles have to be set up to support the risk governance process. In Norway, for example trust and transparency in the stakeholder network are essential.

### **3.1.3 Trust**

Rasmussen (1997) specifies that in addition to study the behavior of human errors in a system, it is also necessary to focus on the mechanisms generating behavior in the actual, dynamic work environment. Trust can be seen as a mechanism that affects this behavior. As a risk governance system is depending on conditions, such as trust in the environment, understanding of these conditions is essential.

Lewicki and Wiethoff (2000) states that trust and distrust are two very different concepts. In trust, one has positive expectations regarding the other's actions and thereby implying a belief in the other actor or stakeholder. Equally, distrust is also a confident expectation. However, one that is negative and implies suspicion of the other. Norway has adopted a trusting culture. This culture is seen through the flexibility for the operators in the industry. The United States has a culture relying on distrust with strict rules and regulations. There is no statistical evidence

which regime works best. However, it has been found that the choice is dependent on the political culture (Engen, 2014).

According to Lewicki and Wiethoff (2000) trust can be studied from a rational or a relational perspective. A rational perspective presents an instrumental way of building and managing trust or distrust. The perspective is seen as a non-personal cooperative strategy, where the choice is to trust or distrust each other. To achieve this interplay, there is a need that stakeholders behave through the same guidelines, meet stated deadlines and perform as promised. The value in completing a task or a goal is not seen as personal satisfaction, but rather seen in the light of the consequences of doing so (Lewicki & Wiethoff, 2000). In other words, trust occurs because it has proved to pay off in the past (Kerkhof et al., 2003).

The relational perspective of trust between organizations emphasizes a social motivation drive rather than just purely instrumental, as in the rational perspective. Trust is achieved because one is treated in a respectful way. The perspective is grounded in processes that engage to create common interests, goals, objectives and similar reactions. An example is a common interest among stakeholders to work as a team towards the same goals and need one another to achieve a robust risk governance system.

A relational perspective is based on the relations between trusting organizations and incorporates cognitive, motivational and affective components (Juhl, 2008). Perceived competence and reliability builds cognitive trust between different organizations (Olsen, 2008). Similar motivation is an influential condition in terms of relational trust. Care among stakeholders and actors, where a comparable personal value system is in place, develops affective trust (Olsen, 2008). For example the government can trust the competence within the petroleum companies. However, they can distrust their action and motivations. This perspective means that the degree of trust relies on components such as the different stakeholders capacity and motivations and how these relate (Lewicki & Wiethoff, 2000).

According to Lewicki and Wiethoff (2000), trust is not created overnight, rather over long time, based on interactions between the stakeholders and actors involved. Participants' choices about which approach to adopt are typically constrained by the features of their environment (Heimer, 2003). The trust in risk governance systems is therefore dependent on whether the environment is created around a rational or relational perspective, or neither. There are several factors that

affect the creation of the trust or distrust environment, for example stakeholders' ownership to the process or top-down/bottom up components. Power distribution, patterns of dependence between negotiation parties, and degree of participation or non-participation are other factors that are deeply integrated into the system and influence the environment (Juhl, 2008).

One must see trust and risk governance as related, because risk governance, through choices of regulations, can undermine trust (Juhl, 2008). Many of the effects associated with trust, are also associated with risk governance. Bottom up and top down are two opposing approaches within risk governance. With a top down approach, also called "command and control", regulators claim the industry to rule-compliance (Lindøe et al., 2011). A bottom up approach is associated with self-regulation, comparable to the Norwegian risk governance system. The latter approach relies on the capability of the industry to manage their own risk according to accepted norms and standards (Lindøe et al., 2011).

### **3.2 Transfer of risk governance systems**

Transfer of risk governance systems is in this thesis interpreted as transfer of technological systems. Technology transfer is the central concept of the study. It is often argued that the term is complicated and confusing since the term involves two multidimensional concepts; technology and transfer (Cohen, 2004). There are different ways to approach technology transfer. Cohen (2004) defines technology transfer as systematically organized exchange of information between two organizations, generally between different countries. This definition presupposes an active transmission of the technology. According to Olsen (1996), technology transfer is normally defined as transfer of technology from one country where it is developed or in use, to another country where it is implemented and adapted to use. Therefore, the technology transfer includes some kind of exchange, which could involve learning as well as a physical transfer, for example implementation of a new legislation.

According to Olsen and Lindøe (2009), recipients will never be able to receive the whole "technology package" and there will always be something that is not transferred. The OfD program is a cooperation between Norway and Uganda. The program is a two-way learning process, where Norway becomes better bureaucrats and Uganda receives support from someone experienced in the petroleum industry (Rasen, 2012). Technology transfer between different

units provide opportunities for mutual learning and inter-unit cooperation (Singh & Premarajan, 2007). The focus of this study is on what can promote and/or hamper the technology transfer in order to understand how Uganda can take advantage of the Norwegian risk governance system. Hence, the learning outcome and advantages from the Norwegian side is not further discussed. For the purpose of this study the theory concerning technology transfer is used.

Technology transfer in this thesis means any process where one country gains access to a technological system from the country where it is developed and/or in use and contextualize it into its own technological system. Contextualization is when risk governance elements are adjusted and implemented into a different local context, in this case the Ugandan risk governance system (Røvik, 2007). As informed concerning the risk governance system, it has to be seen in its social construction and within human, organizational, informational and technological aspects (Cohen, 2004). The contextualization is therefore an important, and interesting part of technology transfer where the elements are being applied to a different social construction.

### **3.2.1 Actors involved in the technology transfer**

*“An important way to understand technology transfer, is to focus on the actors who define the problems, consider alternative options and are responsible for the choices of technologies, as “social carriers of technology””* (Olsen, 1996). Outside-in and inside-out is used as terms as the relations between the “sender” and its “recipients” are not hierarchically organized. The Ugandan Government is in the OfD program seen as having an inside-out position. The “sender” which in this case is Norway, does not operate the industries in Uganda. Norwegian actors are engaged in a planning and implementation process from an "outside-in" position. They are loosely coupled to challenges within the risk governance system (Olsen, 1996).

### ***Knowledge***

Røvik (2007) states that the competence of the individuals or organizations in the transfer process is the critical success factor. In terms of technological systems *“knowledge represents an understanding of the principles that underline their functioning, processes employed to create them, and the use that these technological systems serve”* (Garud, 1997, p. 83). Garud (1997) explains these phases as know-what, know-how and know-why. Know-what is knowledge about facts, and thereby it represents the “tip of the iceberg”. Know-how means that

an actor has an understanding of the processes that comprise the technologies. Therefore, know-how can be seen as knowledge about how to perform a task. This knowledge will accumulate through experience over time. With an understanding of the principles underlying the technology, know-why is achieved. “*Our knowledge of how to bake a cake does not presuppose a knowledge of why the various ingredients interact to produce the specific type of cake*” (Garud, 1997, p. 89). However, without this knowledge it will not be possible to create a new recipe, which is needed when choosing and implementing technological elements into a different context.

The participants presuppose different understandings based on previous experiences (Gilje & Grimen, 1993). With different cultures and experiences, the interpretations and meanings may differ. In effect, knowledge is subjective. Olsen (1996) states that stakeholder must be seen in light of their common technological frame. This frame is a result of current theories, tacit knowledge, practice, goals and actions shared by the stakeholder. In line with the iceberg model presented above, this express how the understanding of explicit and implicit knowledge is important to have in mind in a transfer process. Explicit knowledge is based on know-what, meaning knowledge about tools, manuals and written operational rules such as a supervision strategy or legislation. Explicit knowledge is easier to translate than implicit knowledge. Still, the knowledge has to rely on people to be understood (Olsen, 1996).

Implicit knowledge is heuristics, perceptual skills and tacit knowledge (Olsen, 1996). Tacit knowledge contains the knowledge that cannot be codified and separated easily from the minds of the people (Singh & Premarajan, 2007). In that way, tacit knowledge is embedded in the social and cultural context (Cohen, 2004). This explanation implies that the deeper the degree of tacit knowledge, the harder it is to communicate between actors from different levels and with different cultural backgrounds. Identification of the different actors risk perceptions, concerns and understanding of risks are important factors to consider (Aven & Renn, 2010). Risk perception is based on personal beliefs, experiences and feelings towards risks.

Risk perception can also be termed ambiguous knowledge. This term represents tacit knowledge that can be understood in more than one-way and is difficult to document (Singh & Premarajan, 2007). One major challenge is therefore to transfer the tacit knowledge in a way that is understood by the receiver.

Knowledge is received through education, experience and values in the environment (Olsen & Lindøe, 2009) This opinion is supported by Beer, Eisenstat, and Spector (1990a), which states that learning through training has high effect on successful implementation of a system and correspondingly the acceptance of change. In other words, knowledge is built on participation and dialogue with other people. As the iceberg model illustrates, learning is a major part of the technology transfer process. The learning process needs to be found at all levels; vertical, inside-out and outside-in. Learning happens through norms, performance of tasks, discussions and as a result of mistakes. Learning can therefore be defined as “*a relatively permanent change in behavior that occurs on the basis of experience*” (Imsen, 2005, p. 168). This definition implies that learning is not just change in behavior. Learning also includes processes that confirm existing knowledge and processes of achieving a better understanding (Imsen, 2005). For example, it is no use in reading that smoking kills, if you are not doing something about it.

Learning happens in an environment and through interaction with other people. The actors have some interests and motives they follow (Olsen, 1996). Moreover, these interests and motives are guided by the information about alternatives, and the knowledge the actors have about technologies. Their roles in the transfer process, and the potential benefits they can achieve through their participation, are also affecting the interest and motives. Motivation is therefore an important factor in a transfer process. In line with know-what, know-how and know-why, motivation can be added as a last aspect featuring care-why. Motivation is an inner process that starts and maintain learning (Asbjørnsen, Ogden, & Manger, 1999). The motivation affects the choice of activities, effort and persistence regarding learning. There are separate value systems in different cultures shaped by our cultural baggage (Olsen, 1996). For example, OfD is criticized for the participants from the recipient country to use the knowledge they obtain not to help their organizations, but rather to help themselves and their families to higher paid jobs or to opportunities abroad. For them it is a stepping-stone to a better personal future and the opportunity to obtain “per diem” while attending international conferences and courses.

### **3.2.2 Contextualization**

*“Many chapters, in tracing the history of regimes, shows that each country is such a complex product of it’s technology, history, political institutions, legal system, industry structure, culture and management that unquestioning adoption of one regime’s element in another country could be an expensive disaster” (Bang & Thunestad, 2014, p. 404)*

An important part of learning is the ability to adapt to changes in the local context (Garud, 1997). Certain conditions that need to be in place for implementing transferred technology. There is a considerable risk for maladjustment of the transferred technology to the new environments even though it has been taken care of (Olsen & Lindøe, 2009).

The iceberg model illustrates the challenges of transfer because most aspects are hidden below the surface. Following, Olsen and Lindøe (2009) emphasizes conditions that might create or change risks in the technology transfer process. There are uncertainties related to transferring parts of systems in terms of understandings on how to operate the technology. This represents the uncertainties appearing with lack of know-how or know-why. Furthermore, inadequate adaption between the transferred technology and the new environments also present uncertainties. Since it is impossible to transfer the whole “technology package”, the transfer can introduce latent conditions for accidents. For example, different understandings regarding trust as a condition. Following, a contextualization will cause changes in known risks when the technology is contextualized into a new environment (Olsen & Lindøe, 2009).

The “sender” will rarely have all information about the new environments and the “recipients” will not be able to obtain complete knowledge about the technology. However, technologies in use will normally gradually improve as the actors gain more knowledge and experience (Olsen & Lindøe, 2009). This means that when changes appear in one or more of the technological elements, changes are required in the other elements to ensure the balance for the technological system to work as intended.

For the transfer to be acceptable, it is required that the technology is possible to implement, it is seen as profitable, socially acceptable and customized public requirements (Olsen & Lindøe, 2009). It is for example difficult to implement a technological system that requires trust and bottom-up orientation in a context where this is non-existent.

Changes can be time consuming to implement, which means that conditions in a context can change as a result of new structures. According to Beer, Eisenstat, and Spector (1990b), the most effective way to change conditions and behavior is to put actors into a new organizational context. This imposes new roles, responsibilities and relationships between them, which create a situation that “forces” new attitudes and behaviors on people. Following this, Olsen and Lindøe (2009) states that the interplay between technological elements is not static. Therefore,



it is required that the technological elements must constantly be adapted to changing environments in the risk governance system.

### **3.3 Research questions**

Theories and definitions related to risk governance systems and technology transfer are presented in this chapter. Technology transfer is presented through the iceberg model, illustrating the difficulties with transferring technology due to deeply integrated underlying conditions. The actor's role in a technology transfer process is outlined including their existing knowledge, skills, learning and understandings from an outside-in, inside-out or vertical position. This is assumed to affect the focus in a transfer process. It has been detailed that the interplay of these actors and their capacity needs to be considered when seeing the risk governance system in its context. Technology transfer is about contextualizing a technological system. Seeing the technological system within its social construction indicates how technology transfer creates a new risk picture and includes a high degree of uncertainty due to its complexity. This view is identified in the theory focusing on the mechanisms in the system making the system work as intended. A system depending on trust or distrust is one example of a mechanism laying as a foundation for the risk governance choices.

Through the theories discussed above, together with the collected data, the focus for this study is on understanding what hamper and/or promote transfer of risk governance systems from Norway to Uganda. The research problem is answered in terms of three research questions. The three research questions defines the critical part of the study and are required to be clear and concise (Blaikie, 2010). The three research questions are:

- *What is the focus within the transfer of Norwegian risk governance systems to Uganda?*
- *What impact has the present capacity in the Ugandan risk governance system on the implementation of new technology?*
- *In what way is trust present in the Ugandan risk governance system?*

The first research question considers what is being emphasized within the transfer. The aim is to gain an understanding of what is needed and important to consider when transferring risk

governance systems. It is suitable to study this question through risk governance theory, and the description of a technological system. In addition, technology transfer and the iceberg model are used to study this question.

The second research question considers our understanding of capacity as crucial to the risk governance system and to its ability to adapt new technologies and sustain the changes. Studying the capacity includes analyzing the actors involved and their view on the technology transfer. This question is studied through theories outlined about knowledge, capacity, interplay of actors and contextualization.

The third research question emphasizes understandings and choices made concerning trust. The central theory for this question is the iceberg model, trust perspectives, and risk governance choices.

## 4. Design and methodology

*This chapter describes and discuss our choices concerning the design and methodology for this study. Our research design is prepared in accordance with Blaikie (2010). The chapter justifies the use of a case study approach, involving a qualitative method, and strengths and weaknesses. Moreover, challenges with validity and reliability are included.*

### 4.1 Research strategy

Blaikie (2010) views a case study not as a methodological choice but as a choice of studied subject. Our research problem requires us to study the parameters that is hampering and/or promoting the technology transfer between Norway and Uganda, and to what extent this affects the risk governance system in Uganda. Therefore, we approach this thesis through a case study. Our research problem is a “what”-question. This type of question “*discover and describe the characteristics of and patterns in a social phenomenon*” (Blaikie, 2010, p. 60)

The choice of research strategy affects the method of analyzing and the way we view the collected data (Blaikie, 2010). We aim at understanding the involved actors’ motivation and the foundation for their choices in the transfer process. The abductive research strategy is therefore the strategy we find relevant to us. This strategy starts in the social world of the actors, from their view of reality, and assess how this perspective gives meaning to the individuals (Blaikie, 2010).

Danemarks (1997) view on the abductive strategy is highly relevant. We gather data from the view of the people involved and thereafter we interpret the situation, related to the transfer of risk governance systems between Norway and Uganda. However, there are other possible conclusions as well. The conclusions we consider will only be a part of the story (Danemark et al., 1997).

## 4.2 Methodology

Based on this qualitative method, we aim at getting an in-depth understanding of the parameters that can promote and/or hamper the transfer process of risk governance systems. We found the qualitative method useful in this study as it enabled us to get a deeper understanding of the situation in Uganda and the cooperation with Norway. The data collection procedure is further presented in Figure 9.

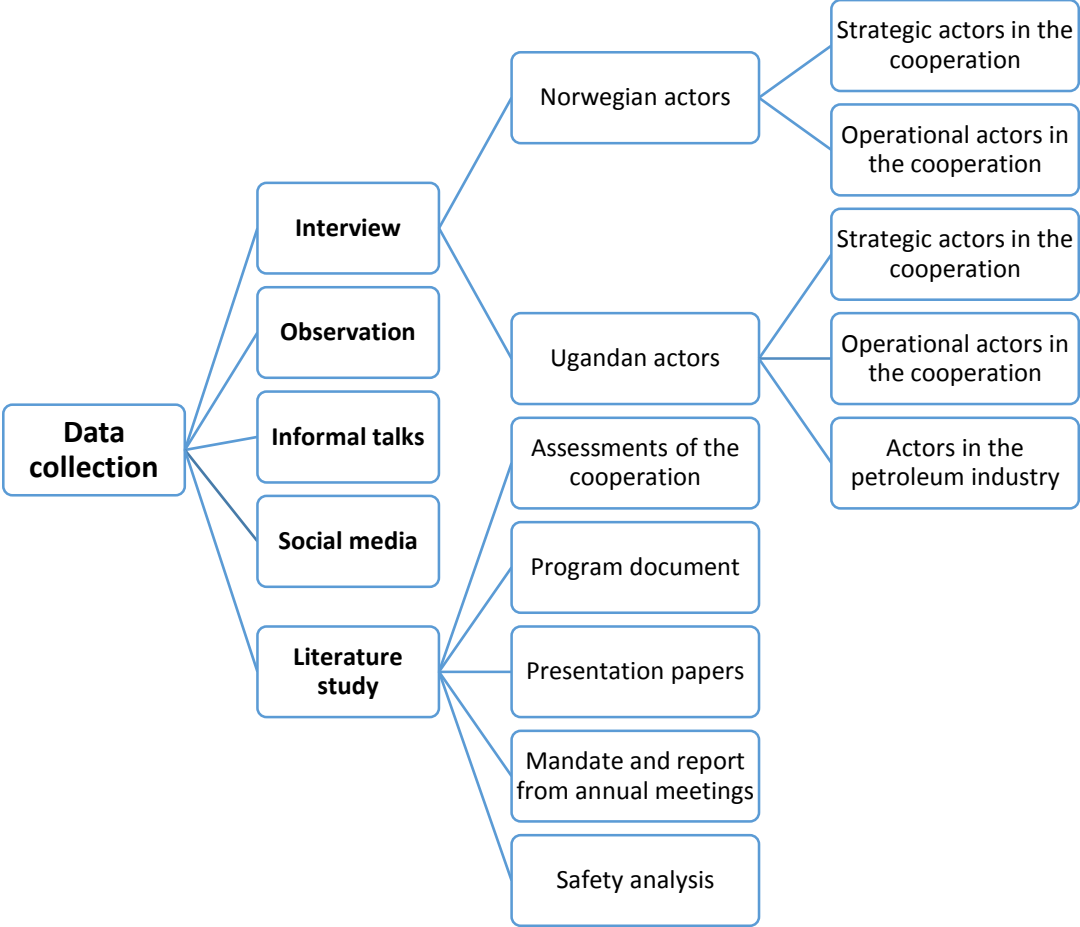


Figure 9: Overview of data collection

As presented in Figure 9, we chose to gather data through a combination of interviews, literature study, observation, social media and informal talks. The interview objects at operational level are actively involved in the knowledge transfer process. The strategic level interview objects are the ones developing the overall plans and the structure of the program.

#### **4.2.1 Literature study**

A literature study was conducted to increase our understanding of the topic of technology transfer, and the differences between risk governance operations in varying local contexts. These documents are more reflective and thoughtful, as well as less spontaneous than interviews and observation (Jacobsen, 2005). Therefore, the literature study provides a good supplement to the interviews. The research questions and interview guide is based on the understanding obtained from the literature study.

The OfD cooperation between Uganda and Norway is well documented. Hence, we were able to gather annual mandate and reports, risk assessments of the program as well as documents, reports and presentations used in the transfer process. We received the literature from some of our informants and professors at the University of Stavanger. A list of the literature used in the literature study of the OfD program is found in Appendix 2.

The selection of core literature is a major challenge related to literature review (Blaikie, 2010). We focused on the literature that explained the cooperation between the two countries. These documents were relevant as they gave us a deep and broad understanding of the program. Some general documents concerning the OfD program were also helpful in order to gain a broader understanding.

In studying documents and reports, it is important to remember that somebody has written these reports, at a certain time, often with a certain purpose in mind. Thus, they can give a polished picture of the OfD program, while ignoring negative aspects. Following, the risk assessment of the program is collected as secondary information in 2013. It is important to remember that these reports and assessments register different factors than us, and that the environment is dynamic. Therefore, findings may not be as relevant at later years.

#### **4.2.2 Informants**

The informants are chosen based on their relevance to the transfer of risk governance systems between the two countries. Informants have either a strategic or an operational role in the cooperation, or they are stakeholders in the Ugandan risk governance system. The informants are divided into two groups. The first group represents the Norwegian informants. The second group represents informants from Uganda. As a limitation of our study, we have merely interviewed employees and actors in the Ugandan petroleum industry at a management level.

The background and relevance of the informants will be explained, as this is of importance for the results. See Appendix 3 for a list of our informants and their position.

It was important for us to talk to informants that have a comprehensive knowledge of the topic. We interviewed two representatives from NPSA. These informants are involved with the OfD program under the HSE pillar. In addition we interviewed an actor in the OfD program from the Norwegian embassy, and the OfD resident coordinator, both located in Uganda. The latter works closely with the OfD program in Uganda on a daily basis and has in-depth knowledge about the program and the operations.

In addition, we had a number of informal talks. These talks included a representative from the evaluation department in Norad, an OfD representative from Petrad, professors from the University of Stavanger, as well as representatives from NPSA. These informants are relevant in our information gathering regarding the OfD program and the cooperation between Norway and Uganda.

The informants from the Ugandan petroleum industry are resourceful and central in our study. They have the final say on all changes, and involved in the daily operations. Informants from the Ugandan Government are either at an operational level involving HSE, or at a strategic level within the OfD cooperation. Informants from the three petroleum companies all work with HSE. In addition, we interviewed three informants from two independent organizations, one NGO and one workers union. See list in Appendix 3.

Our interviews were semi structured using a conversation-based approach. This approach is necessary when our research questions relates to topics that cannot be explicitly asked about, such as trust and capacity (Andersen, 2006). The structure of our interview guide was developed for this purpose. The interview guide was designed around five main topics: cooperation, development and changes, risk governance, actors and prerequisites (Appendix 4). The informants have different roles and responsibilities in the transfer process, and the interview guide was adjusted and customized to each interview.

#### **4.2.3 Observation**

Observations were performed during our fieldwork visit in Uganda. Blaikie (2010) refers to participant observations as '*par excellence*' in qualitative research, meaning it is the best type

of research. We obtained permits to make observations in the oilfields in Albertine Graben with one of the petroleum companies. They hosted us at their camp, showed us around the field areas, and let us observe their daily operations and having informal conversations with the employees and contractors.

We use observations as only one part of the data collection. Observations are a very unpredictable way of collecting information (Blaikie, 2010). However, observations provided a mean for cross checking the information we received through the interviews and they ensured the reliability of the data collected.

One challenge with observation was that neither of us has experience from the petroleum industry. Our understanding of technical terms and operations is therefore limited. During the observation in the oil fields, this proved a challenge. We were aware of the risk of losing control over the situation and to end in a submissive role when the conversation turned to technical (Andersen, 2006). To overcome this challenge, we tried to be active in the conversation and to be involved in the situation (Andersen, 2006).

#### **4.2.4 Social media**

“Oil in Uganda” is a NGO in Uganda that solely focus on the petroleum industry. The NGO is neutral, independent and mainly a communication organization. The purpose of the initiative is to promote transparent, constructive and well-informed public and policy debate (Oil In Uganda, 2014a). Oil in Uganda has a public Facebook page we used during our data collection. The NGO creates discussions on Facebook on several topics we are studying. Facebook is currently the largest social media site on the Internet (Zoppos, 2012). In addition, it is the most visited website in majority of Africa (Essongou, 2010). We found Oil In Uganda’s Facebook site important to gain opinions from the social construction around the Ugandan risk governance system. Moreover, it provided supplementary data.

There are different ways to collect data from Facebook. We merely collected information written on the “walls” on the Facebook page. We did not analyze the semantics of the messages or the characteristics of sender writing the messages. We registered the opinions and topics.

This Facebook page is open to the public, which means that it has no privacy restrictions. It remains a challenge to interpret the seriousness of the posts on Facebook. Social media users

are not necessarily representative of the population (Phillips, 2014). Following, we did not know the role of the people commenting on the topics. There may be false profiles created, with an aim to promote certain topics. However, with the understanding that Facebook samples are more diverse than usual, the collected data opens for a broader insight into many interesting aspects, which we would not have found otherwise.

### **4.3 Research process**

*“The timing of data collection is a fundamental choice in designing social research”*(Blaikie, 2010, p. 199). The timing for collecting data must be seen in the light of the rest of the process. We started the study with informal talks and literature study to gain an overview over the technology transfer of risk governance system.

Due to the nature of our study and the location of the relevant actors, we spent five weeks in Uganda meeting the relevant informants, conducting interviews and observing the oil operations. We visited Uganda in February/March 2014. We consider this visit to be late enough to have gained sufficient overview over the topic and program, and early enough to have time to organize and analyze the data before thesis submission in June 2014. However, a five weeks visit can only give partial understanding of the local context. It is difficult and time consuming to comprehend the complex situation, particularly since we are unfamiliar with Ugandan culture.

During our visit to Uganda, we used the ‘snowball’ method to reach out to relevant informants. This method entails that the informants opened doors to other relevant informants, which gave access to further information and knowledge on the topic. We experienced this process as very efficient and we succeeded to interview all informants we were interested in. Table 3 below outlines the data collection process, what has been done, what the aim has been with the work performed, and what the outcome as been.



When	What	Why	Outcome
<b>Autumn 2013</b>	Literature studies. Meetings and informal talks with relevant organizations; Petrad, NPSA, Norad and UiS	Gain knowledge on our topic, examine the relevance of the topic, find a relevant case, and narrow the topic.	Enhanced knowledge about knowledge sharing vs. capacity building and challenges regarding aid work. Positive feedback on our chosen topic.
	Contact relevant actors	Find out who's relevant actors in our case and seek their interest in our topic	Feedback and interest in meeting us
<b>January 2014</b>	Develop a research proposal, with research questions and objectives	Gained structure and presented research design to relevant actors	A structured research design
	Plan meetings with actors in Uganda	Try to have some central informants to hang on to and reduce uncertainties regarding data collection.	Established contacts that could assist in the field work
	Developed a theoretical overview and unstructured interview guide	Established a framework for our thesis and a structure for our field work	A theoretical approach and an interview guide as well as overview of who to contact and their relevance for our thesis

	Preparation for field work through literature studies and prepare context of the case; Norway, Uganda and OfD	Gain a better overview of the context	Enhanced knowledge about our context
<b>February /March 2014</b>	Data collection through field work in Uganda.  Review of data gathered in interviews and through observation	Achieve findings tied to our research questions  To ensure we obtained all the relevant information for our research problem	Interviews, informal talks, 3 days observation in the oil fields  Talked to more informants and opened up for other views than first expected
<b>March 2014</b>	Presentation of field work and unrefined evaluation of data	Start decomposing process and analyzing data	Presentation
<b>April-June 2014</b>	Finalized and clarified research questions  Data decomposing and analysis	Ensured we answered the research problem  Reduce complexity of the data, to gain a better overview, and to analyze the data through the research questions, in order to draw conclusions to the research problem	The thesis was defined and we could start analyzing in terms of the final research questions  Identify parameters that hamper and/or promote transfer of risk governance systems between different contexts

**Table 3: Data collection process**

#### **4.4 Data reduction and analysis**

The data is analyzed through a qualitative content analysis. The objective is to interpret the subjective meaning from the content of data (Hsiu-Fang & Shannon, 2005). The interpretation of the literature, observation, social media and interviews is done through the coding of text (Lewins & Silver, 2007). We use the directed approach as our starting point for the study. This approach can validate or extend a theory and will identify the coding required through key concepts and keywords in the relevant theory (Hsiu-Fang & Shannon, 2005).

The coding scheme and key words are derived from the theory and the relevant findings during the data collection process. The interview guide is based on the predetermined codes. These were coded immediately as we progressed with the interviews and observations (Fangen, 2004). We did not transcript all the interviews, instead the results were analyzed by listening to the interviews on tape and studying our notes. The interview guide was adjusted if necessary prior to the next interview while impressions were still fresh in mind.

The focus is on transfer of technology, as well as the capacity and trust appearing in the Ugandan risk governance system. Thus, three questions lay the foundation and structure for the analysis. It is most appropriate to present the findings and the analysis in separate chapters, structured in accordance with the three research questions. Each result is not related to one research question alone. It is possible to include the results into discussion on several of the research questions. By this approach we discover and describe elements in the technology transfer, as well as achieve greater understanding of the Ugandan risk governance system. Thus, we identify parameters that could hamper and/or promote transfer of risk governance systems.

#### **4.5 Ethics**

The fact that we are from Norway could pose an ethical dilemma in terms of the OfD program, being funded from the Norwegian Government. It can be seen as an uneven power relationship, where we are looking into the cooperation between the two countries, while a number of the informants are looking to obtain funding from Norway. It could be perceived as we are trying to exploit on the situation of being from the country where the funding is coming from and there is not an equal relationship between the interviewer and interview objects. However, we

have been open and honest about being students and that this thesis will not affect the funding received and the program in any way.

To protect the interview objects identity, they have been anonymized. The thesis has been written inoffensive to all interview objects. Moreover, the interview objects have had the option to pull out or change their statements after the interviews, if desired.

#### **4.6 Validity and reliability**

The legitimacy of the thesis is tested by ensuring it is reliable and valid (Thagaard, 1998). Reliability relates to the results and conclusions drawn, and whether these are produced through a trustworthy process. To ensure the reliability of the collected data we recorded the oral interviews on tape. This recording was done to ensure the possibility of re-interpretation and reproducibility of our interviews. Only one informant objected to this recording. This particular interview was supported by follow up questions and we could contact the informant later if required. In addition, we made detailed notes on all interviews. The interview guide included some questions we knew the answers to, as recommended by Andersen (2006) to control the reliability of the answers.

To ensure reliability, the information gathered in the interviews needs to be analyzed correctly. We were always two persons attending the interview, to ensure we understood the interview objects. Being two interviewers made it easier to ask follow up and clarifying questions. After the interview, we discussed the interview and analyzed the collected data. This discussion was helpful in interpreting the interview objects statements and in discussing the different understandings. One challenge mentioned by Andersen (2006) is that informants can, after a period, forget aspects, remember the conversation differently, or change opinions. This fast discussion made it easier to contact the informants soon after the interviews, hence to minimize the possibility of the informants changing their view.

Some interviews were conducted with two interview objects present. This approach can restrict the openness around the interview and the objects can involuntarily hold back important statements. However, this approach ensures that the information received is more reliable since two interview objects can jointly confirm the information. Whenever two interview objects

were present they were of the same level but with different roles. In other words, they did not possess the same knowledge, and we ensured that neither of them were at a higher authority than the other.

A central question concerning reliability is whether someone else would come to the same conclusions by using the same methodology and design. Thagaard (1998) states that this is hardly relevant for a qualitative study, since the relationship between the interview object and interviewer will be different based on the person performing the interview. The information the informants provided will not necessarily be analyzed and interpreted in the same way by others. However, we used a variety of data collection methods in order to confirm our results. We therefore believe other would have reached similar conclusions by using this variety of approaches.

The reliability of the information is reduced by the Ugandan culture of not criticizing their superiors. The informants we spoke to are specialists in their fields and have high positions in both the government and petroleum companies. However, as we are from the country of the OfD program the interview objects will probably be above average positive to the program and the achievements. We experienced that the more involved the informants were to the cooperation, the more positive they were to the technology transfer. These informants have of course more knowledge about the program, however, there is considerable funding involved, and the reliability of certain statements can therefore be questioned. We have excluded these informants view of the OfD program in further analysis, as these views are not considered reliable.

Different interview objects treated us differently. During the interview process with the Ugandan Government and the petroleum companies, we noticed that they carefully thought through and were more cautious of the answers they gave. The petroleum workers in the oilfields had very limited restrictions towards us. We believe this relates to the setting of the interviews and talks. The observation might have seemed more informal than an organized interview, and the positions they held. Overall, our experience was that being two female students was advantageous in relation to interviews and observations. We were not considered a threat to the system and experienced the interview objects to be open, cooperative and honest. This experience adds to the credibility of the reliability of the data.

The validity of the data concerns whether the findings represent the actual reality (Thagaard, 1998). Validity can be divided into internal and external validity. The external validity is discussed in 4.6.1 as transferability of the findings.

To ensure that the collected data is relevant and valid for the study, and to consider uncertainties such as underlying conditions, we have carefully selected the literature, interview objects, observation and social media. We ensured that the literature and theory are relevant to the research problems prior to moving into the interview stage. The validity of the research is increased as the results we have found are supported by theory. The interview objects are selected based on their position, knowledge and relevance to the cooperation between Uganda and Norway. All interview objects have exceptional knowledge of the Ugandan risk governance system and/or the OfD program. Without this knowledge the validity of the interview objects will be impaired (Blaikie, 2010). We selected interview objects from most aspects of the OfD program to ensure a balanced view. These choices enabled us to confirm the trustworthiness in the information received and contributed to support both the reliability and validity of our conclusions.

Observations at the exploration sites, of risk governance in practice gave a major advantage to our study. The observation enabled us to crosscheck the information given by the interview objects. We also reviewed social media pages on Facebook to broaden the data foundation and obtain a greater understanding of the opinions of society around the petroleum industry. In addition, other evaluations of the OfD program in Uganda, have come to similar conclusions as us. If the findings from different time periods are the same, this increases the internal validity (Thagaard, 1998). Examples of these evaluations are ILPI (2013) and Norad (2012).

The order of the data gathering has not been accidental. The interview guide was based on the literature review. The observation was performed after the interviews, to ensure the information gathered from the interviews were valid. This gave an opportunity to check the validity of previous findings.

#### **4.6.1 Transferability**

External validity entails the questioning of the transferability of the conclusions. The current study aims at identifying parameters that hamper and/or promote transfer of technological systems. Whether these parameters also are relevant in cooperation between other actors remain

to be demonstrated. Blaikie (2010) emphasizes the challenges related to transferability of a qualitative study, particularly a case study. The reason is that it is difficult to reproduce exactly the same conditions; the interviewer, its interpretations, the research object, and the point in time.

We use the OfD program in Uganda as a case, and we study this case the first six months of 2014, in the very last phase of the project. The choice of data collection, the timing, as well as the social construction around the program must be taken into account. Therefore, the transferability of the conclusions will not be without difficulties. In spite of this, we believe that many of the conclusions have bearing in technology transfer from Norway to developing countries also in other industrial settings.

Scharffscher (2010) presents a view on transferability of a case study, in terms of dividing the context of study into an inner- and outer-context. The outer context is the Ugandan risk governance system, which is the context where the actors perform their activities. The inner-context is the structure, standards, guidelines, statuses and responsibilities internally in relation to the cooperation between Norway and Uganda (Scharffscher, 2010). According to this view, the inner-context is transferable. Some of the elements, structures and situations created through the OfD program may be similar in a different setting. For example, another African country creating a petroleum industry will most likely have problems in terms of lack of human resources and weak institutions. The absence of unions and corruption challenges are common in developing countries. However, the specific problems met at the oil sites are not transferrable.

In other words, standardize the way these situations are dealt with can be done, to a certain extent, through procedures, guidelines and challenges. In this study we found that the parameters of interplay and characteristics among the involved actors, time and preconditions in the system are seen as promoting and/or hampering the technology transfer and can be viewed as relevant to other similar transfer processes. In addition, involved actors, systems and the structure they create will largely be similar. In all contexts it will be a cooperation between the governments of the “receiving” country and the “sender” country, like the cooperation between NPSA, NPD, MEMD and PEPD. The way the cooperation has been constructed can therefore be transferred to another country, in terms of internal guidelines and positions. However, the outer-context is not transferable as the settings in the Ugandan risk governance

system is remarkably different to other contexts with cultural and country specific elements. The specific problems met will not be the same in another risk governance system. This idea indicates that the inner-context, being the procedures, guidelines and challenges found in the OfD cooperation between Norway and Uganda, is transferable and will only involve minor variations between different local contexts.

#### **4.7 Strength and weaknesses with our design**

Our study requires us to enter into a broad and complex topic, which is well documented, and frequently discussed.

The OfD program is not completed, but we believe now is a suitable time to analyze technology transfer performed in this program. Since start-up in 2009, the Ugandan Petroleum Sector has gone through great changes. The program is in its last year and Uganda is moving towards production start. We see this as a favorable stage to study the cooperation and analyze the aspects hampering and promoting the transfer. Following, all actors of the project are still present and involved in the cooperation. This means that information focused on the transfer is not disturbed or forgotten.

However, great changes takes time and is difficult to measure. The fact that the production has not started yet complicates this. Nevertheless, as this study want to measure the focus in the transfer process, together with the present capacity and trust in the risk governance system, we find the timing appropriate.

It is challenging to measure changes that occur due to the technology transfer, and to distinguish these from changes that result from natural variations in a dynamic, growing petroleum industry. Uganda is a developing country and there might be other reasons than the OfD cooperation for the changes appearing. As explained by the iceberg theory presented in the previous chapter, not all elements are easy to transfer and some are transferred “invisibly”, which makes these understandings a complex task. Hidden conditions like these may also appear in relation to our research questions. Particularly research question two and three, which considers capacity and trust in the Ugandan risk governance system. They represent



characteristics in the risk governance system, which is diffuse and depends on the person being interviewed as trust and capacity can be understood differently.

There are two major challenges inherent in our chosen data analysis approach. Firstly, by using existing theory we may get a predetermined opinion towards a certain outcome and this can blind us from the contextual aspect. Secondly, during the interviews some of the interview objects may tend to give us the answers we prefer and not their own point of view. However, by having these challenges in mind, there is a greater chance to avoid the pitfalls. Discussions between the two of us also kept us alert to overcome these challenges.

## 5. Presentation of results

*This chapter presents the empirical data. The chapter is divided into three sub chapters in line with the research questions. The first sub chapter presents findings with focus on transfer of risk governance systems. Further, the second and third subchapters contain findings concerning presence of capacity and presence of trust in the Ugandan risk governance system.*

### 5.1 Research question 1

*What is the focus within the transfer of Norwegian risk governance systems to Uganda?*

The following list indicates what is needed and important to consider when transferring risk governance systems: decontextualization, different roles and responsibilities in the cooperation, transfer of capacity, and time prioritization and efficiency.

#### 5.1.1 Decontextualization and Norway

The transfer is not a blueprint of the Norwegian risk governance system and this is strongly emphasized, and focused on from all informants. Still, the cooperation has contributed to implement certain elements from the Norwegian risk governance system to Uganda.

*“Technology cannot be directly transferred”* (NPSA). NPSA explained that their focus during the transfer process is on decontextualization of certain ideas, hence to identify and remove conditions dependent on the Norwegian environment. For example, the tripartite collaboration is decontextualized to stakeholder management. In Uganda, this stakeholder management consists of the government and the petroleum companies only.

The focus on using Norway as a role model and their assistance in developing the industry in Uganda is debated. The NGO is critical to the success of transferring technological system between Norway and Uganda. *“The OfD cooperation will not work because of the huge differences between Norway and Uganda”* (NGO). They argue that Uganda will obtain greater benefits from cooperating with a country more similar to Uganda. Norway has a completely different foundation in terms of trust and capacity, they argue. Accordingly the risk assessment performed by ILPI (2013) concluded that there are risks involved with using Norway as

cooperative country. They do not know the Ugandan situation and this can lead to a number of unfamiliar risks.

This topic is also discussed on the Facebook page of Oil in Uganda.



**Figure 10: Screenshot from Oil In Uganda Facebook page 23.05.2014 (Oil In Uganda, 2014b)**

The claim is that using the model of Ghana will be better than the Norwegian model. Ghana is seen as more comparable due to proximity in both culture and geography. However, the majority accepted Norway as a better role model in terms of avoidance of the resource curse and training. The Governor of the Bank of Uganda stated “*We must be Africa’s Norway. We must manage our oil resources in the stellar manner in which Botswana has managed its wealth from diamonds*” (Wass & Musiime, 2013).

### **5.1.2 Roles and responsibilities in the cooperation**

There is a focus on clarity in roles within the cooperation. The Norwegian actors are found to operate as advisors in the cooperation while Ugandan actors sit in the driver seat. The latter are the decisive and responsible party, as they know the local context best. “*I’m not a public officer in Uganda, therefore, I cannot take responsibility for the decisions that are made in Uganda*” (OfD resident coordinator). Ugandan actors are the recipients, and therefore responsible for selecting and implementing the new technology.

Norwegian actors contribute with their expertise during visits to Uganda, or while Ugandans visit Norway. “*We do not implement Norwegian processes. We give advice on how things can*

*or cannot be done*” (OfD resident coordinator). Both petroleum related laws passed in Uganda the last two years, were developed with contribution from the Norwegian Government and consultants. The laws are functional based and share the characteristics of the Norwegian petroleum law.

Through interviews, it is highlighted that the motivation regarding technology transfer needs to come from Uganda. Ugandan actors needs to require assistance and must be involved in the entire process. They must not blindly follow the assistance and advises of Norwegians. This motivation is exemplified by the current supervision strategy in the Ugandan risk governance system. The Ugandan Government is currently using a 24/7 monitoring approach during operations in the fields. There is a disagreement between Norwegian and Ugandan actors whether this is a wise choice.

The claim is that the petroleum companies will not report on issues to the government if they can avoid it. The Norwegian actors question the motivation and efficiency of the 24/7 monitoring. Note also that governmental representatives performing the monitoring receive a substantial higher wage than while performing their other daily tasks. From the Norwegian side, this is considered a sensitive topic to discuss with the Ugandan Government. Related to this challenge, it was stated, *“you have to choose your own battles”* (NPSA).

Despite the diverse opinions on supervision, one of the focus areas for 2014 is to test a known system audit. This is an approach widely used in Norway and it is based on trust and learning, rather than strict monitoring. The known audit approach will be tested on a small part of the operations. The plan is that this audit will be performed in line with how NPSA practice known audits. Related to this it was stated, *“it is crucial that this is a small and successful audit”* (NPSA).

### **5.1.3 Capacity as a foundation**

A central focus of the cooperation between Norway and Uganda is on capacity building. The objective is to organize institutional arrangements and capacities to ensure a well coordinated and results oriented risk governance system. To accomplish this objective, focus is on assistance, in developing strategies and structures that aims at improving capacity. All actors in the OfD cooperation acknowledge the need for competence, skills and strong institutions as a foundation for technology transfer. Capacity building is therefore the first step in the process.

*“We need to roll out that plan and make sure the resources are in place in terms of people. Both on our side and the Norwegian side”* (PEPD). There is a great competence focus in technology transfer. Competence is considered a requirement, both from Ugandan and Norwegian actors, since both parties must communicate through a similar language. Ugandans must have the capacity to choose and implement the technology they find suitable in their local context.

The competence as a prerequisite for transfer has been achieved through education, work experience and networking through international conferences. Education is essential and informants emphasized that many employees in the Ugandan Government hold university degrees from recognized international universities. Work experience is an efficient and essential way to gain experience and competence, but it appears to be an area lacking sufficient focus. It was claimed that the employees of the government use too few hours at the office performing their work, while they spend the majority of their time out on conferences and courses. These courses and conferences are important learning platforms for the employees, but without actual work experience and hands on work, the knowledge will not benefit the industry. Many conferences involve per diem payments and are held at exciting locations. Following this, the motivations for conference participation are questioned.

Support in establishing regulations and strategies are time consuming. *“We will also now need auditing framework and learn how to audit. We do not have these documents in place. But going forward we expect maybe by the end of this program we should have had those three critical elements; the supervisor framework, the regulations for HSE and we should be having a tool for supervisory and monitoring HSE”* (PEPD). Not all processes are initiated yet, as things take time, particularly regarding approvals from the Ugandan Government.

Transfer knowledge about structures in the government and risk governance system as a whole is important. PEPD is working on implementing a new structure within their department. This structure divides the department into three divisions; a National Oil Company (NOC), a Petroleum Authority (PA) and a Petroleum Directorate (PD). The division of roles is inspired by the Norwegian structure of governmental departments. PEPD believes this is a suitable structure for the division of roles, and it increases the requirement for more internal specialized skills. The petroleum companies believe the division of roles is important and are primarily positive due to the founding of NOC. They expect NOC to bridge the gap between the

government and the petroleum companies. At the moment, the government is very critical to expenses and operations of the petroleum companies. By establishing NOC they will experience the costs related to operations and HSE procedures. Hopefully, these changes will make the cooperation between the government and petroleum companies smoother in the long run.

#### **5.1.4 Time prioritization and efficiency**

Time and efficiency are seen as necessary focus areas in the transfer process. Ugandan actors object to open for petroleum production before the required competence, legislation, strategies, and structures are in place. The process to ensure that the prerequisites for a successful transfer are in place is time consuming. The focus on time is seen as positive from a majority of the informants.

The Ugandan petroleum industry accepts the time needed to establish the industry. It is time consuming to gain knowledge, hire competent people, develop strategies and include serious actors, as well as strengthen the regulations. Time has been prioritized before production and earning money quickly from the industry. This focus has resulted in production being planned in 2018.

Time prioritization and “African time” were also mentioned as a challenge. *“They don’t understand that sometimes in the oil and gas industry you have to make the changes quick. The whole process of writing the letter, writing the project brief, them coming to site to see that everything is alright, you know, time is up, and your losing so much money if the rig is going to wait”* (Petroleum company).

The process has, to some extent, been slower than necessary. Related to this, it was stated *“how slow can slow be?”* (Petroleum company). It took five years to pass the new Petroleum Law. The bureaucratic decision process was extremely time consuming. *“Now, we are on the seventh year and we haven’t produced anything yet. We still have to build a refinery. We still have to build a pipeline, we haven’t even yet got a field development plan approved. So the time is a challenge for the petroleum companies”* (Petroleum Company).

**5.2 Research question 2**

*What impact has the present capacity in the Ugandan risk governance system on the implementation of new technology?*

Certain characteristics are identified in the Ugandan risk governance system that has an impact on the capacity of the system. These are listed in Table 4. These topics will be further discussed in the sub-sections; available knowledge, lack of focus on safety, interactions in the system and cooperation.

Capacity characteristics of the Ugandan risk governance system
Bipartite collaboration as stakeholder management between government and petroleum companies
High competence and legitimacy in stakeholder management
Formal meetings in stakeholder management to share knowledge and discuss strategies
Lack of understanding of the impact of the work
Diverse risk perceptions between stakeholder management and other stakeholders in the system
Knowledge not completely utilized due to organizational arrangement and environment
Relaxed attitude
Strict hierarchy results in lack of creativity and team orientation

**Table 4: Characteristics concerning capacity in the Ugandan risk governance system**

**5.2.1 Available knowledge**

*“PEPD is one of the best governmental departments in Africa regarding capacity”* (OfD resident coordinator). All informants perceive PEPD and NEMA as competent regulators with high legitimacy. They appear to be a pilot for other departments in the Ugandan Government and they are considered capable of challenging the petroleum companies’ strategies. Environmental risks are considered important and it was stated that officers in NEMA are *“better than the pope on environmental challenges”* (NPSA).

*“The key risks facing the resource pillar relates to how best to support the finalization and implementation of new legislation, and the transition to new institutional arrangements”* (ILPI,

2013). Some informants are questioning whether the government understands the new technologies implemented and the consequences this can have. It is mentioned that Uganda has developed good laws, in line with international standards. However, the challenge is the ability of the system to capture the information, implement the laws and apply it to the Ugandan situation. At the Annual OfD meeting in Kampala this year, it was stated that “*further assistance on regulations and implementation of the law is still required, especially on aspects of technical capacity and transition to new institutional arrangement that is required to support the required planning*” (MEMD, 2014)

The NGO referred to the experience with an environmental impact assessment report by the government. This report was supposed to provide the base for some major environmental decisions. However, the decisions were made before the report was completed, and the report ended up supporting the decision already made. This decision process question the legitimacy of the report and the governments understanding of the issues and importance of the consequences.

“*They do not use their knowledge actively. Motivation is more on problems than problem solving*” (Norwegian actor). The challenges, particularly at government level, are related to practical implementation of the knowledge. Informants expressed that the motivation in the Ugandan risk governance system embraces an attitude that “*it will all be all right*”. In addition, the stakeholders are familiar with non-stable conditions, and expect major changes to occur in daily life and in society. They deal with changes as they occur in an unstable environment and do not actively seek stable solutions to the problems up front.

Available knowledge and capacity to implement new technology is a relevant and frequently discussed topic in Uganda. Oil in Uganda initiated a discussion regarding capacity on their Facebook page, see Figure 11.

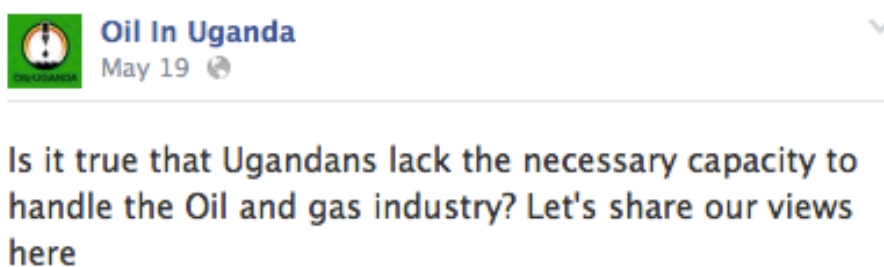


Figure 11: Screenshot from Oil In Uganda's Facebook page 19.05.2014 (Oil In Uganda, 2014b)



The majority of the responses focused on training to gain knowledge and be able to meet requirements to handle a petroleum industry. However, it was argued, *“training is key, but it is useless without the industry experience, which Ugandans may not get until after about 20 years”* (Facebook respondent (Oil In Uganda, 2014b)).

### **5.2.2 Lack of focus on safety**

*“The focus on safety is extremely low in Uganda, at least in general”* (OfD resident coordinator). The majority of the informants involved in the OfD program brought up the general lack of focus on safety in the country. *“HSE risk perception in Uganda is a challenge. Very few are certified by international or independent regulators in their field”* (PEPD). Informants in the industry confirmed PEPD’s statement. They considered this a challenge particularly since the new petroleum law requires petroleum companies to hire national contractors and employees.

Related to this, Oil in Uganda posed an article in December 2013 in their newsletter regarding Ugandan sub-contractors dumping waste outside a local community instead of at the designated area (SSkika, 2013). This issue is difficult for the petroleum companies since they are responsible for their sub-contractors. It exists only a few approved local sub-contractors to choose from and petroleum companies do not believe the knowledge, safety focus and capacity of these sub-contractors to be appropriate for participation in production.

NGOs, unions, media and local contractors have a more narrow emphasis towards risks than the petroleum companies and the government. This is illustrated through a media example told by the OfD resident coordinator: If a petroleum company dumps waste in the national park, there is a lot of commotion and front page news. But when a worker fell down from a government building site and died, nothing was reported and the work continued as soon as the dead body was removed from the site. This example exposes the media focus in Uganda and the difference in focus on two serious incidents.

### **5.2.3 Interactions in the system**

There is a hierarchical structure in the Ugandan risk governance system, particularly at an organizational level within the government. Findings demonstrate that this structure challenge the capacity to implement new technology due to lack of creativity and team orientation. The

OfD resident coordinator claimed that their knowledge is not fully utilized due to the hierarchy and the structure of the organizations. In the Ugandan culture the authorities are not challenged by ideas from lower level employees. The lower level employees are used to receiving instructions of what to do. They seldom use common sense based on their own experiences and act accordingly.

The lack of team orientation is observed through a tendency of hiding information, even internally within organizations. *“They keep everything secret, and say they don’t want to, or can share it. And when I ask why, the answer is: I just can’t do it. This is a challenge”* (Norwegian actor). However, there are different points of views. The government claims that cooperation internally is smooth and that they do not see this as a problem or challenge.

Openness is crucial for actors in the petroleum industry, not just internally within the government. The OfD resident coordinator supports this view. *“One of the key points in the OfD program is transparency, there has to be an openness. It is very little of this, there is no culture for it”* (OfD resident coordinator).

#### **5.2.4 Cooperation**

There are organized meetings and formal interactions between the government and petroleum companies in Uganda. The aim is to achieve mutual understanding and a dialogue in the development of strategies between the stakeholders. Related to this, it was pointed out that Uganda has motivated stakeholders with respect to change and improvement of the risk governance system.

The unions, NGOs and sub-contractors are not included in the stakeholder management. Their competence and perceptions are therefore not part of the system. These groups are not considered to be competent enough and to be too small compared to the two stakeholders. *“The communication with unions and NGOs is on a very limited scale. But there are so many NGOs that are operating in the area and there are so many that anything they create will have oil and gas in it”* (Petroleum company).

*“Unions? No we don’t have the culture of unions here, not yet in oil and gas”* (Petroleum company). The unions are not a traditional part of the Ugandan society and only one informant could mention a workers union in the petroleum industry. The petroleum related union has two

employees, no computer, no transport vehicle and have difficulties obtaining funding and memberships. The unions are many levels below the petroleum companies and the government in terms of knowledge, financial position or influential perspective. Still, both NGOs and the workers union want to be included since they see the benefit of a third party. *“At least one independent third party is necessary to ensure transparency and balance in this industry”* (NGO).

*“I think we have a good relationship. We haven’t been bogged down negatively by the NGOs so far”* (Petroleum company). There exists a large number of NGOs in Uganda, most of them are small and with specialized focus. Following, the NGOs knowledge and focus is at civil society and environmental challenges, none of them at safety or security. The NGOs cannot measure up to the level of capacity of the petroleum companies and the government.

### **5.3 Research question 3**

*In what way is trust present in the Ugandan risk governance system?*

*“There is a high degree of trust in Norway. This doesn’t exist here in Uganda”* (OfD resident coordinator). Table 5 lists mechanisms in the Ugandan risk governance system that indicates that trust is present between the stakeholders in the Ugandan risk governance system. In addition, the right column lists choices that are made within the Ugandan risk governance system and that indicate trust. In the following sub-sections we discuss: need for control, corruption, competence vs. attitude, and building trust.

Presence of trust depending attributes	Choices made affecting trust and distrust
Trust in competence and skills	<ul style="list-style-type: none"> <li>- Implementation of functional based regulations</li> <li>- Creation of forums and quarterly formal meetings</li> <li>- Time prioritizing development of capacity</li> <li>- Changing the structure within PEPD</li> <li>- 24/7 field monitoring approach</li> </ul>
Serious stakeholders	
Willingness between stakeholders	
Secrecy internally and externally	
Lack of motivation and capacity in contractors	
Different values internally and externally	
Lack of reliability in the system	

Table 5: Trust findings

### 5.3.1 Need for control

All three petroleum companies and the Ugandan Government stated they trust each other. However, the findings prove different. During drilling, PEPD is enforcing the 24/7 monitoring approach explained above. The major reason for using this monitoring approach is that the government believes that the petroleum companies will refrain from reporting errors if they can avoid it. Consequently, the petroleum companies do not experience trust from the government due to constant monitoring. However, the monitoring approach was also seen as an advantage by one of the petroleum companies. *Both PEPD and NEMA has monitoring that would be based in the field so that on a day-to-day level for the operational changes there is possible to deal with them on a field level* (Petroleum company). This is favorable as operational changes appear and is one way to avoid frustrations related to “African time”.

### 5.3.2 Corruption

Corruption is a recognized problem in Uganda, and this complicates a relationship based on trust. Production of petroleum has not yet started for the Ugandan petroleum industry, so the industry’s impact on corruption remains to be seen. ILPI (2013) risk assessment describes the corruption in the Ugandan risk governance system and predicts that it will influence the robustness of the system.

The corruption occurs at several levels in the system; street level police, government, petroleum companies and contractors. *“The police at street level are corrupt which makes it difficult for the supervisor to coordinate with them”* (Norwegian actor). In addition, the reason for freezing the OfD program support for the first eight months of 2013, was corruption at the President’s office. Following, no initiatives are taken to comply with the Extractive Industries Transparency Initiative principles, which Norwegian actors strongly recommend. This initiative contains international measures to enable governments to identify secretive management and preserve transparency.

During interviews, suspicion about the information provided by the government was expressed. Secret information is passed on to certain actors through personal contacts. This is particularly related to the association that organizes local contractors and suppliers. Sons and relatives of influential governmental employees mainly run these companies, and they receive privileged information and can therefore easily win tenders and contracts.

In addition, if the petroleum companies meet challenges with PEPD, they would try to take the conflict to a higher level within the government and try to override PEPD. *“Trust will first come when the petroleum industry sees that the government actually comes with reasonable suggestions. The petroleum companies need to have an expression that the government don’t reject an application or a request just to reject it. But actually have an explanation for the rejection or approval”* (OfD resident coordinator).

### **5.3.3 Competence vs. attitude**

The stakeholders trust the other actors’ competence and ability to perform the work, and participants in the stakeholder management trust that the other parties have the capacity to perform their duties. All the petroleum companies mentioned that PEPD has strengthened its capacity, through high competence and skills. In addition, the three present petroleum companies are seen as serious actors and several informants expressed confidence in them to perform safe operations.

It appears that the local industry is suspicious of the attitude of the petroleum companies. It is widely believed that the petroleum companies will surpass the laws, since they are confident that the Ugandan Government will not impose sanctions in the same manner as other industrial countries. The Ugandan Government is too dependent on the petroleum production to do so.

The petroleum companies claim they live up to international standards. However, both Norwegian actors and PEPD claimed differences in action between operations in Norway and operations in Uganda are observed.

#### **5.3.4 Building trust**

Petroleum companies and the government both consider their relationship as positive with close communication and clarity of roles and responsibilities. *“They (the government) have worked hard to get to the point to where they are now, the process of how to gain trust and respect has been long”* (Petroleum company). The petroleum companies believe focus on capacity building and strengthening structures will improve the trust in the stakeholder management. As presented above, establishment of the NOC will help remove the distrust and build confidence between the petroleum companies and the government, since the government will learn to better understand the petroleum business.

## 6. Analysis

*To answer the research questions, our results presented in the previous chapter are further discussed with the theory. The research questions are analyzed in separate sections. The first part covers the focus within the transfer of Norwegian risk governance system to Uganda. Furthermore, capacity and trust, as central prerequisites in the Norwegian risk governance system, are discussed. We consider how capacity is present in the Ugandan risk governance system and how this impact implementation of new technology. Lastly, we discuss the presence of trust in the Ugandan risk governance system.*

### 6.1 Research question 1

*What is the focus within the transfer of Norwegian risk governance systems to Uganda?*

First, the focus on transferring only certain elements and no blueprint is discussed. Further, the discussion considers choice of cooperating country and the actors' roles. Lastly, the focus on capacity as a foundation and time prioritization will be analyzed.

#### 6.1.1 No blueprint: a requirement as well as a challenge

It is clear that the Ugandan risk governance system is not set up as a blueprint of the Norwegian risk governance system. Since the system is complex and strongly integrated into the Norwegian system, it would not be possible to fully adapt it into a new context (Røvik, 2007). As referred to by Aven and Renn (2010), a technological system is strongly integrated within its social construction such as the stakeholders, organizational arrangements and the relationship of this interplay. Transfer of a complete technological system, is therefore a complex, and a near impossible task.

Focus on implementation of only a few technologies can have its advantages. When selecting certain technologies to implement, it is easier to contextualize them into the new system. It is required that the technologies are constantly adapted to the changing environment, regulatory framework and organizational requirements (Olsen & Lindøe, 2009). Thereby, to succeed in the transfer, it is necessary to implement only a few technologies to ensure they are accepted in the changing environment.

“No blueprint” is an important focus in all interviews, both from a “sender” and “receiver” point of view. As found, the decontextualization is an attempt to transfer a system out of its own local context. However, what happens to the system in the receiving country when only certain technologies are decontextualized and transferred into such a complex arrangement? In line with Hughes (1987) definition of a technological system, the combination of these technologies will be the sum that makes up the system. This means that there are other strength and weaknesses in the system when only some technologies are adapted from the Norwegian risk governance system. Thus, a new technological system is created.

One example is the functional dependence in the technologies in the Norwegian risk governance system on all the three stakeholders in the tripartite system. Following Cohen (2004), all elements are required simultaneously to achieve a successful technology transfer. Since there are no operative unions in the Ugandan risk governance system, the tripartite collaboration as in Norway, is impossible. Thus, the composition of the elements has a different relevance, new risk picture, with other strength and weaknesses in the new context. Accordingly, the stakeholder management cannot be seen as a technology adapted from the Norwegian risk governance system, rather a new technology.

Even though there is focus on “no blueprint” of the Norwegian risk governance system, the underlying motives for the decontextualization is implicit a blueprint. Given that the elements adapted are identical to the elements in the Norwegian risk governance system, these specific elements can be considered as blueprints.

As Olsen (1996) states, each actor has an understanding, and is defined according to their inclusion in a common technological frame. This statement highlights the idea that Norwegian actors have experience from the Norwegian risk governance system. Following, the relation of Norwegian actors to systems and technologies are influenced by these experiences. From this perspective, a blueprint of elements comes natural since this is the experience of the Norwegian actors. Thereby, the transfer is a decontextualization of the Norwegian risk governance system, rather than a new system.



### **6.1.2 Choice of cooperating country**

A clear focus from all informants is that the process needs to be initiated by the Ugandan Government. In accordance with the theoretical description of care-why, changes cannot be implemented successfully without the motivation from Uganda. It is necessary that they act as the driving force. Thus, the Ugandan actors' motivation affects the choice of activities, effort and persistence regarding learning (Asbjørnsen et al., 1999).

It is recognized that there is a difference between Norway and Uganda regarding infrastructure, organizational structure and presence of good governance. The majority of the informants brought up these differences as hampering the implementation of technologies. As Garud (1997) argues, technology is often deeply integrated, embedded know-how may be difficult to identify and change. Following the theory, different understandings is a result of different experiences and information. Norwegian actors contributes in the cooperation with their understandings, based on previous experiences (Gilje & Grimen, 1993). These experiences are from operations in a self-regulative risk governance system. Thereby, the Norwegian actors have an in-depth understanding of the benefits this strategy provides. However, the understandings of strengths and weaknesses if selecting a risk governance system built on a different approach, for example command-and-control, will not be as clear. In effect, it is more natural for the Ugandan Government to select and adapt elements similar to the Norwegian risk governance system, being the cooperative country. Thus, the decision is not based on a complete overview over of all alternatives.

Furthermore, the risk governance system in the United States is based on close monitoring and control strategies. This system is also perceived as a robust, well-operating system, with a very different structure than the Norwegian risk governance system. Recognizing that there is no statistical evidence for which system works best, the choice of country to cooperate with will automatically define an essential part of the transfer and focus (Engen, 2014).

It follows from our findings that the Ugandan risk governance system has a hierarchal structure within the organizations. The system is recognized by lack of team orientation, a need to control and secrecy. According to Engen (2014) the choices of regulatory approach is dependent on the political culture. Hence, Norway, with a self-regulative approach, may not be the most appropriate country for Uganda to cooperate with. When the prerequisites differ as much as they do between Norway and Uganda, these dependent conditions may complicate the adaption

process. Consequently, the major differences create possibilities of tacit knowledge due to different understandings. Thus, this may put the focus towards the wrong role model.

Following the theory, a country more similar to Uganda may have more equal conditions and challenges. Hence, a system that will be easier to implement. Considering the discussion on the Oil in Uganda website, Ghana's risk governance system appears to have many of the same challenges and prerequisites as Uganda. From this view, it may be more appropriate for Uganda to cooperate with Ghana.

Given that every system is highly integrated into their local context (Lindøe et al., 2014), it may not matter whether Norway, the United States or Ghana is the partner, despite the great differences. The Ugandan actors make the choice of whom they want to cooperate with to obtain a robust risk governance system. This decision has an impact on the development of the system.

Following this assumption, even for systems with similar prerequisites, there are always many hidden aspects of the iceberg, under the water level. Uganda can never receive the whole "technology package" (Olsen & Lindøe, 2009). The focus on achieving a wider understanding of the system, and its strength and weakness when implementing it into a new context, will always be important. This focus is more important than the similarities of the systems. Thus, the key knowledge when transferring technologies is the understanding of the benefits and challenges of the system, the aim with the system, and which adaptations that is required. Hence, the motivation of the Ugandan actors and the choice of cooperative country will be of utmost importance for the development of their risk governance system.

### **6.1.3 Focus on capacity**

There has been a focus on increasing the capacity in Uganda in order to implement and maintain a risk governance system in two ways. Firstly, to increase the knowledge level for governmental employees. Secondly, to ensure that the strategies and structures of government departments are adequate. This is in line with the definition of Aven and Renn's (2010). These two measures are discussed below.

## *Learning*

In theory, learning is important for the transfer of risk governance systems from Norway to Uganda. Learning is not an element that is transferred, it is developed throughout the process. However, learning is critical in the transfer process. The learning aspect is established and contributes to a greater understanding of the technologies and its adaptability.

Technologies will gradually improve as the actors gain more knowledge and experience (Olsen & Lindøe, 2009). This is emphasized through the iceberg model where learning contributes to reduce the likelihood of omitting tacit knowledge. Therefore, preparations for learning through different activities contribute to increased understanding of the whole risk governance system.

The strategy for increased knowledge is consistent with Olsen and Lindøe (2009) who emphasizes that knowledge is perceived through education, experience and values in the environment. Correspondingly, this focus is in line with Beer et al. (1990b), which outlines how learning has a positive effect on the implementation of a system. This was also mentioned during discussions on Oil in Uganda's Facebook page whether Uganda has the relevant capacity to handle a growing petroleum industry.

Learning is a complex process related to transfer of technologies, since obtaining a complete understanding is a perpetual process. Particularly the elements under the surface in the iceberg model are difficult to learn and understand. The experience is, however, that the actors involved in the transfer process are managing these uncertainties. Firstly, "sender" and "receiver" has both visited each other countries for a longer period and experienced the systems and environments. Secondly, there is a permanent presence of Norwegian actors in Uganda, supporting the practice of new technologies in the local context. Lastly, the focus on having a Norwegian actor located in Uganda reduces the misunderstandings and tacit knowledge. The "sender" has a greater understanding of their local context, in addition to experience from the host local context. Following Olsen and Lindøe (2009), learning happens in an environment and through interaction with other people. Thereby, a focus on learning contributes to greater understandings.

However, these skills are gained through years of experience, and the skills will never be completely transferred. Even though the Ugandan Government prioritizes considerable amount of time to strengthen the capacity in the system, the production is not yet commenced. The

important work experience will not be gained until after production start. As Garud (1997) emphasizes, know-why must be obtained through learning and experience, by being in the working environment. This is required to understand the principles and theories underlying the functioning of the technological system. Garud (1997) thereby confirms the importance of work experience, which can not be obtained until after production start.

### ***Structure***

Another important aspect regarding the focus on capacity building is the orgware of the technology. Following Olsen and Lindøe (2009), when changes appear in one or more of the technological elements, other elements must be adjusted accordingly. This entails that the structure around the elements must be in place to support the elements and to ensure the sustainability of the changes. The new structure in PEPD is a replicate of the Norwegian structure with the departments responsible for the petroleum industry being divided in three. This structure increase the capacity of the Ugandan risk governance system since the individual departments operates independently and therefore can specialize in their areas. Thereby, the structure is profitable for the Ugandan risk governance system and it also confirms its adaptability.

In addition, the division in PEPD is preventing corruption because it clarifies the roles. When one department is responsible for passing the laws and another department is enforcing the laws, there is a double-checking of regulations. The new structure puts actors into a new organizational context, and thereby change conditions, attitudes and behavior (Beer et al., 1990b). Following Olsen and Lindøe (2009), technologies in use will gradually improve as the actors gain more knowledge and experience, which in turn improve the robustness of the system.

#### **6.1.4 Focus on time prioritization**

The Ugandan Government focuses on increasing capacity within the risk governance system before the production starts. It requires technological change over time during the transfer process. Following Aven and Renn (2010) institutions and organizations must be strengthened so that they are empowered to perform their tasks in the most effective and fair manner. Implement changes and understand the whole technological picture is a process. Thus, the focus on time contributes to increase the capacity of the system.

However, Norway has worked at developing a coherent, integrated legal framework for regulating HSE in the petroleum industry for more than 30 years. Following, technologies do gradually improve as the stakeholders gain more knowledge and experience (Olsen & Lindøe, 2009). It is expected that Uganda has a robust and well-functioning system in place before production starts in 2018. In addition to the shortage of time, Uganda does not share the same foundation and preconditions as Norway. Thus, capacity building takes time but is crucial to create and obtain a sustainable risk governance system.

One cannot learn the theory without gaining experience from practical work (Imsen, 2005). There appears to be a trend within the government that the employees spend more time at conferences than working in the office. This means the care-why regarding focus on learning is not completely utilized. A balance between networking and education, and practical experience must be found. As Olsen and Lindøe (2009) states, technological change require the technology to be adaptable to the context and working environment. This means one must spend time in the context to see the benefits and limitations. Following Olsen (1996) interest and motives, affect actions, and so the learning outcome. Spending more time at conferences abroad may hamper the implementation of the technological elements.

### **6.1.5 Summary**

The focus within the cooperation between Norway and Uganda is mainly on improving the Ugandan risk governance system. This is done by looking to Norway and using elements of the Norwegian system, which is seen as beneficial for Uganda. Only individual elements are transferred, not the entire system, since this is considered an impossible task. Norway is the cooperating country. The shared experiences and adapted elements appear as a blueprint of the Norwegian risk governance system. Other options are not considered, which is unfortunate. By transferring only certain elements, and not the entire system, it is important to monitor changes in composition of transferred elements. The operations and risks of the elements may change due to the lack of supporting elements.

The motivation needs to be initiated by the Ugandan actors. Motivation is a central part of the transfer process, due to choice of cooperating country and emphasis within the transfer. Increased capacity and focus on time prioritization to ensure good implementation is considered to be crucial, and a step-one in the transfer process. The capacity is increased through measures

made regarding learning and structural changes. However, experience based knowledge cannot be compensated by planning and education.

## **6.2 Research question 2**

*What impact has the present capacity in the Ugandan risk governance system on the implementation of new technology?*

Firstly, the importance of knowledge in the system is discussed. Further, the efficiency and its impact on the implementation is explored. Following, composition and involvement of stakeholders are studied. Lastly organizational structure and its impact on implementation of new technology are outlined.

### **6.2.1 Importance of knowledge**

The presence of knowledge in the Ugandan risk governance system contributes to a complete understanding of the technology and achieves the know-how. As stated in Røvik (2007) and Olsen (1996) the competence and knowledge of the involved individuals and organizations are the critical success factor for the implementation of new technology.

The Ugandan Government has an inside-out position to the process and a direct relationship in the decisions of the selected technology (Olsen, 1996). Extensive knowledge about their own internal systems and the possible outcome of the changes is required. Even though know-how is sufficient knowledge to perform a task, it is required that the government has a know-why understanding of the risk governance system and the necessary preconditions.

The findings indicate that the two most influential stakeholders have the ability in terms of competence to manage the new technology in a safe manner. Moreover, PEPD will therefore be capable of selecting technologies that are suitable for the system. As Olsen and Lindøe (2009) states, the important aspects of technological systems may be hidden although it is in the environment while in use. Accumulation of the know-why aspect can therefore be path dependent. A close working relationship and cooperation, like Norway and Uganda has created, will increase the understandings of the principles underlying the risk governance system. Thus, convert some of the tacit knowledge to be explicit for sharing between the parties.

The petroleum companies receive guidance from the Ugandan Government in how to manage and comply with the new laws, and understanding their responsibility. The individual capacity has increased for the petroleum companies following that learning happens in interaction with others (Olsen & Lindøe, 2009). This guidance and learning is necessary, as the laws can be interpreted differently. The guidance by the government contributes positively and creates similar compliance to the new laws and common understandings between actors. The orgware seem to have been strengthened as a result of this focus. This development has promoted a more solid risk governance system.

Furthermore, questions relating to the justification and implementation of changes are raised. The environmental impact assessment is an example of this issue. The report was not completed on time and the decisions were made before the report was reviewed. This example demonstrates poor decisions and the lack of understanding by the government. As man-made disaster theory argues, human factors such as knowledge has an impact and may cause undesired events. Therefore, implementing new strategies and procedures requires the stakeholders to achieve knowledge on know-what, know-how and know-why to be able to understand the technologies and its advantages and consequences.

### **6.2.2 Efficiency**

The frustrations of the lack of efficiency in the Ugandan system are a challenge for the petroleum companies. The petroleum companies in Uganda are considered serious stakeholders with focus on HSE management. They appear as important players in the risk governance system. Thereby, a part of what make the elements function the way it is intended in the system (Rasmussen, 1997). Consequently, operating with “African time” could lead to departure of the serious petroleum companies.

“African time” may appear as an underlying precondition, which entails that governments choices must take this into account. The 24/7 monitoring approach take into account that actions are slow in the country. This is supported by the findings that the petroleum companies can see the strategy as positive, because it removes the slow approval process. Moreover, the approach facilitates a dialogue with the government on a day-to-day basis, which is beneficial during drilling when decisions are made frequently. From this point of view, the government is creating a solution suitable for their local context. Thus, understand the underlying preconditions, and how it is valuable for the Ugandan risk governance system.

### **6.2.3 Interplay of stakeholders**

The presence of only two main stakeholders can have an impact on the risk governance system. Aven and Renn (2010) highlight the importance of how the governing choices are seen as an interplay between all stakeholders in the industry. If not all stakeholders are involved, the risk picture can change, and certain risk aspects may be left out. Following the man-made disaster theory, this lack of involvement increase the possibility for undesired events (Pidgeon & O'Leary, 2000). A risk evaluation, such as RNNP, performed by the stakeholder cooperation will only include the views of the government and the petroleum companies. This will eliminate the risks seen by the NGOs, unions, sub-contractors and society. Stakeholders from different levels contribute with different knowledge and values, which should be considered (Aven & Renn, 2010). Lack of inclusion and involvement in the interplay could be consequence. The rationality of the risk-based decisions could be different in the transfer (Aven & Renn, 2010). Consequently, this has a large effect on the risk governance system in Uganda as not all stakeholders in the industry are involved in the risk evaluation.

To include a third party, like unions and NGOs, in the risk governance system, would require these smaller stakeholders to increase their capacity (Aven & Renn, 2010). As the findings indicate, these stakeholders do not currently have the knowledge or structure to join as a third party in the collaboration. Thereby, it would not strengthen the risk governance system if a third party was included, as the parties are not equally strong.

The risks emphasized by NGOs, Unions, contractors and media are seen as a challenge by the government. The opinions of all these actors are causing problems for the government in a society with lack of focus on safety and security. Following Olsen (1996) and Røvik (2007), the lack of focus affects the technology transfer. However, the interests and motives to the stakeholders are guided by the information about alternatives and the knowledge they have about technologies and risks (Olsen, 1996). Since the majority of the NGOs and unions are informed through media their focus is mainly on the environmental issues attached to the petroleum production. Consequently, it is difficult for the government to make these stakeholders understand the importance of other risk related issues. Following the definition of capacity, this highlights the importance of being transparent towards all stakeholders.



The interplay between the stakeholders are of more importance, than the individual capacity. This is supported by Rasmussen (1997) who emphasize that a system is more than the sum of its elements. The way these stakeholders interact and make up for the lack of capacity in some actors will, based on this statement, be the important feature of the system. If the government guarantees the safety of the workers, the union can focus on their specialty areas, as for example salaries. Thus, as long as one stakeholder is managing what needs to be managed, the system as a whole will still have the capacity.

#### **6.2.4 Organizational structure**

It is clear that the hierarchical structure is a challenge to the capacity in the government. In Norway, the structure is flat and this has an effect on the elements being implemented. These two structural choices, as orgware elements, are different and have an impact on the way the industry is functioning (Aven & Renn, 2010).

Moreover, some of the transferred elements have high focus on trust, cooperation, interaction, and the option to think outside the strict limitations. However, in the Ugandan risk governance system, these aspects are harder to identify and develop. This means that some of the implemented elements do not have the required prerequisites supporting the functionality (Olsen & Lindøe, 2009). In other words, there is a possibility of the implementation not being successful.

Lack of creativity, hiding of information and individual orientation results that the knowledge within the risk governance system is not being completely utilized. These factors have to be acknowledged as preconditions in the Ugandan risk governance system (Aven & Renn, 2010). Contrary to Norway, these features are valued and important aspects of the system. These preconditions limit the implementations, and it is not socially acceptable to implement all the suggested orgware elements (Olsen & Lindøe, 2009). Thus, the challenge is to implement the changes in an environment where the structure is different and the fundamental values vary.

This corresponds to the discussion in research question one in relation to understanding how changes will affect the system, and how the system will affect the changes. Thereby, different preconditions are not seen as a hinder in implementation of technologies, rather as a characteristic of the local context, needed to be considered when contextualizing a technology.

### **6.2.5 Summary**

High competence and knowledge of the stakeholders are in negative correlation to the uncertainties related to implementation of new technology. With increased knowledge, competence and know-why, the uncertainties are reduced. The Ugandan Government and the petroleum companies have the required knowledge, and in cooperation with the Norwegian Government through the OfD program they have the required capacity to successfully implement new technology.

The efficiency of the system is related to time management. The expression “African time” implies that things take a long time. This fact challenges the capacity within the Ugandan risk governance system and has an impact on the functioning of the new technology.

The interplay of the stakeholders are challenging the implementation due to lack of information and involvement in the system. However, it is only the government and the petroleum companies who are perceived as the influential stakeholders. As long as two strong stakeholders cover all aspects of the system, this will positively affect the implementation of new technology. Lack of stakeholders concerned about workers interest may make decisions biased, and hence reduce the efficiency of the decisions.

The organizational structure is affected by the Ugandan culture and preconditions. Preconditions complicate the implementation as they needs to be considered when contextualizing elements.

## **6.3 Research question 3**

*In what way is trust present in the Ugandan risk governance system?*

Trust is strongly integrated in the Norwegian risk governance system. The analysis contains trust in the social climate, the presence of trust through understanding and as an instrument.

### **6.3.1 Trust in the social climate**

It appears that the presence of trust or distrust in the Ugandan risk governance system is understood differently by several of the informants. Both Lewicki and Wiethoff (2000) and Kerkhof et al. (2003) brings up the complexity in trust, and that trust can be seen from different

perspectives. As findings emphasize, the stakeholders in the cooperation trust each other's competence and skills. This implies that the stakeholders trust each other to perform safe operations. Seen from the relational perspective, all informants trust the skills and competence of the other stakeholders, which is seen as a part of cognitive trust. However, as the affective trust focus on the care demonstrated by the trusted party, different motivations could affect the trust relationship in the stakeholder network.

The findings show that secrecy, corruption, lack of motivation and different values internally and externally are part of conditions found in the Ugandan risk governance system. This indicates that the social climate consists of distrust. Lewicki and Wiethoff (2000) present one view of trust, seen from the relational perspective and emphasize how social motivation within trust is essential. As the findings implies, the informants are concerned about the other stakeholders' motivation regarding internal and external goal orientation, and the personal motives of the employees. Following, the personal motivation of the employees affects the choices they make (Asbjørnsen et al., 1999). One example is the 24/7 monitoring approach which is an opportunity for the regulators to earn higher salaries as observers. This extra payment is often necessary, as Uganda does not have an established salary system. The motivation is therefore shaped by the cultural baggage apparent in Uganda (Olsen, 1996). Thereby, distrust is a precondition in the Ugandan risk governance system.

### **6.3.2 Trust is present in the way Ugandans understand trust**

The findings indicate that the trust present in Uganda can be seen from a rational trust perspective. Hence, trust is a choice behavior of seeing the positive consequences of trusting the other actors (Lewicki & Wiethoff, 2000). The positive consequences relates to findings are amongst others financial benefits, functioning of the elements and an easier regulatory system appearing in Uganda. A system not dependent on trust will require clarity of roles and a strict follow up, due to the dynamic environment the petroleum industry operates in. Thus, the positive consequences of choosing to trust are apparent. This implies that Ugandans sees trust as purely instrumental, where social motivational drives are not included. Thereby, there is a presence of rational trust in the system.

As Gilje and Grimen (1993) states, different understandings is a result of different experiences and information. The iceberg is multidimensional and looking at the iceberg from different angels will display different issues, trust and tacit knowledge. Furthermore, Bhatt (2002)

emphasize how that subjective observations of the information is the crucial part of knowledge. Therefore, trust can be viewed as ambiguous knowledge. The Ugandan actors view of trust vary from the view of the Norwegian risk governance system. This supports the view that trust exists in the Ugandan risk governance system through choice behavior in the way these stakeholders understand trust.

It seems clear that Ugandan actors have a know-why understanding of the Norwegian risk governance system. This finding is in relation to the Ugandan actors understanding of how prerequisites, such as trust are found dependent in the system. Following Cohen (2004), this is a result of an understanding of the combination of inforware, technoware, humanware and orgware within the Norwegian risk governance system. Considering the definition of know-why, the knowledge Ugandan actors have gained about the Norwegian risk governance system includes an understanding of the principles underlying the system. Thereby, this definition supports the findings. However, trust does also have principles underlying its concept that needs to be understood. Thereby, trust is perceived differently between Norwegian and Ugandan actors.

### **6.3.3 Trust is present as a strategic plan**

It appears that the government in Uganda tries to create trust through technoware elements. Building a risk governance system based on trust can affect and change the attitudes held by the stakeholders, and thereby create trust. According to Beer et al. (1990b), conditions and behavior will change more effectively if they are put into a new organizational context that imposes new roles, responsibilities and relationships. This idea is supported by Rasmussen (1997), which highlights the necessity to focus on the mechanism generating behavior in the environment. A new structure will from this point of view generate behavior, and contribute in creating trust. This view confirms that if a trusting environment is found to be beneficial, choices of control can be created before a trusting culture is integrated.

The changes that are planned for Uganda accommodate for a trusting culture. One example is the development of the NOC. A great part of the informants from the petroleum companies complained about rejection of plans and expenses regarding risk management. It is expected that a NOC will increase the mutual understanding between the government and petroleum companies. In view the concerns that petroleum companies don't understand the reasons behind rejections, the development of a NOC might be the element needed to increase the mutual

understanding regarding cost and planning for risk management. Thus, create trust through implementation of a strategic plan. In view of the relational perspective, all ends up in common interests for a robust risk governance system. Thus, the technoware will change the humanware and orgware seen in light of actions and attitudes.

These arguments open up for opportunities for Ugandan actors to create trust through technoware elements. Despite this, one should consider whether changes in technoware are sufficient to create trust in the system. In light of the theory, when changes appear in one or more of the technological elements, changes are required in other elements to ensure the balance of the technological system will work as intended. Considering the view of Beer et al. (1990b), the only organizational context that is changed using this strategy is the technoware. As the humanware, inforware and orgware are other important elements in a risk governance system, these elements may generate resistance to the changes. Considering the view that each country is such a complex product of its own technology, history, political institutions, culture and management, underline the idea that trust as a strategic plan can be a challenge (Bang & Thunestad, 2014).

The balance around technoware, which in Norway is perceived as trust dependent, in a country where there is a lack of trust, will have an impact on the technology. All four components form a seamless web that constitutes technological pathways (Engen, 2014). This raises the question whether the advantages arising from technologies, disappear when they are implemented into a different stakeholder network, where the relationship is not as strong between the stakeholders. This is acknowledged through how the whole system needs to be taken into account, including stakeholders involved and its social climate (Aven & Renn, 2010).

By creating trust through a strategic plan, the Ugandan Government has an instrumental view on the system. This is a narrow view of an organization where the background and the cultural baggage of the individuals included are not considered (Gilje & Grimen, 1993). As findings show, the social climate in the Ugandan risk governance system consists of distrust. Considering that all elements are equally balanced within a risk governance system, trust will affect the implementation and functionality of the technology. In other words, the social construction cannot be left out when considering how the elements will work in practice. Therefore, to expect trust to be built through planning and implementation of structures alone is a too narrow understanding of a complex system.

Seen from another point of view, trust is not generated over night (Lewicki & Wiethoff, 2000). It is a need to create a structure and interactions, opening up for trust and thereby trust will follow. This is supported by Olsen and Lindøe (2009), which emphasize that technologies in use gradually will improve as the actors gain more knowledge or experience. Thereby, choice of regulation strategies can, over time make the Ugandan risk governance system move towards a trust relationship between the government and petroleum companies.

#### **6.3.4 Summary**

The presence of trust is one of the main prerequisites in Norway. Findings show that trust is not present in the same way in Uganda. However, trust can be seen from a different perspective. It appears that the Ugandan risk governance system have a rational trust perspective. Trust is present as an instrument that can be created through design of systems. However, the social motivation drives, which includes important mechanisms within a risk governance system are not included from this perspective. This creates a narrow understanding of a complex system built on distrust. Nevertheless, trust can be built over time, as long as the structure and stakeholder interactions are receptive towards trust.

## 7. Conclusion

The purpose of this study is to identify what promote and/or hamper the transfer of risk governance systems from the Norwegian petroleum sector to Uganda. The Norwegian risk governance system is complex and strongly integrated in the Norwegian petroleum industry. It is argued that the concept of transferring such a complex and integrated system requires considerations of parameters promoting and/or hampering the transfer. To find these parameters, three research questions were created. These questions emphasized the relevant actors focus areas within transfer of risk governance systems from Norway to Uganda. Furthermore a study of the impact the present capacity can have on implementation of new technology, and in what way trust is present in the Ugandan risk governance system.

Several parameters would promote and/or hamper the transfer of a technological system. As a technological system includes technologies, organizational routines, information and knowledge, it is easy to understand that this creates challenges in the transfer process. Therefore, we still have an impression that the claims regarding the transfer of risk governance systems, and the findings of the present conditions in Uganda, are a rough simplification of a very complex picture. Despite the limitations made, we are still facing two very different systems with a large number of actors making up these systems. In addition, the study context is in a dynamic environment where changes appear continuously. Particularly in Uganda, as the country is moving closer to production. Following, the full effect of the technology transfer will not appear until after production begins. This reduces the validity of the conclusions drawn.

However, through this study, we have found some central parameters that we believe will promote and/or hamper the transfer of risk governance systems. We have not divided our findings into which ‘hamper’ and ‘promotes’ the transfer, as the parameters outcome are depending on the conditions, and could be both hampering or promoting the transfer.

The main conclusions drawn are categorized through “*interplay*” and “*characteristics*” among the involved actors in the transfer process, “*time*” and “*preconditions*” in the systems.

The *interplay* among the involved actors in the transfer process is of importance regarding *understandings*. This is because implementation of technologies is dependent on the actors and organizations involved, and their existing knowledge about technologies, and the local contexts.

Actors' understandings can thereby hamper and/or promote the transfer. Different understandings create uncertainties and unclear underlying latent conditions when transferring technologies, which hamper the transfer process. It is likely that a transfer will be colored by the system apparent in the "senders" local context, and this needs to be considered when selecting a cooperating country. *Inclusion and involvement* horizontally in the cooperation, as well as vertically in the system, will promote and/or hamper the technology transfer. All stakeholders need to be included, to be able to choose and implement a technology to a new local context.

The *characteristics* of the actors involved in the transfer process are found upon *motivation, willingness* and *knowledge*. *Motivation* and *willingness* is parameters creating different views and actions. It is perceived that actors involved in the transfer process can have different motivations regarding personal gain and risk perception caused by the varying local contexts. Different motivations and willingness thereby affects the adaption of systems and could be a promoting and/or hampering parameter. *Knowledge* is an influential parameter that will hamper or promote the transfer due to what extent there is a *know-why understanding* of the systems.

*Time* builds trust and generates experiences, competence and understandings. Prioritization of time is therefore a parameter seen as promoting technology transfer and contributes to reduce the tacit knowledge within the technologies. However, the balance of time is a challenge as all actors require different time schedules and have different expectations.

Different *preconditions* in the system can be seen as a characteristic of the local context and needs to be considered when contextualizing a technology. Preconditions such as creativity, team orientation, efficiency and trust can challenge the capacity, and therefore the implementation of new technology. Thereby, capacity is a promoting and/or hampering parameter. This means that with increased *capacity* through knowledge that includes a know-why understanding, uncertainties are reduced.



## **7.1 Contribution**

Technology transfer can be beneficial and contribute to create a more robust risk governance system, as long as it takes certain aspects into account. Our study contributes to a better understanding of which aspects are important to consider in a technology transfer. This understanding is useful in terms of both capacity building, and as technology transfer between national and international organizations. “Recipient” and “sender” organizations will therefore benefit from this study in terms of understandings about parameters that promote and/or hamper transfer of risk governance systems. Thus, better understanding will reduce uncertainties and vulnerabilities in the transfer process and systems.

## **7.2 Future research**

Firstly, it would be interesting to repeat this study in five to ten years when Uganda is a petroleum producer and further observe how Uganda manage after termination of the OfD program. If the changes at government level have affected the rest of the petroleum industry, this will be seen as a positive development. It would also be interesting to compare the development of Ugandan risk governance system to other developing countries. Either countries that takes part in the OfD program, or countries that manage on their own and use other risk governance systems as a basis. Such studies can contribute to better understandings of the advantages and challenges created by the adapted elements. Further, a study aiming to understand what elements could be transferred and in what order these elements should be adapted. It would be interesting to study if there are any requirements in the order to follow when developing capacity.

Another interesting topic to study is Uganda’s considerations for selecting a “sender”, which in this case is Norway. What are the important qualities of the “sender”, and how can this affect the transfer. Alternatively, one may study which requirements the “sender” should look for in the “receiver” country in order to have success with the OfD program.

It will also be interesting to study the inner and outer context concept of the OfD program for other countries cooperating with Norway, for example Tanzania.

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## Appendix 1 – Actors in the OfD program regarding risk management

OfD cooperation	
Norway	Uganda
<p><b>Overall:</b> Norwegian Ministry of Foreign Affairs (Chair), Norwegian Ministry of Petroleum and Energy, Norwegian Ministry of Finance, Norwegian Ministry of Environment, Norad (secretariat), Norwegian embassy in Uganda, Petrad</p>	<p><b>Overall:</b> Ministry of Energy and Mineral Development , Ministry of Finance, Planning and Economic Development, Ministry of Water and Environment</p>
<p><b>Implementing agencies:</b> The Norwegian Petroleum directorate, Petroleum Safety Authority, Research institutions, Consultants</p>	<p><b>Implementing agencies:</b> National Environmental Management Authority, The Petroleum Exploration and Production Department</p>



## Appendix 2 – List used in literature study

Author	Name
<b>Eggen, Ø. (2013)</b>	Oil For Development; challenges and success
<b>Eggen, Ø., &amp; Raha, H. (2012)</b>	External evaluation of LO-Norway's cooperation with National Organization of Trade Unions (NOTU)
<b>Fulgestad, N. H. (2013)</b>	Knowledge transfer and capacity development regarding risk management in the Oil Industry.
<b>ILPI. (2013)</b>	Risk assessment for the oil for development programme in Uganda
<b>MEMD. (2010)</b>	A development Programme in Co-operation with Norway
<b>MEMD. (2013)</b>	Strategic Environmental Assessment of Oil and Gas Activities in the Albertine Graben, Uganda
<b>MEMD. (2014)</b>	Report to the fifth annual meeting for the programme "strengthening the management of the oil and gas sector in Uganda
<b>Shepherd, B. (2013)</b>	Oil in Uganda; International Lessons for Success
<b>Total E&amp;P Uganda (2014)</b>	Safety results from 2013
<b>Tullow</b>	Safety results from 2013
<b>CNOOC</b>	Safety results from 2013

### Appendix 3 – List of informants

	Organization	Description	Level	Interview guide
Norway				
	NPSA	Manager, male (Uganda OfD program)	Strategic	4
		Manager, male (another OfD program)	Strategic	4
	Norwegian Embassy in Uganda	Middle manager, female	Strategic	4
	OfD resident coordinator	Manager, male	Operational	1
Uganda				
	CNOOC	Middle manager, male	Actors in risk governance system	2
	Total	Manager, male	Actors in risk governance system	2
	Tullow	Middle manager, female	Actors in risk governance system	2
		Middle manager, male	Actors in risk governance system	2
	NGO	Middle manager, female	Actors in risk governance system	5
		Middle manager, female	Actors in risk governance system	5
	Union	Manager, male	Actors in risk governance system	5
	PEPD/MEMD	Middle manager, male	Operational	3
		Middle manager, male	Operational	3
		Manager, male	Strategic	3

## **Appendix 4 – Interview guide**

### **1 - Interview with operational actors in the cooperation (Norway)**

#### **General**

- What role do you play in the OfD program?
- What level do you work towards? Government/ petroleum companies/unions?
- How long have you worked with the OfD program? What is your background?

#### **Cooperation**

- From your point of view, what has been the major changes in the system after the cooperation began?
- How is the Ugandan culture accepting the proposed changes?
- How does the changes align with the Ugandan Culture?
- Cross cultural understandings
- How do you think the Norwegians perceive the Ugandan culture?
- How do you talk together about cultural differences?

#### **Achievements (What is working and why)**

- What are the achievements from the OfD program?
- Why are these changes considered achievements?
- Are they long term achievements?
- Are they sustainable?
- What do you think is the reason for these achievements?

#### **Challenges**

- What are the challenges for the OfD program?
- Why are these factors considered as challenges?
- How are these challenges manageable?
- Some of the changes are major changes in organizational and governmental structure, how are these changes received and implemented in practice?
- What are the major uncertainties around the program?
- What are the major uncertainties around risk management of the petroleum sector?
- What are the challenges ahead in the program?

#### **Development and changes**

- Previous system of Petroleum operations at governmental/regulatory level:
- How was the systems before the cooperation with Norway?
- What has been brought forward from the previous system (as important elements)?
- How are the laws compared to Norwegian laws and regulations?
- The Working Environmental Act??
- Petroleums Act?
- How are the functional based regulations incorporated into the new act?
- How is this received by the involved parties?
- What are the necessary elements to effectively enforce regulations
- What other systems has been in place for other natural resources previously?

- Are the current system in line with those regulations?
- What has been brought forward from these systems?
- What changes have been made since the cooperation started?
- Some elements that came more natural?
- What elements are more challenging?
- How the is process with the division of PEPD coming along?
- Some of the changes are major changes in organizational and governmental structure, how are these changes received?
- Where in the process is Uganda in establishing a national oil company?
- Why do Uganda see it as necessary to establish a national oil company?
- How will this play a role in the petroleum industry?
- There are planned changes to the supervision strategy approach to move away from 24/7 monitoring. How are these plans coming along? What are the plans ahead?
- What is your perception of the cooperation between the Government, Unions and oil companies? Do they manage to work together?
- Has there been a change in the relationship between the regulators and the oil companies since the cooperation between Uganda and Norway began?
- In what way has the risk perception in general changed since the start of the OfD cooperation?
- What visible changes have been made?

#### Actors

- Who are the relevant actors, other than the government and oil companies, in the Ugandan petroleum industry?
- Eks. Unions, communities
- What unions (labor organizations) are present in Uganda?
- What is their role in the current system? In what way are they involved and cooperating with the government and oil organizations?
- Who else has played a role in the preparation of HSE in the petroleum industry
- Can you help us get in touch with these organizations / representatives?

#### Risk governance

##### Tripartite system

- What is your perception of the cooperation between the Government and oil companies?
- Are there any forums or discussion opportunities between the Government and the oil companies?
- Is the aim to develop a tripartite system in Uganda?
- What do you expect the challenges to be?

#### Internal Controls

- Has there been any requirements placed on the oil companies in relation to their internal controls?

#### Functional based regulations

- This has been implemented for a year now in the Petroleum Act, how has this been received by the oil companies and the industry?

- How have you assisted the oil companies in reaching these functional based regulations?
- In what way has the risk perception in general changed over the last few years?

### Pre-requisites

- What do you feel has been the necessary pre-requisites to implement the changes and to make them sustainable?
- What are specific to risk management?
- What are important framework conditions to consider in Uganda?
- Politics, environment, culture, economic stability, infrastructure?
- What are required to ensure the changes are implemented and remain implemented?
- How do you explain the prerequisites and the knowledge in praksis?
- How did you obtain understanding of Ugandan culture and way of working?
- How is tacit knowledge handled?
- What are the pre-requisites for the risk management system (tripartite system, internal control and functional based regulations) to function in Norway?
- Eks. Trust, competence, equality, communication, transparency,
- Are these pre-requisites present in Uganda?
- How do you view the use of time in the processes in Uganda?

## 2- Interview with actors in the Ugandan Petroleum Industry

### General

- What is your role in the organization and what is your background?
- How long have you organization been in Uganda?
- Do you operate in other similar countries?
- What do you know about the OfD program?
- How involved are you?
- How do you view the program and the cooperation between countries?
- **Cooperation**
- From your point of view, what has been the major changes in the system after the OfD program cooperation began?
- How is the Ugandan culture accepting the proposed changes?
- How does the changes align with the Ugandan Culture?

### Development and changes

- From your point of view, what have been the major changes in the system in the last years (2009)?
- What is positive with the new changes?
- What are the challenges with the new changes?
- In what way are the changes sustainable?
- What role do your organization play in the development of the petroleum industry?
- In what way are the changes in line with your internal culture and practice?
- How many of your employees are from Uganda? Do you have specific policies to employ employees from the resident country?
- What skills do these employees have?

## Challenges

- What challenges do you as an international oil company meet in Uganda?
- Are these specific to Uganda?
- Why are these factors considered as challenges?
- How are these challenges manageable?
- Some of the changes made in the last few years are major changes in organizational and governmental structure, how are these changes affecting your organization?

## Changes in the Uganda Petroleum Sector regarding HSE

- How has the new petroleum act affected you?
- How does this act require changes in how your company's risk management practices are performed?
- What is your view on the cooperation between the Government and oil companies?
- How is your company's cooperation with the government?
- Who do you cooperate and communicate the most with?
- How is your relationship with the new PSA?
- The government is moving towards functional based regulation, what is your view on that?
- How does this affect you?
- Do you operate in that was in other countries?
- Is it effective for your operations?
- What is your view on Uganda establishing a national oil company?
- How will this play a role in the petroleum industry?
- In what way has the risk perception in general changed over the last few years (2009)?
- What visible changes have been made?
- How has this affected you and the way you operate on a daily basis?
- What are the challenges and uncertainties for the Ugandan petroleum industry regarding risk management?

## Actors

- Who are the relevant actors, other than the government and oil companies, in the Ugandan petroleum industry?
- Eks. Unions, communities
- How is your cooperation with them?
- Who else has played a role in the preparation of HSE in the petroleum industry?
- **Prerequisites**
- What has been the necessary prerequisites to implement the changes and to make them sustainable?
- What are specific to risk management?
- What are important framework conditions to consider in Uganda
- Politics, environment, culture, economic stability, infrastructure
- What are required to ensure the changes are implemented and remain implemented?

### 3 - Interview with operational and strategic actors involved in the cooperation (Uganda)

#### General

- What role do you play? How long have you been working there? What is your background?
- **Cooperation**
- Who is involved with the cooperation between Norway and Uganda?
- From your point of view, what has been the major changes in the system after the cooperation began?
- How is the Ugandan culture and society accepting the proposed changes?
- How does the changes align with the Ugandan Culture?
- How is this Cooperation working? Does Norway have people in Uganda at all times? Does anyone from Uganda travel to Norway?
- Are there any other countries or systems that is used as inspiration to the new system in Uganda?

#### Cross cultural understandings

- How do you think the Norwegians perceive your culture?
- How do you talk about cultural differences?
- How do you decide what to focus on from the Norwegian model?
- How do you see the different risk management aspects of the Norwegian model generalized so it can be used in a different context?

#### Development and changes

- Previous system of Petroleum operations at governmental/regulatory level:
- How was the systems before the cooperation with Norway?
- What has been brought forward from the previous system (as important elements)?
- What other systems has been in place for other natural resources previously?
- Are the current system in line with those regulations?
- What has been brought forward from these systems?
- What changes have been made since the cooperation started?
- Some elements that came more natural?
- Some elements that are more challenging?
- How the is process with the PSA coming along?
- What is the status regarding establishing a national oil company? When is this expected to be in operation?
- Has there been a change in the relationship between the regulators and the oil companies since the cooperation between Uganda and Norway began?

#### Achievements (What is working and why)

- What are the achievements from the OfD program?
- Why are these changes considered achievements?
- Are they long term achievements?

- Are they sustainable?
- What do you think is the reason for these achievements?

### Challenges

- What are the challenges for the OfD program?
- Why are these factors considered as challenges?
- How are these challenges manageable?
- Some of the changes are major changes in organizational and governmental structure, how are these changes received and implemented in practice?
- What are the major uncertainties around the program?
- What are the major uncertainties around risk management of the petroleum sector?
- What are the challenges ahead in the program?

### Actors

- Who are the relevant actors in the Ugandan oil sector?
- Who are the unions or NGO's that play a major part in the development?
- What is the position of the Unions and NGOs in Uganda?

### Risk governance in Uganda

#### Tripartite system

- What is your perception of the cooperation between the Government and oil companies?
- Do you work together?
- Are the oil companies included in the process of setting up new laws and regulations?
- Are there any forums or discussion opportunities between the Government and the oil companies?
- Is the aim to develop a tripartite system?
- What do you expect the challenges to be?

#### Internal Controls

- Has there been any requirements placed on the oil companies in relation to their internal controls?

#### Functional based regulations

- This has been implemented for a year now in the Petroleum Act, how has this been received by the oil companies and the industry?
- How have you assisted the oil companies in reaching these functional based regulations?

#### Risk perception

- In what way has the risk perception in general changed over the last few years?
- What visible changes has been made?

#### Pre-requisites

- What do you feel has been the necessary pre-requisites to implement the changes and to make them sustainable?
- What are specific to risk management?



- What are important framework conditions to consider in Uganda?
- Politics, environment, culture, economic stability, infrastructure?
- What are required to ensure the changes are implemented and remain implemented?

## 4 - Interview with strategic actors involved in the cooperation (Norway)

### General

- What role do you play in the OfD program?
- What level do you work towards? Government/ petroleum companies/unions?
- How long have you worked with the OfD program? What is your background?

### Cooperation

- Who is involved with the cooperation between Norway and Uganda?
- From your point of view, what has been the major changes in the system after the cooperation began?
- How is the Ugandan culture accepting the proposed changes?
- How does the changes align with the Ugandan Culture?
- How is this Cooperation working? Does Norway have people in Uganda at all times? Does anyone from Uganda travel to Norway?
- Are there any other countries or systems that is used as inspiration to the new system in Uganda?

### Cross cultural understandings

- How do you obtain an understanding of the Ugandan culture?
- How do you think the Norwegians perceive the Ugandan culture?
- How do you talk together about cultural differences?
- How do you decide what to focus on from the Norwegian model?
- How do you see the different risk management aspects of the Norwegian model generalized so it can be used in a different context?

### Achievements (What is working and why)

- What are the achievements from the OfD program?
- Why are these changes considered achievements?
- Are they long term achievements?
- Are they sustainable?
- What do you think is the reason for these achievements?

### Challenges

- What are the challenges for the OfD program?
- Why are these factors considered as challenges?
- How are these challenges manageable?
- Some of the changes are major changes in organizational and governmental structure, how are these changes received and implemented in practice?
- What are the major uncertainties around the program?
- What are the major uncertainties around risk management of the petroleum sector?

- What are the challenges ahead in the program?

### Development and changes

- Previous system of Petroleum operations at governmental/regulatory level:
- How was the systems before the cooperation with Norway?
- What has been brought forward from the previous system (as important elements)?
- How are the laws compared to Norwegian laws and regulations?
- The Working Environmental Act??
- Petroleums Act?
- How are the functional based regulations incorporated into the new act?
- How is this received by the involved parties?
- What are the necessary elements to effectively enforce regulations
- What other systems has been in place for other natural resources previously?
- Are the current system in line with those regulations?
- What has been brought forward from these systems?
- What changes have been made since the cooperation started?
- Some elements that came more natural?
- What elements are more challenging?
- How the is process with the division of PEPD coming along?
- Some of the changes are major changes in organizational and governmental structure, how are these changes received?
- Where in the process is Uganda in establishing a national oil company?
- Why do Uganda see it as necessary to establish a national oil company?
- How will this play a role in the petroleum industry?
- There are planned changes to the supervision strategy approach to move away from 24/7 monitoring. How are these plans coming along? What are the plans ahead?
- Has there been a change in the relationship between the regulators and the oil companies since the cooperation between Uganda and Norway began?
- In what way has the risk perception in general changed since the start of the OfD cooperation?
- What visible changes have been made?

### Actors

- Who are the relevant actors in the Ugandan oil sector?
- Who are the unions or NGO's that play a major part in the development?
- What is the position of the Unions and NGOs in Uganda?

### Risk governance

#### Tripartite system

- What is your perception of the cooperation between the Government and oil companies?
- Are there any forums or discussion opportunities between the Government and the oil companies?
- Is the aim to develop a tripartite system in Uganda?
- What do you expect the challenges to be?

### Internal Controls

- Has there been any requirements placed on the oil companies in relation to their internal controls?

### Functional based regulations

- This has been implemented for a year now in the Petroleum Act, how has this been received by the oil companies and the industry?
- How have you assisted the oil companies in reaching these functional based regulations?
- In what way has the risk perception in general changed over the last few years?

### Pre-requisites

- What do you feel has been the necessary pre-requisites to implement the changes and to make them sustainable?
- What are specific to risk management?
- What are important framework conditions to consider in Uganda?
- Politics, environment, culture, economic stability, infrastructure?
- What are required to ensure the changes are implemented and remain implemented?
- How do you explain the prerequisites and the knowledge in praksis?
- How did you obtain understanding of Ugandan culture and way of working?
- How is tacit knowledge handled?
- What are the pre-requisites for the risk management system (tripartite system, internal control and functional based regulations) to function in Norway?
- Eks. Trust, competence, equality, communication, transparency,
- Are these pre-requisites present in Uganda?
- How do you view the use of time in the processes in Uganda?

## 5 - Interview with third parties involved in the Ugandan petroleum industry

### General

- What role do you play in the organization? How long have you been working there? What is your background?
- How long have Oil in Uganda been operating?
- What is the purpose and goals for the organization?
- What do you know about the OfD program?
- How involved are you?
- How do you view the program and the cooperation between countries?

### Development and changes

- From your point of view, what have been the major changes in the system in the last years (2009)?
- What is positive with the new changes?
- What are the challenges with these changes?
- In what way are the changes sustainable?
- How is the Ugandan culture accepting the proposed changes?

- What role do your organization play in the development of the petroleum industry?
- Risk management

#### Challenges

- What do you see as the challenges in the Ugandan oil industry?

#### Changes in the Uganda Petroleum Sector regarding HSE

- Can you tell us about the new petroleum act and how this affects Uganda?
- Can you tell about your organizations cooperation with the government and oil companies?
- Who do you cooperate and communicate the most with?
- What are the challenges and uncertainties for the Ugandan petroleum industry regarding risk management?

#### Actors

- Who are the relevant actors, other than the government and oil companies, in the Ugandan petroleum industry?
- How is your cooperation with them?
- Who else has played a role in the preparation of HSE in the petroleum industry?

#### Risk governance in Uganda

- What is your perception of the cooperation between the Government, Unions and oil companies?
- Do they manage to work together?
- Should they include other parties?
- What does Uganda have that will make this possible to implement?
- What do you expect the challenges to be?
- What is your view on Uganda establishing a national oil company?
- How will this play a role in the petroleum industry?
- In what way has the risk perception in general changed over the last few years (2009)?
- What visible changes have been made?

#### Prerequisites

- What do you feel has been necessary prerequisites to implement the changes and to make them sustainable?
- What are specific to risk management?
- What are important framework conditions to consider in Uganda
- Politics, environment, culture, economic stability, infrastructure
- What are required to ensure the changes are implemented and remain implemented?