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# A Novel Model for Risk Regulations in the Offshore Oil and Gas Industry

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## Abstract

Increasing interest from stakeholders has brought about a new emphasis on risk regulation in the oil and gas industry. Our basis for this work is the offshore oil and gas industry, which is composed of major operators, entrepreneurs and contractors working globally, but we focus on Norwegian and US activities. The fundamental strategies, institutions, legal traditions and explanations of regulation are reviewed and, together with empirical data, a novel model with the means of identifying “effective” regulation has been developed. The model presented here incorporates three dimensions: the industry’s intentions; their resources and expertise and trust in the regulator (and vice versa: the regulator’s trust in the industry); and the space where functional respective normative rules are deemed most effective.

**Keywords:** effective; legal tradition; risk regulation; trust

## I. Introduction

There is currently an ongoing debate as to the effects of external inspections and governmental supervision.<sup>1</sup> Much is still unknown regarding the causal chain from regulation through inspections to the resulting effects on performance. This article suggests a novel model for studying this causal chain.

## II. Method

Three groups of information sources provide the empirical basis for the proposed model. Firstly, we have assessed the growing portfolio of research projects on technological change, risk regulation, the tripartite system and safety management systems within the offshore oil and gas industry, including assessment of texts of laws, regulations and regulatory guidelines, as well as industrial norms and standards.<sup>2</sup>

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<sup>1</sup> E Hovlid, G Husabø, IL Teig, K Halvorsen and JC Frich, “Contextual Factors of External Inspections and Mechanisms for Improvement in Healthcare Organizations: A Realist Evaluation” (2022) 298 *Social Science & Medicine* 114872.

<sup>2</sup> P Lindøe, M Baram and G Braut, “Risk Regulation and Proceduralization: An Assessment of Norwegian and US Risk Regulation in Offshore Oil and Gas Industries” in IC Bieder and M Bourrier (eds), *Trapping Safety into Rules* (Farnham, Ashgate Publishing 2013) pp 69–86.

Secondly, previously suggested theories and models on fundamental strategies, institutions and explanations of regulation as a means of identifying “good” regulation (eg as outlined by Baldwin and Cave<sup>3</sup>) have been condensed and included in the model presented here. Based on this, a two-dimensional representation has been developed in the context of co-regulation of offshore oil and gas operations based mainly on the work of Baram and Lindøe.<sup>4</sup> Responsive regulation<sup>5</sup> concerns the idea that regulation is more likely to be just and effective when it is contextually responsive to the social and physical environments, particularly to how regulated actors respond to attempts to regulate them, and this is an argument for claiming that the model presented here is relevant even outside the oil and gas industry.<sup>6</sup>

Thirdly, we have conducted interviews with relevant stakeholders in the Norwegian oil and gas industry. In short, this model has been developed based on the two first sets of knowledge and thereafter tested using data collected through interviews.

### III. Prescriptive or functional regulation, legal tradition and trust

Baldwin and Cave<sup>7</sup> discuss the selection of enforcement strategies and accompanying rule types based on an analysis of the kind of regulatee being dealt with. To describe the regulatees’ behaviour, two parameters are used: intentioned (wish to comply) and informed (knowledge of legal requirements and how to meet these). For enforced self-regulation, the expertise of the regulatee is an important prerequisite to being informed.

This perspective is further developed by Rip<sup>8</sup> when describing a contingent regulatory repertoire (C-repertoire) as opposed to a rational repertoire (R-repertoire). In brief, a C-repertoire is characterised by interpretation of the legal requirements based on local discussions between the concerned organisations (firms) and the authorities, whereas an R-repertoire applies a more traditional relationship through which the firms’ (regulatees’) practices are controlled by the external authorities.

Baram and Lindøe<sup>9</sup> discusses modes of risk regulation, the features of co-regulation and regulation and the importance of the regulatees’ resources and expertise to develop legal standards as underpinning and enabling functional regulations.

The selection of the regulation mode may be expressed based on the regulatees’ expected behaviour and the features of the following two dimensions:

- (1) Intentions
- (2) Resources and expertise

If the regulatees’ performances are divided into high and low for the two dimensions, we get four groups that can be represented in a four-field diagram, as illustrated in Figure 1. It is reasonable to assume that a functional framework is best suited for target groups in the upper-right quadrant of Figure 1. These can be said to represent a decent market. For the

<sup>3</sup> R Baldwin and M Cave, *Understanding Regulation* (Oxford, Oxford University Press 1999).

<sup>4</sup> M Baram and PH Lindøe, “Modes of Risk Regulation for Prevention of Major Industrial Accidents” in PH Lindøe, M Baram and O Renn (eds), *Risk Governance of Offshore Oil and Gas Operations* (New York, Cambridge University Press 2014).

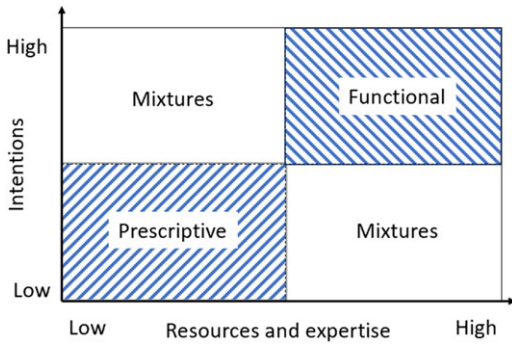
<sup>5</sup> J Braithwaite, “Limits on Violence; Limits on Responsive Regulatory Theory” (2014) 36(4) *Law & Policy* 432.

<sup>6</sup> Cf A Rip, “Practices in the Danger Culture of Late Industrial Society” in G Motet and C Bieder (eds), *The Illusion of Risk Control* (Cham, Springer Open 2017).

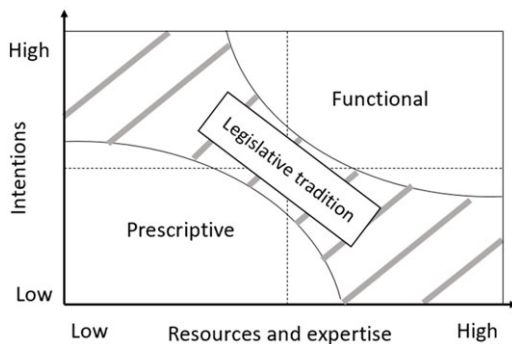
<sup>7</sup> Baldwin and Cave, *supra*, note 3.

<sup>8</sup> Rip, *supra*, note 6.

<sup>9</sup> Baram and Lindøe, *supra*, note 4.



**Figure 1.** Selection of the regulation mode based on the regulatees' features and expected behaviours.



**Figure 2.** Selection of the regulation mode based on the regulatees' features and expected behaviours and the legislative tradition.

group in the lower-left quadrant of Figure 1, a prescriptive framework with detailed set of rules, with explicit norms and precise definitions, is preferred.

Obviously, there will not be sharp lines between the preferred regulation modes. In addition, legislative tradition will have an impact. The civil law tradition, which is typical of central European countries (eg France, Germany) and Scandinavia, is characterized by an emphasis upon written law.<sup>10</sup> Legal practice according to this tradition typically will increase the “Prescriptive” area and reduce the “Functional” area in Figure 1. The common law tradition, relying on common standards and as seen in the British and US legal systems, will increase the “Functional” area in Figure 1. The nuances between these perspectives to achieve moderate trust (to be discussed below) are illustrated in Figure 2.

The Norwegian and US legal frameworks address many of the same risk issues. However, there are significant differences between the two regimes with regard to the assignment and scope of responsibilities and how they are to be implemented. In Norway, the regulations set forth in very broad terms the functions that operators should perform regarding internal control and accompanying non-binding guidelines but without prescriptive details. The US law authorising offshore oil and gas operations assigns regulatory responsibilities to several agencies and discusses operators mainly with regard to their duties to comply with prescriptive regulations to ensure that these activities are safely conducted.<sup>11</sup>

<sup>10</sup> MA Glendon, PG Carozza and CB Picker, *Comparative Legal Traditions in a Nutshell* (Saint Paul, MN, Thompson West 1982).

<sup>11</sup> Lindøe et al, *supra*, note 2.

The judicial system in Norway belongs to the civil law tradition. The civil law tradition is characterised by an emphasis on written law (statute law), favouring prescriptive norms, which is somewhat in contrast to the common law tradition seen in most states of the USA, where legal practice is also emphasised, favouring functional norms.<sup>12</sup>

In this way, safety regulation in Norway and the USA diverge from each other, and also from the mainstream legal traditions in each of the two countries. Hence, based on the above, here we will characterise the US regulation mode as “Prescriptive” and the Norwegian regulation mode as “Functional”.

It is intriguing that these two nations have selected regulation regimes that are the opposite to their legal traditions for players in a global industry that would be expected to follow the same business model, including intentions to follow rules and levels of resources and expertise, irrespective of where they operate. However, they may both have selected effective/efficient regulation modes given their different regulatory contexts. To explain this, we believe an additional dimension or merit must be added to the two-dimensional “resource–intention” representation given above; namely, that of trust.

#### IV. A model for an effective regulation mode

Trust between different parties is a large and complex area. It is outside our scope to cover this extensively here. Nevertheless, we stick to a rather straightforward understanding of the concept of trust. In the context of regulation, one may encounter terms such as “confidence”, “authority”, “legitimacy” and “accountability”. A perspective on trust claims that both trust-based and mistrust-based strategies involve reducing complexity; in other words, trust reduces social complexity by allowing specific unwanted behaviours to be removed from consideration, whereas distrust works to reduce the complexity of unwanted behaviours. Here, trust means an open dialogue between industry and the regulator and the regulatees (industry) trusting that the regulator will exercise their legislative task of mistrust with the best of competence and intentions. This reduction in complexity provides more effective regulation. We have above illustrated the selection of the regulation mode according to the regulatees’ expected behaviours and features in two dimensions, but to obtain a model with a broader perspective we must add a third: trust in the regulator (and vice versa: the regulator’s trust in the regulatees).

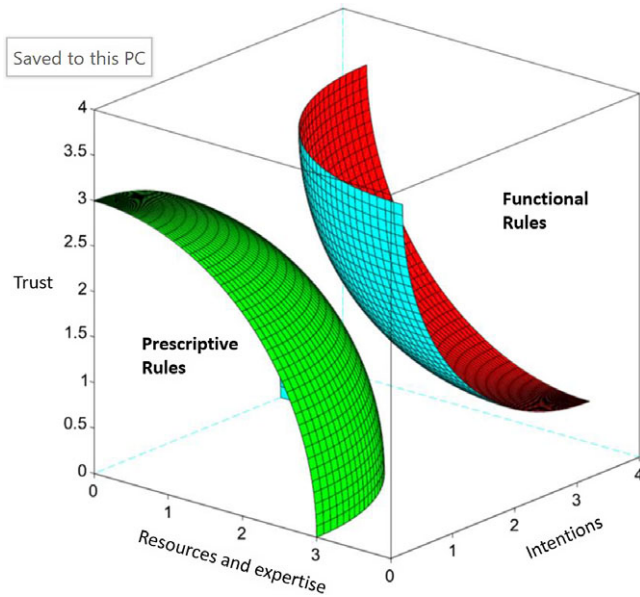
- (1) Intentions
- (2) Resources and expertise
- (3) Trust

For the reasons given above, for a regulatee with high intentions and high resources and expertise and with high trust in the regulator, a “Functional” regulation mode will be most efficient. For the same regulatee but with low trust, a “Prescriptive” regulation mode will be most effective. In three dimensions, this can be illustrated as in Figure 3, on a scale from 0 to 4.

The model can be used in a dynamic way, not only guiding the choice of the most effective regulation mode in the current situation. Regarding maintaining robust regulations based on functional rules, the model provides guidance, in a causal chain manner, on which features to be improved. This agrees with the perspective of Tyler,<sup>13</sup> who argues that the procedural justice approach shares a core similarity with the restorative justice approach. The restorative justice approach argues that the goal when dealing with people

<sup>12</sup> GS Braut and PH Lindøe, “Risk Regulation in the North Sea: A Common Law Perspective on Norwegian Legislation” (2010) 14 *Safety Science Monitor* 1.

<sup>13</sup> TR Tyler, “Restorative Justice and Procedural Justice: Dealing with Rule Breaking” (2006) 62(2) *Journal of Social Issues* 307.



**Figure 3.** Three-dimensional model for the selection of the most effective regulation mode.

who may have broken social rules should be to seek ways to heighten the future motivations that those people have to engage psychologically and behaviourally in society. This engagement includes developing or becoming more committed to social values that promote self-regulation and consequently adhering more closely to laws and social regulations in the future. In our model, procedural justice relies on prescriptive rules, while functional rules facilitate restorative justice. Hence, functional rules represent a more effective regulation mode.

To achieve this regulatory mode through self-regulation, the regulator (authority) will also have to change its way of working. There has to be a shift from operating remotely at a desk, assuming that a monetary penalty will magically induce all desired changes, to engaging with how businesses actually operate on the ground.<sup>14</sup> Furthermore, achieving this will require open and transparent responses to the authority by businesses at all levels. This means that there must be an industry–regulator relationship of trust on an open, full and frank basis.

## V. Verifying interviews

Members of the Regulatory Forum, the Safety Forum and the NORSOK-standard Expert Group on Materials representing oil and gas companies, suppliers, labour unions and governmental agencies were contacted and asked to participate in this study. The interviews were conducted using a web-based predefined questionnaire consisting of twelve questions, four of which will be reported here. The request was sent out to sixty respondents by email, endorsed by the forum and group leaders; thirty-one replied, representing a response rate of over 50%. The breakdown by oil company/supplier/other was 10/7/14. No analysis has been conducted regarding the difference in responses between these three groups.

<sup>14</sup> C Hodges and R Steinholtz, *Ethical Business Practice and Regulation. A Behavioural and Values-based Approach to Compliance and Enforcement* (Sydney, Hart Publishing 2018) pp 184–86.

**Table 1.** Responses from members of the Regulatory Forum, the Safety Forum and the NORSOK-standard Expert Group on Materials regarding assessing their own organisations with relevance to avoiding major accidents.

	Increasing	Stable	Declining
<i>Assess the resources and expertise in your organisation in other skill areas</i>			
– Resources	6	22	3
– Expertise	8	19	4
<i>Assess the resources and expertise in your own skill area</i>			
– Resources	7	20	4
– Expertise	9	18	4

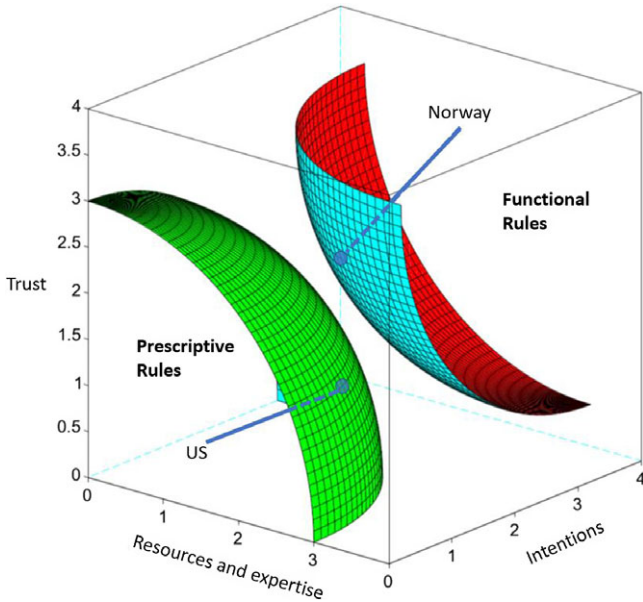
We asked the respondents questions regarding self-assessing the oil companies' intentions and their resources and expertise. The model for the regulation mode presented in this paper was not represented to the respondents, but the multiple-choice questions were designed to gauge indirectly their behaviours and features:

- (1) Intentions question: assess the resources and expertise in your organisation in other skill areas than your own with relevance to avoiding major accidents. This is a measure of management's intentions to follow the regulations.
- (2) Resources and expertise question: assess the (a) resources and (b) expertise in your own skill areas with relevance to avoiding major accidents. This is a measure of the necessary expertise being present in the organisation to follow the regulations.

The answers from the respondents were given through categorical quantitative assessments; however, we acknowledge that these questions cannot fully gauge all of the qualitative aspects and nuances in this field and may need to be further developed. The responses are rather similar for all four of the questions, as highlighted in Table 1. For resources and expertise, these are calculated together, and the average is used to gauge intentions and resources and expertise. Scores were multiplied by four for "Increasing", multiplied by two for "Stable" and multiplied by zero for "Declining", and the final score represents the sum total divided by the number of answers. This process gave scores of 2.22 for intentions and 2.26 for resources and expertise.

The third feature of trust between the regulatee and the regulator is not investigated separately in this study. We rely upon previously published data on the levels of trust in different countries. Hence, trust is set equal to the "index of legal certainty" of 7.19 for Norway,<sup>15</sup> with a base deduction of 4.00, which gives 3.19 on a 0–4 scale. These three scores for intentions, resources and expertise and trust are plotted in the model, and they are shown in Figure 4. As can be seen in Figure 4, the "Functional" Norwegian regulation mode is effective given the scores on regulatees' intentions, resources and expertise and trust between the regulates and the regulator. Furthermore, Figure 4 illustrates that, as the judicial system in Norway belongs within the civil law tradition, favoring prescriptive norms, small negative changes in or deceptions of these features will challenge this regulation mode.

<sup>15</sup> B Gómez Fortes and I Palacios Brihuega, "Citizens' Evaluations of Democracy – A Microscope with Quality Seal" in M Ferrín and H Kriesi (eds), *How Europeans View and Evaluate Democracy* (Oxford, Oxford University Press 2016) pp 155–77.



**Figure 4.** Three-dimensional model for the regulation mode showing the Norwegian and US contexts. Both are deemed effective due to differences in their levels of trust.

## VI. Model for an effective regulation mode: validation

Rigorous and extensive studies have been conducted to compare the differences and similarities between the US and Norwegian regulation modes. We have not conducted similar interviews with the US parties in the offshore oil and gas industry as in Norway. However, it would be interesting to seek to understand and categorise the differences between the two countries (Norway = “Functional” and US = “Prescriptive”) and to investigate whether the proposed model could help explain them and thereby validate the model for two different nations and regulation modes.

Given the global nature of the offshore oil and gas industry, we find it reasonable to judge that the intentions and resources and expertise of the industry would be equal in the two nations. The numbers from Norway can therefore be used for both nations. However, the level of trust is different, and so this difference needs to be included in the model. Trust between the parties is set equal to the “index of legal certainty” of 7.19 for Norway and 5.75 for the USA<sup>16</sup> with a base deduction of 4.00, which gives 3.19 and 1.75, respectively. This is illustrated in Figure 4.

A third nation that could be assessed in order to test the model is Brazil. Brazil, which belongs within a similar legal tradition as Norway, has chosen to regulate the same industry differently. Brazil uses a regulatory framework that is in line with its legal tradition, with detailed requirements in the regulations, thus using prescriptive rules as expected within the civil law tradition. This difference from Norway may be explained by different national expectations and social factors (eg by the fact that tripartite cooperation is not established in the same way in Brazil as in Norway).<sup>17</sup> In the Norwegian system, continuing dialogue is expected between the authorities, firms (employers) and employees, which suits with the C-repertoire’s requirements,<sup>18</sup> whereas in Brazil, contact between the parties is more accurately characterised by the R-repertoire.

<sup>16</sup> *ibid.*

<sup>17</sup> CR Hellebust and GS Braut, “Regulated Self-Regulation or External Control? Effects of Different Legislative Approaches in the Petroleum Sector in Norway and Brazil” (2012) 4(2) *SPE Economics & Management* 115.

<sup>18</sup> Rip, *supra*, note 6.



Using the same rationale as above to judge the intentions and resources and expertise of the industry in the two nations, it can be seen that they are equal. Our investigation in Norway gave scores of 2.22 for intentions and 2.26 for resources and expertise. These values, when inserted into a simple two-dimensional model (given in Figure 1 with a scale of 0–4) are appropriate for functional rules.

Again, the level of trust is different between these two nations, and so this will need to be included in our three-dimensional model. Trust is set equal to the “index of legal certainty” of 5.63 for Brazil, which is slightly less than that of the USA.<sup>19</sup> The three-dimensional model therefore indicates that a “Prescriptive” regulation mode would be effective in Brazil. Moreover, the fact that Brazil has selected a regulation mode that is in line with its legal tradition will make such regulation more robust if it is challenged by external stakeholders.

## VII. Discussion and conclusions

We have presented the rationale and developed a simple, novel model in three dimensions for the evaluation of an effective regulation mode. The axes are: (1) the regulatees’ intentions; (2) resources and expertise; and (3) trust between the regulatees and the regulator. Based on the literature in this area, we argue that the model is relevant for risk governance. Each of these three features can be elaborated further than has been presented here, strengthening the relevance of the model for regulation-mode selection and for suggesting areas that could be improved for both the regulatees and the regulator.

In presenting the model addressing two rule types, we acknowledge that the enforcement strategy is to a large extent a condition of the rule type applied. The notion that enforcement strategies are different for “Functional” and “Prescriptive” rules is embedded in the model.

The presented model for effective regulation should be further developed, and it should be considered whether more quantitative analyses should be carried out. The model should be tested on agencies and authorities that use detailed regulations or have large differences between supervisory objects (or regulatees) in order to investigate whether it is relevant to these contexts as well.

**Competing interests.** The authors declare none.

<sup>19</sup> Gómez Fortes and Palacios Brihuega, *supra*, note 15.