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Differentiated social risk: Rebound dynamics and sustainability performance in mining

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ABSTRACT

This article examines the application of social risk in the global mining industry. The current approach to social risk conflates risk to people and risk to projects. We argue that differentiation is needed to determine the respective attributes of both risk types and to understand how and where they interact. Establishing a clear understanding about where a risk is directed is important from multiple vantage points: due diligence, risk and liability management and social protections. A key contribution in this article is the demonstration of 'rebound dynamics' surrounding social risk. The authors argue that social risks can generate impacts across a range of institutions, boundaries and factors. Understanding the workings of social risk in this dynamic space is critical for ensuring that the industry addresses social harm as part of its commitments to sustainable development.

1. Introduction

The workings of the global mining industry raise important questions about sustainable development (Buxton, 2012; Cowell et al., 1999; Hilson and Murck, 2000; Humphreys, 2015; ICMM, 2008; IIED, 2002; Tilton, 1996).[1] Large-scale mining projects can influence the development trajectory of nations, alter the social fabric of local communities and disrupt the environment on which livelihoods depend. The changes brought about by mining can be unscheduled and unpredicted. There are mines that were initially developed to have minimal or manageable social impacts that instead led to social and environmental devastation. A case in point is the collapse of the tailings dam at the Samarco mine in the Minas Gerais state of Brazil in November 2015.[2] This catastrophic event resulted in the loss of lives and hundreds of homes as mine waste spread into the Doce River, affecting numerous communities and natural systems over a vast area. The tailings dam had been in place since 1977 and, up until the point at which it collapsed, was not considered to be a significant risk to local people.

Mining companies are under pressure from governments, lenders and financial institutions, civil society, local communities, and a range of other actors to contribute to sustainable development. This expectation has two primary dimensions: (i) to minimise harm to people and the environment; and (ii) to 'do good' by generating net positive benefits. The mining industry uses the term 'social risk' uncritically to respond to both of these issues. The mining industry's usage does not clearly differentiate between *risk to people* and risk *to the project*. This lack of clarity invites questions about what is viewed as constituting *a risk*, and who or what is considered to be *at risk* in the context of mining. The physical sciences use the term 'rebound' to describe a change in direction when objects come into contact with each other. We use this term to describe the interface between mining companies and communities.[3] It also serves to highlight the effect that risk directionality can have in terms of managing social harm and delivering on sustainability goals.

This article comprises six sections. Section two explores techno-scientific definitions of risk before introducing perspectives from the social sciences. Section three demonstrates how the

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[1] We draw on the Brundtland (1987) definition where sustainable development considers the social, economic and environmental aspects of development in which the needs of the present do not compromise the ability of future generations to meet their own needs.

[2] Samarco is a joint venture iron ore operation owned by BHP Billiton and Vale, two of the world's largest mining companies.

[3] The 'rebound effect' is a term used in energy economics to indicate situations where expected energy gains from new technologies are lost because of other behavioural or systemic responses (Greening et al., 2000). We have avoided the term rebound effect for this reason.

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concept ‘social licence to operate’ has served to connect sustainable development to risk in mining industry discourse. Section four provides further context by introducing literature about mining's well-documented social impacts. After describing mining as a socially risky business, in section five we differentiate between social risk and business risk. We articulate the conceptual benefits of differentiating these terms, and show how the mining industry has conflated *risk to people* and *risk to project*. In section six we explore directionality issues within the rebound dynamic; that is, the ways in which social and business risk can influence and affect the other.

2. A social approach to questions of risk

The global mining industry is driven by a techno-scientific approach to risk. We critique this approach by drawing on alternative understandings of risk, particularly in terms of the treatment of socio-cultural factors. While the mining industry's use of social risk is ostensibly disconnected from theoretical developments in the social sciences, this body of knowledge provides an important backdrop to our discussion about social risk in mining.[4] This backdrop highlights the conflict between the qualitative and quantitative analysis of risk in mining and the different perspectives being applied in the risk assessment process.

Techno-scientific approaches to risk derive from the fields of engineering, statistics, actuarialism, epidemiology and economics (Lupton, 2013) and are expressed through the mathematical functions of probability and harm, where harm is associated with human health, the environment and physical assets. This approach dominates risk assessment in the global mining industry. Renn et al. (2011) explain that, by contrast, social scientific approaches to risk also consider qualitative factors. These authors highlight how, for instance, psychology considers individual *perceptions* of harm and its likelihood, and sociological perspectives consider *social constructions* of risk. They explain that social scientific approaches focus on understanding the broader “risk phenomenon”, including types of harm and the ambiguities associated with different interpretations of risk. This stands in contrast to a techno-scientific approach that is more focused on developing discrete strategies to identify and control a defined set of risk factors.

One of the most cited definitions of risk in mining is the International Standards Organisation's definition from ISO 31000 – Risk Management.[5] This international standard defines risk as the “effect of uncertainty on objectives”. Hillson (2010, p. 67) extends this definition to include risk as: “a possible future event that would be significant if it occurred”. Hillson's concept of risk includes threats, which might materialise and which would cause problems if they did. He describes potential significant harms as “downside risks” and opportunities to be “upside risks” because opportunities are possible future events that would be helpful if they occurred.[6] Our focus is on downside risk in mining and, in particular, the potentially significant social harms that may be generated, exacerbated, or triggered by large-scale mining activities.

Across the techno-scientific and social science disciplines, risk is considered to have two related but distinctly different components: probability and consequence (Kendrick, 2015). Probability relates to the uncertain nature of impacts or outcomes from a particular event and the likelihood that a risk will materialise. Consequence relates to the material dimensions of risk; that is, the outcome or impact component of the risk. Social science perspectives of risk consider the degree to which potential effects matter to different parties or are considered to be consequential by different people in different contexts at different points in time. The assessment of risk will depend on how risk is understood in any given situation, who participates in assessing risk, and what type of information is available at the time.

One of the first scholars to engage with these types of questions was Chauncey Starr, a pioneer in nuclear energy and Dean of Engineering and Applied Science at the University of California. In fact, the origin of social science perspectives of risk have been linked to his seminal work published in 1969 (Burgess, 2006; Siegrist, 2010; Zinn, 2009). Starr's work explored the question, “How safe is safe enough? ” a ground-breaking study that looked beyond expert perceptions of risk using “historically revealed social preferences and costs” (p. 1232). Starr recognised that social views were too rarely considered within the context of technological developments:

> Analyses of social value as a function of technical performance are not only uncommon but are rarely quantitative. Yet we know that implicit in every non-arbitrary national decision on the use of technology is a trade-off of societal benefits and societal costs (Starr, 1969, p. 1232).

Since this time, a diverse body of social science risk work has evolved. Indicative examples include the psychometric paradigm (Fischhoff et al., 1978), cultural-symbolic analysis (Douglas, 1982), risk society (Beck, 1999), governmentality (Foucault, 1991), systems theory (Luhmann, 1995), the social amplification of risk (Kasperson et al., 1988), the deficit model of public understanding of science (Wynne, 1988), and participatory approaches to risk assessment and management (various scholars including Power (2007), Lidskog and Sundqvist (2012) and Lockie and Measham (2012)).

Social scientists have been critical of techno-scientific concepts of risk, arguing that they fail to incorporate critical socio-cultural factors, such as the way different groups and individuals value certainty and different types of “social reality” (Zinn, 2009, p. 510; Tulloch and Lupton, 2003). Aven and Renn (2009), for example, approach risk by including base elements of uncertainty and consequence. In their description of uncertainty they argue that risk is inherently tied to human values. This description suggests that confining risk to an objective mathematical equation of probability and consequence fails on at least two counts: (i) the broader social context in which risk is constructed and (ii) the values base of people who are tasked with measuring the risk.[7]

Lockie and Measham (2012) address this conceptual problem by taking risk as more than an objective evaluation of harm. For Lockie and Measham risk is “a cognitive and emotional bridge between negative events affecting other people and our own fears and expectations” (p. 1). Moving risk out of a strictly techno-scientific understanding has clear advantages. To begin with, the

[4] This backdrop includes, for example, the highly influential concept of the ‘risk society’ by Beck (1992). Beck links the historical development of industry, the market and a peculiar approach to the question of uncertainty in modern life. This work is one of the most widely cited pieces of social science writings on record.

[5] ISO 31000 was published as a standard in 2009, and provides a standard on the implementation of risk management. See: http://www.iso.org/iso/home/standards/iso31000.htm.

[6] Everyday use of the term risk typically refers to downside risk or potential threats; that is, the probability of action or inaction resulting in adverse impacts or harm (Lupton, 2013; Mahmoudi et al., 2013). In the global mining industry this negative reading of risk is most common (Evans et al., 2007) whereas opportunity or upside risk tends to be absorbed in alternative discourses such as ‘corporate social investment’ or ‘shared value’. In mining industry practice, there are few risk processes that encourage an explicit opportunity focus (Evans, 2004).

[7] We take risk assessors to be inclusive of experts and other specialists (e.g. regulators), people exposed to risks and project proponents that generate or trigger risk.