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We're in the middle of it: Consultants' role in risk management in the Norwegian petroleum sector

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ABSTRACT

Most risk management research focuses on owner/operators and regulators, and ignores other actors. Preventing major accidents in the offshore oil and gas sector is a key responsibility of the companies that own and operate the infrastructure. Regulatory oversight of their activities comes in the form of industry-specific goal-based regulation administered by a specialist regulatory agency. In this paper we focus on a third actor in the system – the consultants who provide specialist services regarding safety and risk.

Our study draws on interviews with experienced consultants in the Norwegian oil and gas sector (n = 11, average experience 20+ years). Power's concept of riskwork is used to examine how consultants interact with their clients and how they see their role in relation to risk management. The analysis shows that the role of experienced consultants goes well beyond metaphor of the fox guarding the hen house. Rather, consultants contribute to regulatory compliance on the part of their clients but, further, they try to positively influence decision makers beyond simple compliance in order to promote what they believe to be the best safety decision making.

The paper argues that consultants' role in the system is under examined and under theorized. Alongside earlier research, our study indicates that consultants play a big role in risk management, which should be both recognized and scrutinized.

1. Introduction

Risk management aimed at preventing major disasters in interconnected and highly coupled industries relies not only on operating companies and public regulators, but also a myriad of supporting organizations with different responsibilities. Organizations playing various roles in risk management include professional associations (Carter & Mahallati, 2019), self-employed inspectors (van der Heijden, 2010), classification societies (Silos et al., 2013), and safety consultants hired by industry companies (Hale, 1995) or regulatory agencies (Hayes et al., 2022). In many cases, the work of these organizations is linked to either seeking or verifying compliance with regulatory standards (Carter, 2019). This study addresses the role of risk and safety consultants working in the oil and gas sector in Norway. They are hired to provide specialist services by companies that own and operate oil and gas infrastructure for two key reasons – either because the operating company lacks competence inhouse or they need some kind of assessment or verification to be performed by an independent third party.

The roles of consultants are understudied in organizational theory as well as in risk and safety science. In Norway, the importance of tripartite cooperation between operating companies, regulators and the unions is recognized (Forseth and Rosness, 2021; Rosness and Forseth, 2013) but there has been little research on the consultants who form an important fourth group in this complex network when it comes to achieving the desired outcomes. Structural aspects of regulatory effectiveness have been studied intensively in safety science. Even though earlier research indicated that consultants play a major role in companies' and industries' risk management (Almklov et al., 2014; Hood, 2007), these consultancies have hardly been explored. Understanding the consultants' role can give information not only about power structures and decision-making in current risk management, but also how future regulations may be translated and implemented.

Taking a novel approach, this research starts with the day-to-day

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understanding of their work by the consultants themselves. In an empirical interview study on risk regulation, we have had a lens to explore the various roles of the consultants, as they describe their organizational identity and work. Our analysis thus is inspired by Power and his study of riskwork (2016), in contrast to a typical risk and safety study framed around what can go wrong and how it might be avoided.

These considerations lead to this research question: *How do the consultants in the oil and gas industry conceptualize their role in relation to risk management in their sector?*

The next section is about the context for this study, before introducing relevant literature to explain the consultants' role. Section 4 is about our methodological approach. In Section 5 we describe the interview results that are discussed in Section 6. The consultants see their role as intermediaries bridging the gaps between risk regulation or regulators, and the industry companies that hire them. They reduce these gaps with their knowledge, tools and through being a role model in regulatory compliance, by encouraging managerial decisions by their clients that are based on an accurate understanding of regulatory requirements and risk modelling results.

2. Industry setting

The interviews analyzed in this paper take place in and around the petroleum industry. Organizations that operate in the offshore oil and gas industry must manage the ever-present potential for disaster. Accidents such as the Piper Alpha explosion and fire in the UK sector of the North Sea which killed 167 people in 1987 (Cullen, 1990) and the Deepwater Horizon blowout in the Gulf of Mexico that killed 11 people in 2010 and caused major environmental damage (National Commission, 2011) are only two examples of the destructive potential. As such, companies that operate such facilities are subject to significant government regulation. In Norway, this is the purview of the Petroleum Safety Authority Norway (PSA). They oversee the sector using function-based (or goal setting) legislation. In 2015, they changed how they and companies should define the concept of risk, now emphasizing uncertainty as a core component. Where they previously defined risk as a combination of probabilities and consequences, risk now is the consequences of activities, with associated uncertainties (Petroleum Safety Authority, 2016). The new risk concept involves all actors in the sector's risk management. Studying the change and implementation of the risk concept has given the opportunity to zoom in on the consultants and their role in risk regulation.

In this study, we use the term *consultants* to refer to companies selling specialist services in safety and risk management and to their employees. Their primary clients are operating companies. The most common task for the consultants interviewed in this study is preparation of risk assessments. Some of them also perform audits, or certifications of the industry companies' compliance with rules or standards. They are not directly responsible for regulatory compliance which perhaps explains why they are somewhat invisible and yet, as we shall see, they are influential in risk management outcomes. See the method section and Table 1 for information about the interviewed consultants and Section 3 for earlier research about their role.

3. Theoretical building blocks shedding light on consultants' role in risk management

In this section, we present risk and safety management regulation, the riskwork needed to control risks, the auditwork connected to this, and research on the roles of industry companies and consultants.

3.1. Risk and safety management regulation

Risk and safety management is about controlling activities "to avoid accidental side effects causing harm to people, environment, or investment" (Rasmussen, 1997, p. 184). As such, governments have long had a role in ensuring that sufficient measures are put in place by those who operate potentially hazardous facilities. Nevertheless, companies remain responsible for ensuring safe operations of their own facilities. Indeed, increasing deregulation has led governments overall to shift more responsibility to the industry companies (Størkersen et al., 2020).

In most industries, a combination of public and private regulation is essential to control risks. Compliance with regulations usually involve a complex interplay between traditional enforcement and market-based mechanisms, as Sampson et al. (2014) found in the maritime industry. Private regulation has been common in many industries for centuries, for example by insurance companies and the maritime system with classification societies.

Safety regulations are now typically goal-based and founded on internal control principles (Baram & Lindøe, 2013; Power, 1999; Størkersen, 2018). That they are function based or goal-oriented means it is up to the company to decide how to control risks and achieve safety, provided it can be demonstrated that risk is controlled sufficiently. The internal control principle means that companies must demonstrate and document that they manage their risk, through management systems, internally controlled rules, risk maps, and checklists, etc. (Baram & Lindøe, 2013). The activities must be accounted for in an auditable and transparent way (Power, 1999), through documentation of measures to prevent harm (Dekker, 2017).

This implies that risks are inherently knowable and that risk management is only a matter of control but in fact risk in complex systems is dynamic and has a significant degree of uncertainty. Acknowledging this, Power (2004) states that regulations should allow for some uncertainty, accept a degree of disorganization and provide "a space for decision-making where competence may flourish and express itself" (Power, 2004, p. 63). Schulman (1993) argues for organizational slack. Space and slack is possible with goal-based regulation, but is still in contrast to a common company approach where procedures become ever more specific in a misguided attempt to cover every contingency and eliminate all possibility of error (Størkersen, 2018). The possibility of failure should be legitimate, and actors must be encouraged to be reflective. In this study, we are on the lookout for such spaces in risk management and how they are filled.

3.2. Actors in risk management

We now see that regulation gives the industry companies the central role in risk management as is appropriate given that they control the infrastructure that is the source of risk and the people who design, operate and maintain it. Haavik (2011) has pointed out that dominant theories of accident causation tend to focus on either technology (e.g. Normal Accident Theory) or organizations (e.g. High Reliability Theory). In his view, what is missing is a focus on the relationships between human and non-human actors in the system and how such relationships impact those system actors. The work of risk management is influenced by many actors: politicians, regulators, many companies' management, operational personnel, as well as environmental stressors (Rasmussen, 1997). Fig. 1 depicts the actors involved, and the general need for cooperation between levels and actors. The actors provide both resources to, and constraints and pressures on, each other's decision making and riskwork.

3.3. Riskwork

A riskwork perspective encourages a focus on the lived, embodied experiences of actors and their occupational identities in relation to risk, and how these relate to everyday risk practices – while still locating these within wider organizational and professional power dynamics. In this way of thinking about what constitutes risk management, risk management practice is an outcome that emerges (Power, 2016). This is in contrast to more traditional studies that might see risk management as a unified form of knowledge that constitutes the starting point for

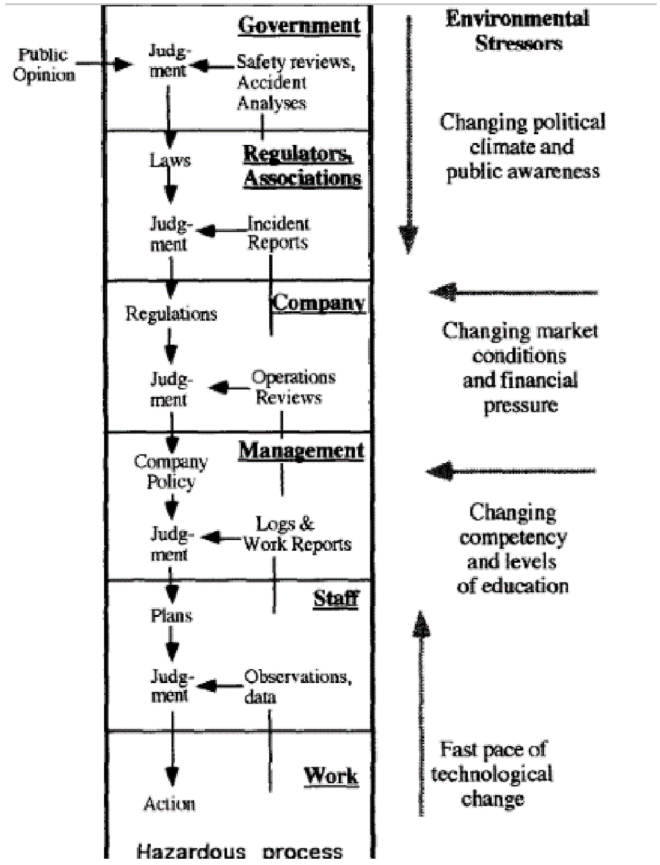

Fig. 1. The socio-technical system involved in risk management of hazardous processes (Rasmussen, 1997, p. 185).

analysis.

There is a developing literature using a riskwork perspective in the health care domain (Bonnet et al., 2021; Gale et al., 2019; Mitchell & Demir, 2021; Spendlove, 2018) but this approach has not been widely used elsewhere in the regulation or safety fields. Exceptions include studies of constructing risk maps in project work in the Norwegian petroleum sector (Jørgensen & Jordan, 2016), external risk communications on the part of government agencies (Boholm, 2019) and decision making about domestic violence in a police control room (Black & Lumsden, 2019).

Two strands of the riskwork literature are of key relevance to the work of the studied consultants: symbols and types of work i.e., tools and tasks.

Tools have both a functional and symbolic importance in riskwork. Despite the distance from the sources of risk, tools are critical in determining outcomes as they 'produce the organizational facts of risk which become reciprocally embedded in the intentionalities of actors. One cannot be understood without the other' (Power, 2016, p. 8). Power further notes that 'the instruments through which riskwork is conducted play a major role in constructing and maintaining the visibility of risk objects' (Power, 2016, pg 18). Risk matrices or risk maps with traffic light colors symbolizing risks are typical tools. Many organizations require their personnel to produce such tools to inform decision making to make sure risk is considered, even when production pressure is high and time is short. They try 'to capture and process these constructions of risk by situated actors for whom getting the job done is at least as important as conforming to official norms of safety' (Power, 2016, p. 7). As an example, Jørgensen and Jordan (2016) observed how risk maps were developed and used. They have concerns about the 'blinding' effect of the 'traffic light' grading of risks, the tendency to focus on short-term rather than longer-term objectives, and the pseudo-comparison of qualitatively different types of risk objects on risk maps. Yet, the risk map was also regarded as useful and facilitated inter-organizational collaboration and assurance, and project management. Such risk tools and artefacts have a 'normative power over actors for whom compliance and conformity are complex and effortful accomplishments' (Power, 2016, p. 12).

The second feature of riskwork of relevance to this study is the tasks of riskwork – the nature of the work itself beyond simple application of expert knowledge. Labelle and Rouleau (2016) identify four kinds of riskwork in play, noting that they can be conflicting. Firstly, regulative–normative work is about understanding external requirements and fostering risk practices that are compliant. Techno-scientific work applies expert knowledge about risk and risk objects to operationalize and materialize approaches to risk. Thirdly, political work is needed to build networks and negotiate risk ownership. Finally, interpretative or emotional work may be required to deal with the potential consequences of risk objects. The political aspects of riskwork are complex and not simply aligned according to competing interests. Riskwork can be deeply affective and emotional in nature. Cool processes that may be described in terms of information exchange may, on deeper investigation be closely linked to emotional processes of professional identity. In an example of this, Power emphasizes the importance of organizational riskwork that supports the 'facilitation and internalization of a specific type of 'risk talk' as a legitimate, cross-functional vocabulary of business' (Power, 2016, p. 17). This is in contrast to approaches that focus on knowledge needs, but similar to the description of 'safety professionals' (Provan et al., 2017).

3.4. Auditwork

In addition to the four *riskwork* types, Power (2016) describes *auditwork*. Auditwork will at first glance seem like riskwork, but its main goal is demonstrating compliance. Proof of compliance through audits and internal control is required by regulators, banks, insurance companies and consumers.

Auditwork relates to regulative-normative riskwork, but is actually separated from riskwork, since it is not aiming to avoid accidental side effects during an operation, but during audits. Riskwork is when one calculates how to manage risks, implement measures, or perform operations safely. Auditwork is about preparing for the documentation and verification of this. When one documents that operations are safe and risks are managed, it gives auditors the ability to verify that rules are being followed without examining the actual work (Hood, 2007, p. 1996). This is similar to the safety work term of Rae and Provan (2019), pointing at a set of management activities done to demonstrate that safety is managed, instead of the actual work done to work safely and prevent risk.

In fields such as organizational theory, safety science, and risk governance, one has seen that virtues of accountability have led to too much focus on audits (Bieder & Bourrier, 2013; Hood, 2007, 2011; Jensen & Winthereik, 2017; Power, 1994, 1999; Størkersen et al., 2020; Walters et al., 2011). This research implies that auditwork has increased to the level where it sometimes can take the attention from riskwork.

3.5. Professionals in riskwork and auditwork

We have seen that industry companies are responsible for their risk management, including compliance with the relevant regulations. The more detailed a regulation is, the easier it is to demonstrate compliance or deviation (Hale & Borys, 2013) – but risk and safety management regulation in Norway is not detailed. Rather, it is goal-based and leaves much discretionary space to the companies (Baram & Lindøe, 2013; Størkersen, 2018; Størkersen et al., 2020). Companies often lack specialist competence in risk and safety and so have the impression that implementation needs to be more complex than intended by the legislation (Almklov et al., 2014; Størkersen et al., 2017). Thus, they look for

professional support. Companies seek specialist input on safety and risk in the form of both riskwork and auditwork (Baram & Lindøe, 2013). Risk and safety consultants have expert knowledge in risk assessments and other tasks important to support companies' efforts to have control over their activities and also to be compliant (Almklov et al., 2014; Hohnen & Hasle, 2011; Hood, 2011).

A recent large study on safety professionals employed in industry organizations found a variety of roles for these inhouse safety professionals, including aligning organizational resources and safety measures and systems, and controlling how activities are done according to procedures (Provan et al., 2017).

> *Safety professionals influence organizational decision-making through providing advice for decisions that others are making, as well as how they create pre-conditions in the organization that influences decision-making without direct involvement (*Provan et al., 2017, p. 106*).*

It is not uncommon that these inhouse safety professionals do not feel their views are sufficiently heeded in their organization (Provan et al., 2017). On the other hand, another large empirical study found that inhouse safety professionals are often too closely linked with and dependent on management, and do not have sufficient autonomy and professional strength to increase safety in the organization (Provan et al., 2019). Such tensions between safety professionals and management may shed light on the role of external risk and safety consultants.

Safety advice can also be sought from external professionals, i.e. consultants. Thirty years ago, Hale (1995) already saw that inhouse safety professionals either were seen as managers giving general advice, or narrow technical risk analyst experts, while safety professionals hired from certification bodies had higher status and power within the company. Yet, to influence a company from the outside is not easy, since the hired consultant has limited time with the industry company managers (Hale, 1995). In addition, managers in larger companies could be more used to interacting with specialists, while in smaller companies one may have lower competence and be more dependent on the technical expertise of the safety professional, to increase safety or just to be compliant (Hale, 1995).

These results coincide with research around the *recognized organizations* or *classification societies* that perform risk assessments and certification in the maritime industry. Ship owners can choose consultants based on how they assess risk, and thus prefer companies that go easy on their weaknesses (Silos et al., 2013). In an effort to standardize the consultants' work, they have their own international regulation by the International Labour Convention, their performance is ranked (Paris MoU, 2015), and they are audited by national governments.

Thus, research results suggest that consultants play a major role in other interconnected industries, which may increase the complexity and give both benefits and hindrances for safety (Almklov et al., 2014; Baram & Lindøe, 2013; Hale, 1995; Hayes et al., 2022; Hood, 2011; Silos et al., 2013). Many industries have become dependent on consultants translating regulations to management systems, as illustrated by this quote from the maritime industry:

> *"It's amazingly many working in safety. How many lectures we've been to and listened to about how the world isn't able to survive if we don't have all these safety companies. It surely has become an industry. " Said by a manager in a maritime interest organization, interviewed by* Almklov et al (2014*, p. 31).*

One aspect the earlier studies mention as potentially negative for safety is that consultants need to make a business out of their role. Although there has been limited research on risk and safety consultants, we note that their role is not straightforward. The safety consultants of different kinds are acting between the other parties in the chain of risk management. They are not directly placed in the socio-technical system by Rasmussen (1997) or described in Fig. 1. Thus, they are of particular interest in our current study.

4. Method

This is a cross-sectional qualitative study using individual semi-structured interviews with consultants. This study is one of the activities of the project *Consequences of fundamental changes in risk regulation*, investigating the practical consequences of a legislative change towards a risk definition based on uncertainty.

4.1. Recruitment and participants

Eligible participants for this study were individuals with experience as risk/safety consultants for oil and gas companies, while employed in consultancies external to the industry companies. Potential participants were identified by the project members and were invited by e-mail to participate in a digital interview where they could talk about their role and experience with risk analyses, management, and conceptualization. Eleven consultants from nine consultancies operating in Norway were asked and accepted our invitation for interviews. See more information about the interviewed consultants in Table 1.

As this was a part of a study of the risk concept, standards and regulations, seven of the interviewees held a role as a standard committee member in addition to their primary role as a consultant.[1] This was discussed in the interviews, although the development and use of standards is not addressed in this study.

4.2. Data collection and analysis

Individual interviews were chosen as they are suitable for rich, in-depth descriptions from each individual. The data management, privacy and information security were approved by the Norwegian Agency for Shared Services in Education and Research.

The 11 interviews were performed digitally in 2021 and 2022, in Norwegian. Each interview lasted about 60 min and was led by two of the researchers in the project, usually the authors of this paper. One researcher led the interview, and one was taking notes and providing comments and additional questions.

Each interview followed a semi-structured interview guide which had questions on the following categories: risk understanding in general; the risk concept; risk management in practice; rules, regulations, and standards; and relation with clients or other relevant organizations. The interview-guide comprised several open-ended questions in each category. The interview guide was not followed top to bottom but served as a

Table 1
Information about the consultants interviewed.

Interview code	Position within consultancy	Background	Years of experience
1	Risk analyst	Technical (PhD)	15+
2	Risk analyst	Physics/mechanics (PhD)	40+
3	Risk consultant	Technical (PhD)	20+
4	Safety consultant	Social science	15+
5	Risk analyst	Engineering	15+
6	Risk analyst	Engineering (PhD)	20+
7	Risk analyst	Engineering	15+
8	Risk analyst	Engineering	25+
9	Risk analyst	Engineering	30+
10	Risk analyst	Engineering	30+
11	Safety consultant	Engineering	30+

[1] Relevant standards for risk assessments in Norwegian industries are NORSOK Z013 Risk and emergency preparedness analysis (for the oil and gas industry), NS 9415 Floating aquaculture farms — Site survey, design, execution and use (for aquaculture), and NS5814 Requirements for risk assessment (for land-based industries).

guide for potentially relevant questions in the topic categories that were to be touched upon during the interview. All interviews were audio recorded and transcribed verbatim or summarised in Norwegian and English.

Data were analyzed in several steps which aligns with the 15-point checklist for a good thematic analysis developed by Braun and Clarke (2006). Thematic analysis is a tool to analyze qualitative data (Terry et al., 2017) that aims to 'find the manifest and latent meanings within the data' by looking 'for recurrent ideas' in order to integrate data into 'unifying fully developed ideas' (Connelly & Peltzer, 2016, p. 55) to help answer the research question(s). Underpinning thematic analysis is the assumption that 'what participants think, feel and do… reflects… the perspectival reality of a particular participant' (Terry et al., 2017, p. 19). First, three of the authors analyzed 3–5 interviews each and wrote a draft analysis. Patterns were discussed between all authors and combined into themes relating to the aims of the paper. The analysis was further developed, in parallel with the first authors' reading through the interview transcripts to make sure the analysis and overall understanding of the data material matched. The aim of the text was to include rich descriptions and interview quotes that exemplify the patterns uttered by the consultants about their role, while not forgetting the nuances that were present in the interviews. The research focus and analysis were then expanded through several iterations, in discussions, conference presentations, and project meetings.

4.3. Study limitations and considerations

Since the consultant study is a part of a larger research project on risk management and its inspiration from the Norwegian oil and gas industry, we targeted consultants that are or have been working with this industry and that are particularly informed and engaged in the conceptualization and regulation of risk. Other studies from this project have approached risk management from other angles (Engen et al., 2022, 2023; Kongsvik & Finnestrand, 2022; Ognedal et al., 2022). When we study risk management in the Norwegian oil and gas industry, we are aware that this can be different to other industries. There may be an underlying aspect in the interviews that the actors in this industry are in the forefront of risk and safety management, and may do things differently, more advanced than or create templates for other industries. This point is not directly discussed in this paper.

The selection of interviewed consultants gives interesting, but not generalizable information. The sample provides rich descriptions from engaged experts, and insight into the day-to-day work of highly experienced risk consultants. However, the role the interviewed consultants have in risk management may be different to the role other risk and safety consultants have, in this industry, in other industries and other countries. Also, the role of different consultant companies and their costumers (different oil majors) will vary. Therefore, the findings of this study are limited to the role of the interviewed consultants only, as an indication of the role consultants may have in risk regulation. We wanted to hear from the consultants themselves what they see as their role, and the interviewed consultants were not problematizing their power or responsibility as market actors. The interviewers sometimes asked about this, but future work could address this more systematically. The lack of reflections on the negative sides by the consultants themselves is a limitation of the study, and should be explored in further studies. At the same time, it is also a strength and the aim of this study: The paper shows what the consultants emphasize as their roles.

5. Empirical results on the consultants' roles

A variety of responsibilities, tasks, and practical applications are described by the interviewed consultants. Their role in risk management spans the regulators and industry companies, and bridges conceptual knowledge, practice, and legislation.

The interviewed consultants articulate two main roles: expert knowledge for decision-making support, and a role of proving compliance. Some of the interviewees have had a shift in roles over the years, from mostly verification of compliance, towards providing documentation for decision-making support. This may be because of change in the market or experience, but this quote can also show the variety of projects the consultants are presently hired for:

> *"It wasn't so clear what the decision was to be used for, it's a little clearer now. There are slightly higher expectations that this is a basis for a decision, so there's clearer communication from the customer that "we'll use this for this and that". […] A long time ago it was an input to design, and then there was a period where it was very much a verification request to document that the total risk is within acceptance criteria as they called them, and then it was a bit like a verification request. But now it has become much more that [it] will be a basis for the design of installations or operations in one form or another" - Consultant, interview 8*

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5.1. Expert role for decision-making support

When describing their work with industry companies, the interviewed consultants talk about their role as mediators between state-of-the-art knowledge, regulation, and risk analysis in practice. They listen carefully to the language used by others and notice when understanding differs between individuals. This is particularly the case when requirements involving the understanding of risk are discussed. Thus, one of the contributions of these consultants is to facilitate discussions that create a shared understanding of the regulations, conceptual risk understanding and analytical decisions that needs to be made. As one consultant describes:

> *"I have only noticed sometimes that there are misunderstandings […] you sit in meetings with people and hear that people talk about uncertainty in different ways, we talk about [key risk concepts] in different ways. […] even though people may sit and think that we have a common understanding, and you actually […] understand that "oh, there are really misunderstandings out and about"" - Consultant, interview 6*

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Many of the consultants emphasize that the purpose of their work is to provide accurate, nuanced information to their client, the decision maker. If a consultant wants to give a good understanding to an industry company manager, the consultant needs to communicate clearly in a language the manager understands. The interviewees have several techniques for that. In order to facilitate their clients' understanding of new requirements, the consultants modify tools that the clients are familiar with.

The interviewed consultants also describe why they are so concerned with the communication with the industry companies. For them, it is about supporting their clients to make safe decisions. For instance, through ensuring that the uncertainties, assumptions, and what they do and do not know, do not get lost in the risk analysis process before the information reaches decision makers.

> *"So the decision maker needs to understand what he or she is actually making a decision on. Must understand what this means, because you make some choices that you in principle have not looked at in detail […] this is a choice that we know based on experience is a good choice, but then you have some assumptions, and those assumptions you have to bring with you into operation, and these assumptions you need to understand. And it places very strong demands on the decision-maker in some contexts." - Consultant, interview 8*

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This extends to the nuances of the technical reasoning behind designing decision making so that important details are not lost, as in

this example about the fire rating of a pipeline riser where the fact that it is not fire rated is seen as shocking in the absence of information about credible accident scenarios.

> *"And then you end up with, okay, you're in accordance with the 10^{-4} requirement for explosion and to prevent escalation for example. And if you are, then "great", if you are not then "okay, what do I do now?". But you do not really know what contributes. It can be like that […] where one has chosen not to design for a riser fire because it is so unlikely. And this is perfectly fine in relation to the risk acceptance criteria. But no one in the company knows that this is the case. So when we say that «no, this one is not designed for riser fire, so it will fail in 30 min». Then they're very shocked. Which I think is incredibly stupid, that the information that I think is very important. That it disappeared completely in the risk analysis." – Consultant, interview 3*

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5.2. Regulator role contributing to compliance

These consultants also describe that an important part of their work is to implement the intentions of regulators. That is, their role is both to interpret how the regulator (the Petroleum Safety Authority – PSA) is attempting to steer risk management practice and also translate this to something useful for industry companies.

> *"The PSA wants [companies to] work systematically and that you […] actually use [analyses] where you are not sure what to do, right." - Consultant, interview 8*

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This aspect also relates to interpreting for the operating company specific non-conformances raised and recommendations made by the regulator. The consultants state that it improves their own analyses and provides more accurate guidance to industry companies. This is in the intersection between legislators and industry companies.

> *"But I'm in the discussions, right, where we are to interpret when PSA comes with any recommendations or deviations for the companies […] We have to help the oil companies with what is given, so we are in the middle of it, even if we are not the ones who formally get deviations, we are often indirectly … because some of the deviations […] can be linked to some study work that we as consultants have actually done." - Consultant, interview 8.*

By listening to and interpreting regulators' intentions, consultants also have a role in helping industry companies comply with legislation. Not all clients are driven by making the best decision for safety. According to the interviewed consultants, some are primarily interested in demonstrating regulatory compliance for its own sake and so focus the scope of work for the consultant on demonstrating that risk is acceptably low and that no further risk reduction is necessary. In cases such as this, the work of the consultant is to provide documentation that the risk is acceptably low in contrast to providing decision support as described above. This is reported to most often be the case with some companies rather than others.

> *"… for example, drilling rigs, drilling contractors, they are […] more old school. That it must be done, and it must be documented, and preferably be so-and-so low. There's still a bit left of that. Also, it has to do with the fact that we do what we're asked. […] when they plan a drilling campaign then we're normally in and do risk analyzes. Then it's done just to find out if it's ok." – Consultant, interview 8*

.

The interviewed consultants describe that they sometimes need to be very clear and committed to their understanding of regulations, particularly if clients want to do something that is not in the spirit of the regulations. One example of many is when a consultant is hired to calculate and demonstrate low risk rather than determine what level of risk is posed by a particular activity or design. However, the regulation states that they need to take all conditions and uncertainties into account. This means the company cannot use a too narrowly calculated low risk figure for anything, because it has to be broadened to comply with regulations.

> *"… there's something we as consultants often suspect is why they come. "Can you show that this may not be so dangerous after all?". We can do that, but you can't use that answer for anything." - Consultant, interview 2*

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Not only do consultants have a role in helping industry companies to comply with legislation – they feel they have an independent duty to do so, even if the company they are hired by tell them to do something else.

They describe how they navigate between governmental regulations, industry standards, consultants' own guidelines, and clients' specifications. The consultants say they are obliged to always know and comply with governmental regulations even if guidelines or the client specifications suggest otherwise.

> *"But then this poor consultant has an independent duty, so if it turns out that [client]'s specifications aren't in accordance with the regulations, then the consultant must find out on his own. This is very clearly stated in the framework regulations, that is, that 'everyone has an independent responsibility to meet the regulations, you can't blame that you have been told to do something else'. […] So, everyone in this chain needs to understand what the requirement is. Know the regulations. Doesn't help to blame others." - Consultant, interview 2*

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5.3. Making tools for bridging expert knowledge and standardized compliance

Standards are seen by the consultants as a tool for translating regulations into expert advice on measures and compliance for the industry companies. Since methods for risk analyses can vary, one participant describes the wish for standardization across companies:

> *"… methodology has been practiced very very differently, so now we try to be very specific on how it should be done." - Consultant, interview 3*

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Most of the interviewed consultants have had influence on the development and philosophy of the standards. One consultant describes how they want to inspire companies and other consultants to make good and visible risk analyses themselves. Also in this work, they describe the importance of binding the conceptual to the practical.

> *"One sees that the practice that's been hasn't been entirely good. And then one wants to get a better practice described in the standard. And then it's my responsibility to make it happen. To achieve something that's reasonable. A reasonable balance between how detailed analyses one actually can do, and how detailed analyses you need to make for the decisions you're actually going to make." - Consultant, interview 2.*

A way to aid practice is by providing good examples, simplified methods and language accessible to those involved with risk management at different levels.

> *"… we discussed a lot back and forth what academic jargon we should use, what's appropriate. Should we assume that we have 20 people who work with risk assessments throughout the year, or should we, which is*

more likely, that it's some guy or woman who'll do something with a risk assessment." - Consultant, interview 4

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Another role of a standard is to clarify what to expect of a risk analysis. They want to build a bridge between the public and the industry, and to operationalize the governmental regulations into more practical procedures.

"The contribution [of this technical standard] is to get requirements that are correct. Which isn't too strict and difficult to achieve. Something that's achievable but at the same time something to strive for." - Consultant, interview 3

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6. Discussion of the consultants' role in riskwork and auditwork

The results of this study show that the consultants have several important roles in the risk management of their industry. Bringing back the terms of riskwork and auditwork (Power, 2016), we can recognize that the studied consultants play a major part in both. As one consultant said 'we're in the middle of it' despite their lack of direct control over the physical infrastructure which could potentially cause harm and the people who operate and maintain it. Still, our data suggests that the consultants' role has a wide scope and that there are aspects of risk management that sit outside the formal regulator/operator dyad. The consultants are boundary spanners (Hayes & Tillement, 2022) between the government and management levels in risk regulation (as these actors are illustrated in Fig. 1 by Rasmussen (1997)).

In some assignments, the consultants do risk analyses and operationalize and materialize approaches to risk. In those situations, their main responsibility is firstly *techno-scientific riskwork* (as described by Labelle and Rouleau (2016)) and yet this work is not context-free. Consultants hold a certain expert position when they come into the organization with the trust, legitimacy and respect of experts (Hale, 1995; Provan et al., 2019). Often, and increasingly experienced by the consultants, their work is directly informing and influencing decision makers in the operating companies. This can be seen as *regulative-normative* riskwork (Labelle & Rouleau, 2016) and includes providing detailed technical evaluations of sources of risk and the potential benefits of engineering measures that may be costly but would also act to reduce risk. This aspect of the riskwork of consultants has particularly come to the fore in the context of recent changes in risk management concepts. The consultants underline dialogue as an important feature in their role of supporting safe decisions in the companies. As external consultants, and not inhouse safety professionals (Hale, 1995; Provan et al., 2019), the consultants may even have more influence in bringing messages to the managers. At least, they make great efforts in providing state-of-the-art knowledge and convincing company managers to update their vocabulary and 'risktalk', as also discussed by Power (2016).

Political riskwork happens when the consultants update the actors' concepts of risk, and otherwise build bridges between the public regulator and actors from industry companies and research. Earlier research has shown that companies and regulators understand that consultants play an important part in how companies implement regulation (Almklov et al., 2014; Antonsen et al., 2017). In our study, the consultants describe that a key part of their role is to execute the intention of the regulator, and they explain how they become translators between regulation and the company operator. We see that the consultants are facilitators for shared understanding for those in risk decisions, which makes the actors able to establish a common enough understanding to reach a conclusion that is acceptable to everyone.

As a part of translating new regulation, concepts and research to the clients, the consultants employ several tools. Artefacts of different kinds, such as risk matrices and standards, can shape practices (Power, 2016, p. 275). Providing good examples can also aid practice and decisions. Hence, the consultants modify accepted tools such as risk matrices to take the new requirements into account and explaining to their clients how such modified tools function. These are important symbols and tools in their riskwork (Jørgensen & Jordan, 2016). The informants indicate that their clients may be very attached to old tools and language around former types of risk assessments. Another tool is the industry standards, that address a gap in regulation and help companies making sure they run safely. In their work with standards, consultants must acknowledge and perform what Labelle and Rouleau (2016) describe as *emotional or interpretative riskwork*, dealing with the potential consequences.

In this relationship with the companies' riskwork and real risks, the consultants could be attentive to their own status. When they are hired as experts and implement legitimized understandings of the risk term, tools and routines, they also construct their own *model power*. This can marginalize the industry actors, that possess important situated knowledge, know the consequences of accidents, and have a high degree of company power, but rarely with risk expertise or risk language (Almklov et al., 2014). If the consultants 'own' the risk management terms and tools, it can reduce the discussions and learning for the industry organizations, and thus the quality of the riskwork. Power (2016) asked for a space in risk management where thoughts could flourish. If the consultants fill that gap entirely, even in the name of bridging between regulators and companies, one would lose an important room for innovation and practical discretion.

Although the consultants have the best intentions and work for the common good, they belong to a profession that sells risk expertise to actors with lower risk management competence. The consultants' industry thrives on others' uncertainty and vulnerability, and should thus be careful not to get into a principal-agent dilemma where they may have other interests than their costumers, that could improve their business (Almklov et al., 2014).

It is evident that the consultants are heavily involved in the *riskwork* of the industry, but they are also hired for the sake of *auditwork* – when industry companies want the consultants to provide accountability for them. If consultants are trusted to do risk assessments, make standards, management systems and also audit them, it is outsourcing of both regulation development and regulatory enforcement to the same parties, which is suggested to be a case of the fox guarding the henhouse (Baram & Lindøe, 2013, p. 51). The consultants in our current study explain they sometimes are hired to meet the needs of their clients in a direct and narrow way, only to ensure "shallow compliance". When the consultants are asked simply to get the operator out of problems, they play only a functional role in the overall riskwork of the industry. In such situations they essentially do the auditwork of the companies. The consultants experience to be called in to cover the backs of the company managements, to demonstrate the managements' will to comply with regulations that are not clear cut, as also discussed in Størkersen et al. (2020). In some situations, this also is similar to research results about how shipping companies pick consultants that will give the easiest audit (Silos et al., 2013) or implement the cheapest safety management system (Almklov et al., 2014).

The consultants operate in a sphere combining market logic, regulatory power, and expert knowledge, which can influence safety and risk management negatively in several ways. For example, some consultants may not simplify risk management where they can, since they are specialists in advanced risk analysis, safety management or verification, and may benefit if the industry companies see the need of buying their services (Almklov et al., 2014; Baram & Lindøe, 2013).

In our current study, however, the interviewed consultants say that they themselves always stand up for the regulations. The studied consultants perform their role with an emphasis on making accurate and context-specific information available to managerial decisionmakers, and thus to be a role model in the compliance of regulations. They insist on being mediators between regulation, state-of-the-art methods, research, and the industry, and to bridge and communicate the new

concepts to these actors. They fill in some spaces where experts are needed, and they make sense where there is ambiguity in science or regulation.

As the consultants say themselves, they are in the middle, in the intersection of actors and artifacts in risk management in their sector. Their descriptions illustrate the existence of the spaces for decision-making among requirements in risk regulation, wanted by Power (2004). And further, we can see that many such spaces are (partly or fully) filled by the consultants' riskwork and auditwork.

7. Conclusion

In this analysis, we have seen how consultants' view their role as intermediaries bridging the gaps between actors and knowledge in risk regulation. Our study shows that consultants play an important role in risk management, even though they are not typically included as a part of the sociotechnical system of risk management. We see that riskwork in the oil and gas industry may not be limited simply to operating company personnel and regulators, but also is the work of safety and risk consultants. Power (2016) notes the collective nature of riskwork and the fuzzy boundaries between actors. We should not be surprised that consultants play a key role in riskwork, as they are widely used by industry companies and hence mentioned in literature. Yet, consultants are surprisingly invisible in the literature describing and analyzing the socio technical system. Although we have only the voices of the consultants and earlier research from the companies' side, we see that the consultants' impact is significant. Our understanding of the socio-technical system becomes more relevant and precise by including this perspective.

Through this study, the organizational risk and safety fields have gotten a glimpse of knowledge about the weighty role of consultants in the long and winding chains of risk regulation. Future qualitative studies of consultants and intermediaries of different kinds, will improve the understanding of relationships, decision-making, and dynamic interdependencies between actors in the network. Important to note, however, is that Power (2004, p. 63) asked for a space in risk management with uncertainty and disorganization, where competence could flourish. If all gaps are filled, even in the name of bridging between regulators and companies, one would lose an important room for innovation and practical discretion.

CRediT authorship contribution statement

Kristine Størkersen: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Jan Hayes:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Martin I. Standal:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Maja Ognedal:** Conceptualization, data gathering/investigation, analysis/discussions, writing. **Martin R. Skogstad:** Conceptualization, data gathering/investigation, analysis/discussions, funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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