The role of valuation practices for risk identification

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Abstract

This report uses a relational theory of risk within which risk is understood as a relationship between a risk object and an object at risk where the risk object threatens the value embedded in the object at risk. A case study of risk management in railway planning examined through a relational understanding of risk demonstrates how riskwork is conditioned by what is valued, how, and by whom. The report argues that riskwork originates in the versatile valuation practices that take place in organizations. Furthermore, it suggests that bringing such valuation practices under critical scrutiny opens up the possibility for a reflexive approach to risk management. Such a reflexive approach would take into account how risk identification is embedded in a particular organizational order.

Keywords
Relationship of risk, Valuation, Risk management, Practice, Railway planning

Introduction

Risk identification is widely acknowledged as an essential component of risk management (e.g., Cooper, Walker, Raymond, and Grey 2014). However, how risk identification is understood derives from how risk is conceived. If risk is understood as an observer independent fact, it follows that risk identification will focus on establishing causal circumstances that potentially can produce adverse outcomes. But, if risk is understood to be an observer dependent mode of addressing the uncertainties and contingencies that characterize life, identification will consist of unfolding from a particular point of view what is considered to be a risk or not.

In the present report, we adopt a relational theory of risk (Boholm and Corvellec 2011) that builds on the second of these two views of risk to show that evaluation practices, i.e., how and why people attach value to things, play a key role in risk identification.

The relational theory of risk draws on sociological and anthropological insights that understandings of risk are situated in specific social contexts. Conceptions of risk draw on knowledge, values, and concerns that are embedded in livelihood and imprinted individuals by social institutions, historical experience, and collective identity (Boholm 2003a, 2003b; Caplan 2000; Grätz 2009; Mairal 2003, 2008; Sjölander-Lindqvist 2005; Stoffle and Arnold 2003; Stoffle and Minnis 2008). Far from being abstract and disembodied constructs, risk conceptions are associated with everyday practices and cultural assumptions that vary from group to group, place to place, and time to time (Shaw 2000).

More specifically, Boholm and Corvellec (2011) build on Hilgartner's (1992: 40) analysis that 'particular risks include at least three conceptual elements: an object deemed to "pose" the risk, a putative harm, and a linkage alleging some form of causation between the object and the harm' (emphasis in original). To characterize an object as 'risky', two conditions must be met: the thing under consideration has to be constructed as an object, and a linkage has to be established between this object and a putative harm. Objects should be understood in a broad sense. They can be natural phenomena, such as lightning, technological, like a cell phone, cultural, such as the virginity of girls, or behavioral, such as smoking. The relational theory of risk (Boholm and Corvellec 2011) suggests that risk is a cognitive schema, a cultural model of a domain of knowledge (Strauss and Quinn 1997, Chapter 3) that constructs relationships between objects in terms of a potential threat to the value embedded in objects at risk.

Three elements are central to this schema. First, there are risk objects, identified as potentially dangerous. Dangerousness is a matter of potentiality: a risk object might incur damages only under contingent circumstances (Corvellec 2011). And not all the characteristics of risk objects are equally salient. Whether one speaks of dogs, guns, nuclear waste, competitors, the evolution of technology, or of a piece of new legislation, the identification of a risk object implies

fronting some characteristics that are hazardous under some circumstances and downplaying others which are not. The dangerousness of risk objects results from a circumstantial framing.

Second, there are objects at risk, identified as being endowed with value, that are considered at stake. Objects at risk embody worth, for example life, nature, principles, or money, but also include chief executive officers, companies, or nations. Like risk objects, objects at risk are not a given; rather they are defined when indexed with worth. While risk objects are construed around characteristics of potential destruction, objects at risk are construed around characteristics of appeal and importance, weight and significance. The value understood to be associated with an object at risk can potentially be degraded, stained, reduced, diminished, or even lost. A key characteristic of an object at risk is that its worth is circumstantial and contextual, and therefore merits protection from various potentially harmful influences, for example by adequate riskwork[1].

Third, relationships of risk build on connections and associations (van Loon 2002) that are established by means of conjectures, probabilistic models, laboratory tests, narratives, or other means. A relationship of risk establishes a contingent relationship, answering the question 'What if?' (Ravetz 1997): relationships of risk rest on hypothesized conditions, courses of events, and consequences (Corvellec 2011), but they are also causal. It is not sufficient to claim a relationship of convenience, similarity, or proximity. A relationship of risk must establish that the risk object actually has a potential to threaten the object at risk. It has to establish a relation of causality between the two. How and possibly why the risk object threatens the object at risk needs to be spelled out in order to establish a relationship of risk. For example, one needs to show how and why a legislative change threatens a company's business model or key success factor. Scientific understanding and expertise therefore assumes a privileged position in societal risk management (Jasanoff 1999).

Our purpose in this report is to show, using a relational understanding of risk, how risk identification as a form of riskwork, connects risk objects, objects at risk, and relationships in an assemblage where each element gains identity from being put in conjunction with the other. Something becomes a risk object when put in a relation to an object at risk. Constructing risk is a craft which relies on expertise, expectations, and social roles embedded in particular organizational settings. Our contention is that valuation practices are an essential ingredient of this craft.

[1] The notion of Object-at-Risk (OaR) may seem similar to the notion of Value-at-Risk (VaR) (e.g. Dowd 1998). There is indeed a similarity in the sense that both OaR and VaR rest on imagining a potential loss in value consecutively to an adverse event. But there is also a major difference. Whereas VaR is a probabilistic measure of the potential loss of a financial portfolio, OaR refers to the object itself that carries this loss. Moreover, this object not needing to be financial.

On valuation

Several authors have noted that value is central to the concept of risk (Boholm and Corvellec 2011; Hansson 2010; Möller 2012; Rescher 1983; Shrader-Frechette 1991). For example, Rescher (1983: 31) observes that 'there is no risk assessment without normative *evaluation*' (emphasis in original). Similarly, Rosa (1998: 28) defines risk as 'a situation or event where something of human value (including humans themselves) has been put at stake and where the outcome is uncertain', and Aven and Renn (2009, p. 2) claim that 'risk refers to uncertainty about and [the] severity of the consequences (or outcomes) of an activity with respect to something that humans value'.

However, acknowledgement of the essential role of value for risk takes us only half way into understanding risk identification. As valuation studies (e.g., Beckert and Aspers 2011; Berthoin Antal, Hutter, and Stark 2015; Helgesson and Muniesa 2013; Muniesa 2011) have made clear, value is neither objective nor subjective. Value is an outcome of intricate social processes of identification, definition, hierarchization, and calculation that condition preferences in more or less determined ways. Therefore, if one wishes to understand what value stands for, one needs to unfold the social practices of valuation that determine, explicitly or implicitly, what is worth being considered as an object of care and why this is the case (Horlick-Jones 2005).

The observation that valuation processes are intrinsically social, dating back to the early days of social science, noted by pioneers such as Emile Durkheim (1991 [1893]), Marcel Mauss (2000 [1902]), Max Weber (2008 [1921-1922]) and Gabriel Tarde (1902), has found a renewed interest in economic sociology (e.g., Beckert and Zafirovski 2010) and economic anthropology (e.g., Carrier 2005; Wilk and Cliggett 2007). For example, the *The Worth of Goods* edited by Beckert and Aspers (2011) provides several examples of how definitions of value result from social processes with individual and organizational practices at their core.

Beckert and Aspers (2011) suggest that value is diverse, and there is no generally agreed upon exchange rate for translating one scale of value into the other, for example, as Appadurai (1986) notes, translating the environmental scale into the symbolic or the economic scale, even if differences between how stakeholders define value do not necessarily prevent them from communicating about value and trading objects of value. Value is inevitably a matter of judgement and attitude: something that derives from the preference of actors. Preferences are not exogenous (Bourdieu 1979), as mainstream neoclassic economic theory assumes; they are embedded in the social psychology of desire, the non-decidability of meaning, and the dynamics of organizational and managerial practice. It is not always clear where criteria to assess value come from, how they relate to the object under consideration, or how they develop into taken-for-granted conventions (see, e.g., Hennion 2015). But it is clear that managerial practice has the ability to

establish such criteria in terms of organizational norms and turn them into tools for decision making. Or rather, as Stark (2009) claims, at the core of managerial practice is an ability to create ambiguity and uncertainty about what is valuable so that the co-existence of multiple principles of evaluation provides managers with sizeable opportunities for ventures of their choice.

Beckert and Aspers (2011) show that valuation is a multifaceted organizational practice that draws on hearsay, legal assessment procedures, as well as mathematical algorithms when trading in derivatives. Valuation processes draw on organizational *modus operandi* (Corvellec 2009, 2010), rhetorical traditions (Sauer 2003), historical commitment (Vaughan 1996), mindfulness (Weick and Sutcliffe 2007), modes of accountability (Dekker 2007), and communitarian commitments (Boholm, Corvellec, and Karlsson 2011; Gherardi and Nicolini 2000). Depending on organizational practice, valuation is something that organizational actors actually do (Heuts and Mol 2013). Valuation is embedded in the everyday dynamics of organizational life. It is a situated collective achievement, not an individual subjective outcome. Individual cognitive frames shape and are shaped by collectively validated preferences so that organizational and managerial practices condition and subtend what individuals consider as being of worth. Valuation reflects agreements as well as trade-offs or conflicts among actors about what matters. It is an activity that takes place over time, and that is as much tuned to past experience as it is to scenarios about the future or a sense of the present. It is this organizational practice, in the specific case of risk identification that the case study in this report will portray.

Case study: railway planning in Sweden

Institutional framework

At the time of this study, in 2007-2008, the Rail Administration[2] is responsible for the railway system, including the rail track, the signal system, and the provision of electric power to trains. Trains themselves are operated by companies (e.g., the former monopoly SJ, regional companies, Veolia, and cargo carriers) which hire rail capacity from the Rail Administration.

Schematically, the procedure for railway planning unfolds as follows. It starts with an investigation phase aimed at identifying possible routes and comparing them in terms of costs, benefits, risks, technical requirements, environmental impact, and other possible effects and consequences. The investigation phase involves substantial consultation with the regional county board(s), municipalities, potential stakeholders, and members of the public. It results in a proposal that must include an analysis of socioeconomic costs and benefits and show how the railway line corresponds to the national transportation policy goals.

[2] Two years later, in 2010, The Rail Administration ceased as an independent government authority. Today the Swedish Transport Administration is responsible for planning the transport system for road and rail traffic, and for maritime shipping.

Next comes the railway plan phase. This phase involves a detailed planning of the decided route, including exact design of bridges, tunnels, barriers, and road crossings. The railway plan must include considerations of safety regarding future train traffic, specification of constructions, construction processes and facilities (such as working roads or locations for storage of excavated masses), as well as legal, organizational, technical, and economic issues. Swedish regulation of railway planning requires that the Rail Administration makes a systematic assessment of the operational and environmental risk involved in its projects. Correspondingly, the Rail Administration has issued risk management rules (Banverket, 2008) and a handbook (Banverket, 2006) that spell out how risk management should be conducted.

Apart from a detailed characterization of all technical elements of the new railway line, information on risk identification, and risk management strategies, the railway plan must show that all property rights and land use matters have been legally settled. It must also account for the mandatory consultations held with the public, real estate owners who are affected by the project, municipalities, and regional boards. And it must present an Environmental Impact Assesment (EIA) that needs approval by the county board, or if they refuse, the Swedish government must approve it, which would cause substantial delays to the project.

Although providing stakeholders with certain legal rights, Swedish railway planning adheres to a technocratic regulatory style of consensual negotiation between the state, political interests, and elite stakeholders, but public participation is limited (Löfstedt 2005). Continuous reconciliation of a multitude of interests therefore proves to be a major task for railway planning officials who must negotiate diverging regulatory issues and stakeholder interests, and adapt general rules and standards to contextual practical working agreements regarding complex socio-technical arrangements (Johansson 2012).

Planning for upgrading a track section

In 2004, the Swedish government decides to upgrade railway capacity on the Norway-Väner Link north of Göteborg by doubling track rail, dimensioned for high speed trains. The new railway line promises to reduce travel time, offer more frequent departures, present new commuter stations, and provide diverse environmental benefits. The building of the track begins in 2009, and the new Göteborg-Trollhättan railway line is inaugurated in December 2012.

Between March 2007 and mid-autumn 2008, Boholm attends all 23 planning meetings for a sub-section of the route, located in a rural area south of the city of Trollhättan, 90 kilometers north of Göteborg. The meetings include the Rail Administration internal project meetings, the project's reference group meetings with stakeholders such as the county board, the municipality of Trollhättan, the regional public transport company, and the Road Administration, and one public consultation meeting with the general public as part of the exhibition of

the railway plan (October 2007). All meetings are documented by field notes written during observation. Data also includes internal documents, minutes, official reports, Rail Administration handbooks and standards, and informal talk (including asking questions) with officials, planners, designers, and consultants. This case study is part of a larger research project on risk in public transportation carried out together with Corvellec.

The planning project is managed by a Rail Administration project leader responsible for the project's budget and schedule. This project leader is in charge of coordinating the in-house expertise on economic matters, environmental control, quality, information, purchase, safety, and traffic. Railway planning is an information intensive activity. It requires numerous investigations into geology, hydrogeology, ground water, ecology, wild life, landscape, property, building materials, technical design, existing roads, and traffic. Calculations of economy, time, safety, construction stability, logistics, and mass balance are essential to project management, in particular to rule out inconsistencies and unwanted consequences. Railway planning thus depends on external consultants that are contracted for a number of tasks ranging from fine-tuning the spatial location of the railway line, the design of the signal system and the contact cables, the design of bridges, tunnels or over- or under-crossings with roads, to environmental impact assessment and various legally mandatory investigations. Ensuring that consultants fulfill their contractual commitments is a key task of the project manager.

Identifying values at stake and risk objects

The risk identifying exercises

A series of meetings is dedicated to the identification and management of risk. A one day meeting is held at the beginning of the project (March 2007) to identify and assess risks relevant to the railway planning stage. This risk identifying meeting brings together about 15 project members, consultants, and Rail Administration officials, representing a variety of specialist competencies. It is the first stage in the preparation of the mandatory risk management plan. The project leader introduces the objectives of the meeting. When the participants introduce themselves, it shows that eight come from the Rail Administration (expert support, technical co-ordination, and real estate), and seven are consultants, two of whom work under (or with) the lead consultant. Competencies in the group include environmental impact assessment, geotechnology, contaminated soil management, construction, real estate property, tunnel building and tunnel security, and bridge design.

After a joint introduction to the concept of risk, defined as the product of consequence and probability, and of how the Rail Administration views risk assessment, the group is divided into two sub-groups. Each participant is asked

to write down on sticky notes the risks that he or she can identify, and then describe what the Rail Administration calls the domains of consequence of this risk—whether it pertains to time, economy, quality of delivery, environment, work environment, trust among partners, or "third party or parties". Each sub-group is to do a risk assessment and the two sub-groups are to jointly categorize each individually identified risk as red, yellow, or green.

The instruction immediately gives rise to questions among the participants regarding which risks are relevant to the identification exercise and which are not. The question is asked: 'What about risks that the Rail Administration cannot influence?' Traffic risks and circumstances relating to weather conditions are brought up as examples of risks that are beyond control in the planning process: 'What about the planning stage in relation to the building stage? If it rains a lot, is that a risk that should be counted?' Answering these questions, an official from the Rail Administration explains that focus should be on what the project planning can influence, and that experience from earlier projects therefore is important.

Another meeting is held three weeks later (April 2007) with fewer participants: the project leader, the co-coordinators of the consultants, and the quality coordinator from the Rail Administration. The sticky notes have been compiled into a list of 125 different risks that have been entered into the Rail Administration's risk management planning document template. This template contains several columns. One column lists the risk items, specifying their domains of consequence: one for a quantified estimation of the consequence that the risk presents and one with an estimated probability of the risk. The document also has columns for management actions, indicating who is considered to bear the responsibility for the risk, and the date for the latest update of the information about this risk. The magnitude of risk is calculated as the product of consequence and probability, and since both consequence and probability are measured on scales ranging from 1 to 5, the highest possible risk estimate is 25 and the lowest is 1.

The purpose of the April meeting is to provide an assessment of which risks may be involved and to present prevention measures for each risk or type of risk. The project leader suggests that the group should quickly go through the list to see if something has been forgotten. Questions arise about how the risks should be sorted. After some remarks she says that 'risk estimates are very subjective'. Someone suggests merging two risks into one, and the quality co-coordinator answers that merging risks may in some cases make them clearer and easier to follow. The list is read through and commented upon, but with little discussion about specific risks. After the risk-list has been reviewed, the group discusses how the measures might be described and whether a name of a specific person should be entered in the responsibility column. Someone notes that the important thing is that the process is traceable so that it is clear how the group has worked. The discussion is mainly about how to comply with the formal requirements for

the risk management planning document, for example with action plans and checklists. The discussion is also about how this document is going to be used. At a later project meeting (May 2007), the project manager presents the risk management plan. At that time it contains 86 identified risks.

The brainstorming exercise at the initial March 2007 meeting, in particular, shows how railway planners identify, understand, and negotiate risk. Our observations of the exercises in risk identifying show how riskwork is a dynamic social process of evaluation practice revolving around the detection, characterization, and agreement on values and potential threats. The next section features that risk identification work entails dealing with a variety of issues such as accident and contingencies, lack of competence, regulatory obstacles, interfering authorities, technical limitations, traffic problems, and resource uncertainty.

Risk identification work

In what follows we focus on a number of themes that emanated from the risk identification exercises. To separate risk issues written down by the planners on the sticky notes from what was said during the discussions, we use the following typographic conventions: risk items written on the sticky notes are indicated within square brackets; statements made during discussions are identified within quotes.

Matters 'out of control'—accidents and contingencies

The planners make considerable effort to address matters that they understand to be 'out of control' but can have a vital impact on the building of a railway line due to the complex causal conditions for such work. The planners are acutely aware that even with the minutest and most prudent planning, it is unrealistic to believe that all negative events that might possibly occur can be foreseen. An external and crucial 'matter out of control' which is repeatedly referred to during the discussions of the March 2007 meeting is weather conditions: the two risks [exceptional weather causes delays] and [construction area is flooded] are discussed a lot. One specialist argues that these risks are not very probable, but another expert counters that 'natural catastrophes are becoming more frequent' and that 'this is a fact'. It is suggested that the probability is a 2 for these risks. One planner points out that a small river in the area has been flooded recently and asks about the consequence of such an event. Someone answers that 'this is a question about the solicitation process. How did that look?' The discussion continues and one participant notes that the water level in Lake Vänern (Sweden's largest lake) could be a risk and that this gives rise to questions such as: 'Can this risk be made clear in the procurement documents? Can water flows be specified?'

The discussion moves to the sharing of economic responsibilities between the Rail Administration and, for example, construction companies in case of weather related emergencies: 'At what point does the contracting authority take over

costs from the contractors?' Then a discussion follows about what is referred to as 'correct pricing', and the comment that 'contractors might speculate in weather!' Someone suggests that 'maybe the consequence is a 4' but it is unclear what this suggestion referred to. The discussion on weather-related risk continues and a question is raised about how such things are managed 'on the oil rigs in the North Sea'. Someone asks what will happen if there is a '100-year wave every 10 years'. Then the weather-related discussion shifts to storms and a question is raised whether storms have 'the same probability' as heavy rain or sea waves.

A question is asked about the practical matter of how to approach a flooded workplace area. In connection with that, one expert argues that 'storms are more temporary than floods. You have to shut down and floods last longer.' The discussion on weather rambles and ends by broad comparisons with serious flooding cases in Sweden and elsewhere: 'What about Arvika (our note: a medium sized Swedish city affected by a catastrophic flood when in 2000 the water levels from the nearby lake reached 3 meters above normal)? Or Bangladesh?'

Other matters discussed from within an 'out of control' interpretation frame are construction risks such as [landslide during building], [the foundation for the bridge fails], [landslide in Slumpån with ecological disaster], and [collapse in tunnel, concrete leaks into mountain shaft]. A general comment that is made in connection with these risks is that construction problems must be distinguished from environmental problems. The risk [mountain ground work fails and there is a collapse in a tunnel] is given as an example. A question is then raised about probability and the discussion continues with the questions 'Shall we not start with probability?' and 'is this usual?', and although it is not clear to which one of the noted risks the speaker refers, an expert answers that 'it has occurred' and points out, as a comparison, that '[collapses] are more common within the Road Administration'. The probability is set at 2 and no one protests. The discussion continues and an expert puts forward that 'there is a difference between bridges and tunnels' and that 'a bridge has a probability of 5 and a tunnel of 2'. No one protests and another of the construction experts agrees to the suggested figures.

Discussion continues on the identified risks [landslide in Slumpån] and [Slumpån is affected by process water]. The Rail Administration environmental expert states that these risks have major consequences. The project leader suggests that the risks should be sub-divided to make clearer what is collapsing: 'fundaments of the old bridge, or land masses?' It is agreed that the consequences would be major, commending a 5, but that this probability is more difficult to assess. No one has an answer and it is suggested that the risk should be classified as a 'yellow' (with a middle-size risk estimate) with a probability of 3. The project leader then asks 'can we agree on this?' Someone thinks that the probability is too high since 'such things occur several times every month but there are protection measures.' The identified risk [landslide and collapse during building] gives rise to a question about whether this was caused naturally by a collapse of the ground due to high amount of water. Somebody notes that the

identified risks could result in loss of public trust in the Rail Administration. The Rail Administration environmental expert mentions that a landslide has already occurred in a nearby stream, and if that would happen during the building phase, it might be interpreted as being caused by the Rail Administration's construction activities. One participant asks about a probability and notes that 'such things will happen again'.

Mistakes and lack of competence

Another theme of risk issues identified during the risk identifying exercises relates to human and organizational failure. In the discussions of the March 2007 meeting, the identified risks [ill-conceived planning] and [lack of competence] are met with the question (as usual) 'What about probability?' which renders laughs and a lively discussion. It is commented that this is 'a likely risk but also likely that it will be managed' and that 'there is a tremendous uncertainty in project planning—a guessing competition' and that 'how good a job one does, there is always big uncertainty'. It is further noted that 'things will always happen!' The group agrees on a 4 for probability. It is argued that mistakes and lack of competence is a 'significant risk' and that it is particularly important that it is managed properly by means of 'internal control'. An economic dimension is involved here since the participants recognize that appropriate and qualified skill in railway planning costs money. Someone remarks that 'the contracting authority has run public procurements before, and you get what you pay for'. The consequence is rated high, a 5.

About the risk [poor competence of private contractors, for example, consultants], someone comments that 'If the consultant does not think correctly, everything can be affected'. It is also noted that 'competence is a combination of knowledge and experience'. One participant argues that the risk of poor competence is small; another asks if this risk might vary from one group of actors to another. A question is raised as to whether there is a difference between the contracting authority (i.e. the Rail Administration) and the contractor in terms of necessary competence in railway planning. During the discussion, someone points out that there is an interaction between the contracting authority and the contractor and that these have differing interests. It is underscored that the probability that a contractors has poor competence is low, but that the consequences are devastating if this proves to be the case. The probability that the contractor lacks competence is agreed to be 2. The consequence is set to 5.

Some participants express concerns about contractors' incompetence, inability, or even neglect. Others counter that insufficient performance of contractors may also derive from incorrect, inadequate, and insufficient steering by the Rail Administration. The relationship between the Rail Administration and the contracted builders or consultants is seen as crucial and rather sensitive. Several underscore that the Rail Administration's ability to steer contractors is

only indirect because they steer through procurement and contracts. Contractors can always fail. Likewise, contracts can prove to be faulty or inadequate. So the Rail Administration officials have no other choice than to trust the contractors (Kadefors 2004). Railway planners are acutely aware that contractual control and steering have limits and give rise to a considerable degree of uncertainty. Furthermore, the Rail Administration planners also recognize that 'outside' society (such as the media, the public, other authorities) may not regard the division of responsibility between the public and the private actors in the same way as they do. Faults by the contractor are understood to have a propensity to 'spill over' onto the reputation of and trust in the Rail Administration. What has been identified in the literature as 'reputational risk' (Power, Scheytt, Soin, and Sahlin 2009) shows to be a salient theme in the risk identification process.

Regulatory obstacles and interfering authorities

Another theme of identified risks concerns relationships between the project and its social environment that includes local property owners, external government authorities, municipalities, and the county board. There are numerous restrictions in terms of law, administrative rules, and legal standards that can have a decisive impact, causing time delays and cost increases for a railway project. Government agencies have diverging interests, for example, regarding environmental protection, heritage conservation, or safety standards. The local stakeholders who own land affected by the new railway line have a legal right to compensation for loss of ownership and/or use of land or buildings; therefore, they are identified by the planners as potential threats to the implementation of the new railway line. For example, one risk identified and discussed at the brainstorming meeting in March 2007 is that of [finding previously unknown archaeological remains]. It is recognized that such discoveries have caused difficulties for other projects before. It is noted that there are actually plenty of archaeological remains in the area where the new railway line is be built. There are jokes about this risk and someone comments that the Swedish National Heritage Board (the government authority in charge of the preservation and protection of the historic environment) does not have an adequate inventory of archeological sites and that therefore findings might turn up unexpectedly. Other risks within this theme are [an archeologically sensational discovery is made] and [a new species of bird or plant is discovered]. The rationale behind these risks is that the legislation about archaeological heritage and nature conservation may come into play if new discoveries are made. The planners agree that these risks have a low probability, namely 1. The fact that there are bog lands in the south of the route that are not very well investigated is then discussed, alluding to the fact that the actual knowledge about the area is still limited and that some new species might turn up eventually. The consequence of such risks is rated high, namely 5. Someone asks how such risks might affect trust in the Rail Administration since

it may suggest that the authority has done a poor job at the investigation stage. The environmental controller adds that biotopes worthy of protection are going to be carefully investigated but remarks that a consequence might be that the public would become engaged in the planning process. The group agrees on 3 for probability and 4 in consequence for [loss of trust in the Rail Administration].

Technical limitations and traffic problems

Technical coordination and traffic disturbances, construction problems, and construction logistics in relation to ongoing road and rail traffic during building are recurrent themes during the risk identifying exercises. Risks that were identified and discussed at the March 2007 meeting and belong to this category are [connecting different branches of technology like rail, signal, power line], [assisting power into a functional whole] and [project boundaries in relationship to the rail line that remains in operation]. As usual, the first question is about probability. There is no clear answer and someone comments that a complication may be that 'documents are incompatible'. An additional complication is that there is going to be construction work on a congested road which crosses the railway. Someone raises the questions: 'Are these risks two different risks or do they belong together?' Focus then turns to the risks that [road and rail are going to be simultaneously trafficked], and [traffic over Slumpån on the existing railway bridge]. Answering the question 'what is the risk of traffic problems?' someone comments that it will be 'complex to build and difficult to plan.' Building will be difficult since it will be necessary to make adaptations to the existing railway. The question is raised: 'What about probability for Slumpån?' The answer that comes up is that this 'will depend on where the bridge will be located'. The probability is estimated to 4 and whether it should be 5 is discussed. 'At Velanda, it is possible to plan but the probability will depend on the exact location of the line.' What about probability? Nobody seems to know, and it is said that [traffic problems] 'can occur'. The probability 3 is then suggested.

About the identified risk that [different technologies do not form a functioning whole] the participants acknowledge that the railway planning stage is important and that 'a few things might have been missed' and that 'coordinated examination must be accomplished'. Then follows the usual question about probability: one answer is that this can happen but that it is something that can be managed: 'the consequences are not very big. But can be very high if it happens on the Inauguration Day!' Nobody, however, seems to think that this is very likely, though, and the measures 2 and 3-4 are suggested for consequence. Someone argues that the consequences 'depend' since the risk is not so complex technically, but there are other complications; the risk is then categorized as medium-sized, thereby having little significance. The group is asked to decide on a consequence estimate and they settle for 3, with the comment 'which does not lead to any action'.

Resource uncertainty – matters of economy and expertise

Various factors such as continuity of staff, funding, and internal priorities within the agency are recurrent themes of concern. From a project perspective, decisions made at higher administrative levels may imply that priorities change, and as a consequence so will allocated resources. Another concern is about the financing of later stages of building, when it comes to various costs for compensation for stakeholders or restoration work. One set of issues refers to the contractor and especially to the lack of competition in the market among contractors. This is identified as a risk of escalating cost. During the discussions at the March 2007 meeting, the noted risk that [project participants quit] gives rise to a lively discussion. This risk is related to the consequence areas of time and economy, and the consequence is rated as a 4.

Two other risks are identified together [too few contractors leads to high prices] and [too few contractors due to too many restrictions], and a participant comments that 'this is interesting' and 'a consequence of the procuring process'. It is argued that 'a robust market for contractors' is needed. It is also suggested that the Road Administration and Rail Administration should coordinate their procurements better so that they do not invite to tender simultaneously. Someone questions this, and asks 'What market are we talking about? For tunnels? This is a Nordic market and what about the region?' and, under the assumption that this market is actually very small, the comment follows 'You can't squeeze blood from a stone'. Then one participant asks: 'What about the probability for this risk?' The answer given is that it 'depends on the procuring authority that can mitigate the risk'. The measure 3 is suggested. What about consequence? 'The cost can easily exceed 30 million' but this figure is objected to as being all too low. The consequence is settled for 5.

Concluding discussion: Risk identification as organizational practice of valuation, starting with value and working inside-out

These glimpses into risk identifying practices in railway planning show to how great an extent riskwork is intuitive and experience based. Although risk identification and assessment is orchestrated according to a formal risk management protocol, the process is guided by practical reasoning based on a blend of expertise with fragmentary, intuitive, anecdotal, narrative, and socially situated knowledge. Experts draw on their past experience and heuristic conjectures to produce apportions, hierarchies, bargaining, and qualified guesswork. There is only a nominal resemblance to the formalistic rationality of risk identifying techniques and procedures. Understanding risk and risk management work is embedded in more or less explicit organizational practices (Corvellec 2009), and is shaped by social trust among actors, their respective understanding of the institutional context, collaborative intentions, and a sense of mutual responsibility (see also: Boholm 2013a, 2013b).

In particular, risks are clearly not identified independently of their management—contrary to a cornerstone of formal risk management (e.g., Royal Society 1992). Rather, risks are identified in the context of how actors understand and anticipate their control of elements deemed crucial to the project (Boholm 2010). Keeping control over the factors understood to condition the success of the project—e.g., budget, schedule, feasibility, possible vetoes, political support, societal worth—surface as a recurrent concern and a way of structuring discussions.

As predicted by the relational theory of risk (Boholm and Corvellec 2011, 2014; Boholm *et al*. 2011), actors focus on the potential threats to values deemed to be critical to the success of their project. Actors keep building relationships between, on the one hand, matters pertaining to insufficient competence, mistakes, violations of contractual agreements, inefficient technical coordination, traffic disturbance, construction problems, and problems in construction logistics, and, on the other hand, matters pertaining to the continuity of staff, available technical expertise, actual and future funding, collaborative stakeholders, and Rail Administration priorities. Riskwork begins with situated valuation processes to establish vested value meriting protection measures. Valuation practices are therefore at the core of risk identification since it is when risk objects are connected to a value at stake that risk emerges as a meaningful organizational category. Since actors consider time, cost, and quality to be essential values, they focus on what may incur delay, unforeseen expenses, and insufficient performance. Risk identification and assessment rest on collective definitions of potential threats to what matters.

As the present case illustrates, the activity of ascribing value is produced together by actors through managerial activities. Examples of such activities are formal or informal interactions, choices or absence of decisions, heated debates or consensual agreements, and calculations or rules of thumb. Valuation activities are encapsulated in memos, tables, standards, slogans, contracts, and other inscriptions that enable them to act at a distance (Lowe 2001; Robson 1992). In particular, the production of a common inscription in the form of a risk register or map requires and facilitates negotiations across perspectives and organizational members, for example, to assess the relevance of a norm or associate a red, yellow, or green colour to a specific risk. In this sense, the main performance of risk maps may be to enforce communication even when communicative premises are weak (See also Jordan and Jorgensen, this volume). Practically, but even metaphorically, risk mapping exercises bring actors to the same table, even if they come from different domains of expert knowledge, or from different hierarchical levels, and even if they all read the map in idiosyncratic ways.

Valuation is an organizational practice embedded in organizational history, culture, and mission, but also in routines and rules of thumb. It is this practice that determines what, at the end of the day, comes to be identified as a risk or

not. And correspondingly, risk identification has its origin in situated judgments about what is of worth and thus a legitimate object of protection. Riskwork can employ objective measures of threats or systematic evaluations of consequences but only after a value at stake has been identified. The starting point is exercises in practical rationality to establish collective judgments of worth.

If one accepts the position that a potential threat becomes a risk only when attached to something that is of value, as suggested by Boholm and Corvellec (2011), the origin of risk will therefore not be found in external threats but in internal conceptions of value. Riskwork starts with an inside-out activity, where value serves as heuristic ground for searching what may constitute a risk, rather than an outside-in activity that consists only in imagining the possible negative consequences of threats.

A relational understanding of risk thus brings with it an invitation to risk-workers to reflect on what is held as of value and why. We have good reasons to assume that most risk-workers have quite clear ideas about value in many cases, in particular when life or money are at stake, but that in other cases their assumptions are less clear. Riskworkers may not always be fully aware of the practical consequences of the socially flexible character of valuation, to the extent that others not only can have other ways to value things, but that priorities and hierarchies of value often prove to be less stable than admitted . A practical recommendation to risk-workers would therefore be to bring their own valuation processes under systematic critical supervision. Here are three simple questions that organizational participants and others can ask: What are we holding as valuable? Why are we holding this in esteem? Where does this esteem come from? There are indeed good strategic reasons for asking why one is holding, for example, the company brand or a budget in esteem so that any threat to them is considered as a risk to be identified and managed.

Based on our findings, we would also suggest more critical reflection upon what currently established valuation processes mask or down-play. Valuation processes are also de-valuation processes in the sense that hierarchies are set up where certain objects are held as more valuable than others. For example, a public administration that gives top priority to economic consideration might downgrade public service, reliability, or sustainability, to mention other possible orders of worth. The question of what cannot be seen or imagined due to established taken-for-granted assumptions opens the way for critical reconsideration of the rationale(s) for organizational activities. An enquiry into why an actor is heralding this and not that as a risk prompts a critique of prevailing organizational sense-making and the social order in which it is embedded. From our perspective, the most important lesson for riskwork, is for actors to stay clear about what one holds as of value and why.

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