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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.

different ways in which people construct and respond to information about risk can be engaged, as well as the symbolic and normative dimensions associated with risk itself. The propensity for scientific information to be considered "factual, free of bias and bereft of emotion" (Coleman, 1995, p. 70) is strongly contested by social scientists (see for example, Douglas and Wildavsky (1982), Tierney, (1999), Lockie and Measham (2012) and Power (2007)) as it results in missed opportunities for addressing what is considered to be of greatest concern to people. For these reasons, social scientists tend not to support the proposition of value free or objective risk assessment.

Social science perspectives assert, instead, that individuals and institutions judge risk differently depending on their values and perceptions. This can lead to conflict over the severity and probability of risks, the appropriateness of risk management techniques, and whether and under what circumstances risk mitigation measures are acceptable, tolerable or intolerable (Renn et al., 2011). Perceptions of risk (including risk identification, assessment and management) can be influenced by a range of factors, including the level of control people feel they have over the degree of risk they face. Qualitative characteristics that decrease risk tolerance include involuntariness, dread, inequitable distribution of risk, and the artificiality of the risk source. These kinds of preconditions influence how project-affected people respond to risks that are imposed upon them.[8] If industrial risks are deemed unacceptable – or otherwise unmanageable – affected people may object, protest and put the project at risk. What is of interest here is the dynamic interaction that occurs when a mining project introduces or imposes risk to people and the process through which this has a subsequent effect on the business or other parties.

3. The approach to social risk in mining

Risk has become a central management concept in mining to the extent that risk is now assessed across almost every aspect of the business (EY, 2015; ICMM, 2008). Mining companies rate potential risks and their severity in risk matrices that utilise *a posteriori* knowledge of past events to provide predictions of their future occurrence. A rapid review of corporate financial and sustainability reports suggests that business, financial, legal, enterprise, reputational, and project risk are prominent risk categories. At the operational level, environment and safety risks have become a management mainstay. This is particularly the case in jurisdictions where regulatory frameworks are stringent and where managers may be prosecuted if they are found to be in breach of legislation. Sovereign risk is another domain where the mining industry calculates risk, largely as a tool to determine the political, security and regulatory risk associated with conducting business activities in a given jurisdiction. This section explores the role of social risk within the project risk literature and explains how it was later applied in mining and sustainable development.[9]

Formal risk analysis was not routinely undertaken for major projects until as recently as the 1990s. Nor was it common for risk analysis to be conducted throughout the project cycle (Ward and Chapman, 1991; Liu et al., 2016). By the mid-1990s, there was more frequent use of project risk analysis across a wider range of major industrial projects, including mining. Project risk assessment focuses primarily on analysing physical risks such as structural, engineering and environmental aspects using technical and quantitative techniques from the techno-scientific tradition. Researchers discovered that project teams tended to be overly optimistic about the risk profile and viability of their projects (Royer, 2000). In response to this research, project risk analysts became more aware of the need to move away from tactical, short-term, technical risk analysis and include a more strategic, long-term approach to risk assessment and planning (Chapman, 1997). This transition has proven problematic in the global mining industry where volatile commodity markets, geo-political uncertainty and social opposition make long-term thinking inherently difficult (EY, 2014; Kunz et al., 2013).

An emphasis on non-technical risks began to appear in the project risk literature from the early 2000s Jaafari (2001), for example, suggests that external factors, such as social, political and institutional issues, were a key source of project uncertainty and that project developers needed to improve their approach to non-technical risks if they were going to succeed in reducing uncertainty. Miller and Lessard (2001) position stakeholder engagement as critical to reducing non-technical risks, including the risk of stakeholder opposition to projects. They coined the term "social acceptability risk", defined as "the likelihood that sponsors will meet opposition from local groups, economic development agencies and influential pressure groups" (Miller and Lessard, 2001, p. 439).

It is at this point that the concept of social risk began to appear in mining and sustainable development literature with Joyce and Thomson's (2000) reference to "social risk" in their analysis of "social licence to operate". According to Thomson and Boutilier (2011, p. 1779), social licence refers to the "level of acceptance or approval continually granted to an organisation's operations or projects by a local community and other stakeholders". Kemp and Owen (2012, p. 3) suggest that social risk is implied in the industry's reference to social licence, but only where risk to people has a "rebound" effect on the business, such as through public outrage or opposition. These authors argue that social licence is a "pragmatic calculation", where companies invest in winning community support, often at the expense of understanding potential harms for different groups of people.

Concurrent to Joyce and Thomson's articulation of social licence, the broader concept of sustainable development started to gain traction in mining industry circles. Sustainable development has since emerged as a central management objective for the global mining industry. The final report of the global Mining Minerals and Sustainable Development (MMSD) research project, *Breaking New Ground*, describes the minerals sector and its relationship with concepts of sustainable development. The report recognised that simply meeting market demand for mineral commodities "falls short of meeting society's expectations of the industry" and is seen as "failing in its obligations" to society and "increasingly unwelcome" (IIED, 2002, p. xiv). The report elaborated on the industry's need to build social licence and address social impacts, but it did not engage the concept of social risk. Botin and Anderson (2009) later made a direct connection between mining, social risk and sustainable development. They linked social risk to a broad set of mining impacts with the potential to generate social harm, including changes in land use, dust, noise, impacts on surface and groundwater resources, in-migration, displacement and resettlement, dependency and livelihood impacts.

A key dimension of the classic sustainable development framework is the social pillar. Including social dimensions in a policy

[8] Renn's (1998) research indicates that people have a higher tolerance for risks generated by natural phenomenon (e.g. floods, earthquakes) than for industrial risks.

[9] We consider industrial-scale mines to be 'projects' in the classic sense of the project management literature. According to Lester (2007, p.1) the most authoritative definition is that given by the British Standards Institution (BS-609-1: 2010) where a project is "a unique set of coordinated activities with definite starting and finishing points, undertaken by an individual or organisation to meet specific objectives within defined schedule, cost and performance parameters". Designing, planning, constructing, operating, expanding, decommissioning and closing a large-scale mine fits this definition.

framework does not, however, guarantee that social harm will be addressed in practice. Several analytical frameworks have been developed that encourage the mining industry to examine social aspects of mining within multi-dimensional sustainability assessments (Corder et al., 2010). These processes have potential for ensuring that social considerations are included in project risk identification and analysis in mining. To date take up has been limited.

4. Large-scale mining as a socially risky proposition

There is a substantial scholarly literature about the actual and potential social impacts of large-scale mining projects, including issues relating to indigenous peoples (Whiteman, 2009), their cultural heritage (O'Faircheallaigh, 2008) and their employment (Barker, 2008); human rights (Kemp and Vanclay, 2013); gender and development (Gier and Mercier, 2006; Lahiri-Dutt and Macintyre, 2006); livelihoods and resettlement (Adam et al., 2015; Downing, 2002); equitable distribution of benefits (Bebbington et al., 2009; Langton and Mazel, 2008); and community development (Banks et al., 2013; Kapelus, 2002). Civil society groups (including Oxfam, Amnesty International, Human Rights Watch, Mining Watch Canada) have also called attention to mining's myriad social risks and impacts.[10] One need only peruse websites such as *Mines and Communities* to get a sense of the sheer number of cases and issues involved in this debate.[11]

It is clear from this body of work that many researchers and commentators consider mining to be a risky proposition for people and the environment. In some cases, this reflects an ideological *a priori* opposition to large-scale mineral resource extraction. For others, mining is considered to be risky on the basis of evidence that highlights mining's harm-inducing effects. Whatever the standpoint or perspective, the heightened attention that has been paid to mining's harm-generating and adverse social impacts has been pivotal in terms of encouraging the industry to take more responsibility for understanding and managing these effects.

A key challenge of exploring the mining industry's *application* of social risk assessment is the paucity of empirical studies on this topic. This is distinct from understanding actual impacts, where available research is comparatively rich. That mining projects often generate heightened social risks and result in adverse impacts is well established. What is less well understood is how mining industry personnel assess social risk, including:

(i) the identification and understanding of the risks of social harm in specific operating contexts
(ii) the assessment and analysis of threats to social groups and entities that stem from mining activities
(iii) business responses to the likelihood and consequence of foreseeable risks for the social group or the business.

The industry has a stated awareness of its potential to generate adverse social impacts. Recent research indicates that the industry has a strong tendency of prioritising risk when the cost to the business is obvious or high. In examining conflict in mining, Franks et al. (2014) suggest a pattern whereby company-community conflict translates into costs to the business due, in large part, to opposition and civil protest against mining projects. This work monetises the corporate cost of conflict in an effort to prompt the industry to manage social and environmental risk earlier in the mine lifecycle. The cost of conflict work provides an evidence-based, economic rationale about why social risks should be addressed by a business. The solution offered is that earlier identification and improved analysis and management of social and environmental risk can prevent unwanted costs and disruption because it provides an opportunity to proactively assess and address potential conflict.

What the cost of conflict research does not elaborate is the potential consequences for communities and other social groups and entities when risks do not result in a cost to the business or where the cost is acceptable to the business. In other words, research on the cost of conflict does not cover 'cost to community' living with a risk, including the stress associated with any potential loss of productive land, food and water insecurity, or increased conflict. Neither does this research calculate material costs to community where harms have eventuated. These costs can include sourcing alternative land, purchasing food, transporting water, coping with injury and loss of life as an outcome of violence. This can be a difficult task given that some of these impacts would have arisen over an extended time horizon and may have occurred after a mining company had exited a region. These circumstances make it even more challenging to attribute responsibility and trace root causes.

Evidence suggests that the mining industry's generation of social risks can be both knowing and unknowing. The knowing generation of social risk occurs when company personnel have information about a particular social risk but fail to analyse the circumstances because they either do not believe that a risks exists or they do not accept that responsibility sits within their corporate remit. One well-documented example of a failure to investigate known social risk relates to the Porgera gold mine in Enga province of Papua New Guinea's (PNG) Highlands.[12]

Civil society campaigns about the Porgera mine have focused on human rights violations, environmental pollution and, most recently, gender-based violence including multiple gang rapes of women by the mine's own security personnel. According to a report by Columbia and Harvard Law Schools' International Human Rights Clinics (2015), Barrick Gold was slow to respond to abuse allegations, which were raised for a decade before generating a response from the company. It was not until some of the world's most influential international NGOs, including Human Rights Watch and Amnesty International, launched a global campaign that the company agreed to investigate the rape allegations. Barrick Gold discovered that there was a problem and that human rights abuses had indeed occurred. The company took disciplinary action against employees who were involved or who knew about the abuses and did not act, and offered a remedy package to victims.[13]

While little is known about the internal organisational processes of decisions and actions around social risk management in the mining industry, we can posit that there are instances where managers and decision-makers did not realise that a particular issue was consequential for other parties. Unintentional generation of social risk may be a function of flawed or substandard

[10] Much of the literature on social impacts forms part of approvals-related studies, not all of which are easily accessible, or available in the public domain. Likewise, ongoing social monitoring of social risks and impacts is not commonplace, nor publicly accessible.

[11] See: http://www.minesandcommunities.org/.

[12] The Porgera mine is a combined open pit and underground gold and silver mining operation that is owned by the Porgera Joint Venture (PJV). Canadian mining giant, Placer Dome, was the majority shareholder of the PJV, until 2006, when it was acquired by Barrick Gold, one of the world's largest gold mining companies. The PJV is now jointly owned by Barrick Gold and Chinese-owned Zijin Mining Group.

[13] The remedy framework itself "*Olgeta Meri I Gat Rights*" (All Women Have Rights) has been subject to much criticism at the international level, primarily regarding the nature of compensation and the requirement for victims to sign legal waivers preventing them from taking legal action against the company (Knuckey and Jenkin, 2015).

processes, lack of skills, experience, motivation and/or incentives (or disincentives) to undertake social risk assessment. In examining entrenched conflict between resettled communities and Anglo Platinum at its Mogalakwena mine near Mokopane in Limpopo, South Africa, Farrell et al. (2012) suggest that failure to give due consideration to social and human rights risk reflects a corporate culture that is not attuned to its social context. The case study suggests that the company's overly legalistic approach exacerbated the situation and intensified the level of risk that later rebounded to the business.

Rio Tinto's Argyle diamond mine in Western Australia offers another example of how an incomplete knowledge base generated social risk (Doohan, 2008; Doohan et al., 2012). The Argyle diamond mine is situated on Barramundi Gap, a site of cultural significance to indigenous Miriuwung and Gija women. Early anthropological work for the mine did not account for women's cultural sites or knowledge and subsequent developments by the mine put their sites and their knowledge at risk. For years, women attempted to assert their rights and responsibilities over the land where the mine was located. Due to a lack of knowledge, awareness and willingness to remedy this oversight, mine management overlooked this issue, to the detriment of the women, their culture and their traditional rights. This situation was eventually remedied, as described by Doohan (2008) in *Making Things Come Good*.

The line between a business not knowing and being negligent is becoming harder to distinguish. It is increasingly difficult for mining companies to claim that they did not know about the potential for social harm if a comprehensive baseline was established from the outset of project development and monitored over time. The social science around 'extractive industries and society' is growing and companies are expected to develop and maintain a social knowledge base that informs their understanding of externalities and non-technical risks. The 2011 United Nations Guiding Principles on Security and Human Rights (UNGPs), for example, require businesses to demonstrate due diligence in considering human rights risk that stem from their activities. Due diligence processes are designed to ensure that businesses understand their operating context and proactively identify, prevent, mitigate and account for their potential human rights risks. This is important for two reasons. First, that human rights are a necessary precondition for sustainable development and, second, that conventional notions of risk in project management have not prioritised risks to external parties (Domínguez-Gómez, 2016; Silvius and Schipper, 2015).

Increased awareness about social impacts of large projects (Vanclay et al., 2015; Esteves and Vanclay, 2012; Vanclay and Esteves, 2011), combined with new and emerging frameworks such as the UNGP are changing the mining industry's approach to social risk. The global industry also uses The World Bank's safeguard and sustainability policies and the International Finance Corporation's (IFC) environmental and social performance standards as a reference point for responsible business practice.[14] Risk identification is a first principle in the bank's framework, in terms of the foundations around risk management systems. These frameworks are prompting greater consideration of the social dimensions of mining and generating an increased awareness of the harms that it can generate.

The mining industry remains fixated on obtaining its social licence and the risk that communities pose to its businesses. In the next section we highlight that the industry tends to conflate social risk (i.e. risk from the project to people) and business risk (which can include, but is not limited to, risk from people to the project). We argue that this issue must be resolved if the industry is to improve its approach to differentiating between business and social risks, and then identifying, analysing and managing social risks that stem from its activities.

[14] The IFC is The World Bank's private sector lending arm.

5. Differentiating social risk in mining

Given the paucity of empirical research on the mining industry's internal understanding and approach to social risk, we turn to mining-related sustainability literature for guidance on how the sector conceptualises and represents social risk. Idealised approaches to identifying and managing social risk can be found in international norms, corporate policies and sustainability reports, and operational performance standards for social performance in mining. In this section we examine this literature as a proxy for how the global mining industry understands and applies social risk. The literature focuses on two types of social risk: one that stems from the project and is directed at stakeholders; and the other that stems from stakeholders and is directed at the project. While social risk may have different meanings in different discourses (Vanclay et al., 2015), we argue that when these risk types are both labelled as social risk, the relationship between them is obscured.

In mining-related literature, it is common to frame social risk in terms of risk *to the business from stakeholders* rather than risk *to social groups and entities from the business*. Barclay et al. (2009, p. 15), for example, define social risk as "the range of potential impacts on a project that may result from its interaction with communities and stakeholders". For Bekefi et al. (2006, p. 3), social risks are "challenges by stakeholders to companies' business practices due to real or perceived business impacts on a range of issues related to human welfare". The risk-to-the-business-from-society perspective is prominent in corporate policies. Barrick Gold's (2012) Community Relations Standard, for example, defines a social risk as "a risk to the business related to external stakeholders, particularly the local community." This approach serves to connect social risk (or perceived risk) to the business' financial bottom line.

Other mining industry scholars take a different stance on social risk. For instance, Brereton and Parmenter (2006, p. 1) state that "a social risk exists wherever there is the potential for an existing or planned project to impact adversely on one or more social entities (such as residents of nearby communities, Traditional Owners, adjoining landowners or local businesses)". Likewise, Graetz et al. (2015) draw on their extractive industry experience to define social risk as risk *from the business to social entities*:

> Social risks are the perceived or expected potential future threats to, and unwanted impacts on individuals and groups of individuals arising from the processes of social change precipitated by development interventions and the decision of external actors, namely business, industry organisations, financiers, executive governments, regulators and non-government organisations.

As noted above, the global mining industry uses a range of international policies and standards to set its own social performance benchmarks, such as those set by The World Bank and the IFC. These policies and standards tend to be equivocal on the topic of social risk. The World Bank, for example, suggests that social risk is:

> The possibility that [an] intervention would create, reinforce or deepen inequity and/or social conflict, *or* that the attitudes and actions of key stakeholders may subvert the achievement of the development objective, or that the development objective, or

means to achieve it, lack ownership among key stakeholders [emphasis added] (The World Bank, 2016).

Rio Tinto's (2011) Social Risk Analysis Guidance Note, states that social risk "covers a range of threats and opportunities for the business that may result from how the business impacts upon and interacts with communities and stakeholders". Similarly, Anglo American (2014) considers social risk to be the "probability and severity of risks to the business as well as to employees, contractors and external stakeholders." These definitions connect (external) social risk and (internal) business and project objectives with the effects pathway flowing both ways, concurrently. Other mining industry scholars also use social risk as a single term to cover both risk to people and risk to business without differentiating directionality (see, for example, Cessford, 2011; Lapalme, 2003; Franks et al., 2010).

That the current approach to social risk in mining does not clearly distinguish between these two types of socially-related risks is an issue. The lack of clarity creates a barrier to accurately defining key concepts and understanding the process through which risks interact. This leads to a situation where risk assessment in mining is partial or incomplete and the net risk across different entities and organisations is not captured. Responsibility for risk can, as a consequence, be left unassigned and undefined for all stakeholders.

One further barrier to accurately defining key concepts is that the mining industry also equates social risk with social acceptability risk. As outlined above, social acceptability risk takes as its starting point people's perceptions about the safety of current or future activities. This perception will be based on the understanding that people hold about the riskiness of a given industrial project, which may or may not relate to empirical evidence about the risk (Botterill and Mazur, 2004; Renn, 2004; Sjöberg, 2012). If the level of risk is not acceptable, it could lead to hostilities and opposition that threaten project viability or corporate reputation. Social acceptability risk is, in this way, a helpful concept. Social acceptability is an important component of risk assessment but should not be taken as being complete in and of itself.

Without community opposition, companies are often unresponsive to concerns about particular risks. However, social opposition is not always the best indicator of whether harm is present or imminent. Social risk can readily manifest within communities that have limited political power and access to public debate to 'voice' concern or lodge a grievance. In these circumstances, it is the community and not the company that faces potential harm and carries the burden of risk. Mining companies cannot rely on communities to voice dissatisfaction or non-acceptance before attending to social risk. If they do, they will fail to meet their policy commitments to sustainable development and demonstrate human rights due diligence under the UNGPs. Conflation of business risk and social risk (and social acceptability risk) increases the likelihood that risks are carried by those people with the least ability to shift responsibility back to entities with duties or obligations to respond to those risks.

Two problems arise in situations where risk types are conflated. First, in prioritising their own self-interests, the key question for businesses becomes: how will this affect the project and how can we protect ourselves from harm? By de-prioritising social risk in this way, there is a reduced opportunity to respond to the following set of questions: how will we affect people; are these effects harmful; are protections in place; are those protections sufficient; what additional protections may be required; how will our (in)actions be understood by others; and what are the consequences for all parties? Second, an undifferentiated approach to risk obscures the process of risk interactions and the need for questions such as: what is the process through which social risks can threaten the business, what triggers these processes; over what period of time might this occur, which parties will be involved and what about project-induced social risks that have no immediate consequence to the business? The next section considers the implications of obscuring these interactional dynamics.

6. Differentiating risk types: getting caught on the rebound

To this point we have sought to clear up a conceptual problem in the mining-related sustainability literature. When mining companies create risk to people, this is called social risk. When external stakeholders put business objectives at risk, this too is called social risk, but it is also referred to as business risk.[15] For clarity, we call *risk to people* 'social risk' and *risk to business* 'business risk'. We have separated these risk types in order to explore the relationship between them. What we are most interested in is the rebound dynamic; that is, the interaction between social and business factors.

The notion of rebound serves to highlight the dynamic nature of social risk. In mining, social risk traverses disciplinary, departmental and institutional boundaries in ways that are not well understood. While understanding the chain of causality, effect and response is challenging, mapping risk patterns and pathways is critical to understanding mining's propensity to generate social harm. Mapping broader patterns could move the industry's approach to downside social risk beyond the identification and quantification of individual risk factors in the techno-scientific tradition. An approach that considers the broader risk phenomenon of the rebound dynamic (Renn et al., 2011) has the potential to open up new discoveries about risk interactions. Where risk types are collapsed into a single term, the discussion about risk and rebound dynamics is not possible.

Changing risk dynamics across social and business domains has been described by Franks et al. (2014) in their cost of conflict study described above. The cost of conflict study demonstrated how conflict translates environmental and social risk into business costs. This is an example of how companies get 'caught on the rebound'. There are other nuances within the rebound dynamic that are worth exploring. Conflict can assist companies in understanding social risk by translating it into a business language, but does this help mining companies to define pre-existing risks or to explain the pathway that followed? How does translation into the business sphere affect internal resource mobilisation, or awareness in diagnosing or responding to social risk? More importantly, what does social risk translate into for other parties, such as communities or government, where 'cost' is not the primary language for interpretation? Future discussions should be directed towards understanding patterns of risk and response within this dynamic space where risks rebound that were not foreseen or predicted.

For this reason, companies must be prepared to think more expansively about risk and responsibility. A narrow approach identifies and controls a limited set of individual risk factors. We argue that if mining companies expand their frame of reference to include risk types and dynamic interactions between parties, this will result in an improved reading on the causes and consequences of social harm. Rather than a singular focus on a narrow set of business interests, social risk assessment must prioritise external parties and engage their experience and perspectives. If mining companies are able to grapple with the rebound dynamics of social risk in this way, they will be in a better position to protect their business interests and contribute to sustainable development.

[15] Or related terms such as project risk or enterprise risk.

7. Conclusion and future directions for research

In this article we address a long-standing and deeply ingrained conceptual problem in mining industry practice. We note the conflation of *risks to people* and *risks to projects* in mining. Separation and differentiation of these concepts allows the interactional space between them to be explored. Drawing on terminology from the physical sciences, we argue that this space can be characterised by its 'rebound dynamic'. This dynamic reflects the particular mobility of social risk in mining and the wide range of instigating or affected parties, boundaries and factors that can be brought into play. Thinking about differentiated social risk in terms of directionality and interactivity is critical to understanding the industry's ability to generate social harm and manage risk.

Areas for future research inside the rebound dynamic are numerous. Case studies that illustrate the inner workings of social risk in mining are critical. Pathway analysis, for instance, would provide an important contribution, not only for social performance specialists, but for other disciplines. Understanding responses to different rebound dynamics across leadership groups and styles will be of interest to management researchers, inside and outside the resources sector. In this same vein, the internal workings of companies on issues relating to social performance is under-researched. Applied and embedded research in project or operational teams that documents associated behaviours, logics and processes will be of immense future benefit.

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