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Socioeconomic value creation and the role of local participation in large-scale mining projects in the Arctic

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ABSTRACT

This paper examines socioeconomic value creation and the role of local participation in decision-making and negotiation processes during the planning phases of two operational large-scale mining projects: Red Dog Mine in Alaska and Diavik Diamond Mine in Canada. The analysis is conducted using a proposed life-cycle framework adapted for mining projects. Local socioeconomic value creation is realized through direct employment, training, integration of supporting industries, and taxes and royalties. Further, at both mines, there was a high level of local participation during the planning phase. The phases of the life-cycle model are interrelated, and thus actions and the level of participation in the early phases have influenced socioeconomic value creation later in the life cycle. The participation of communities throughout the planning phases of mining projects is a key to facilitating sustainable development outcomes at the local level.

1. Introduction

The melting Arctic presents new opportunities and challenges for mineral exploration. Considerable natural resource extraction is currently being carried out in its North American, Scandinavian, and Russian sections (Harsem et al., 2011). Industrially, the region, on the whole, is characterized by limited market economics, a dependence on government transfer payments, subsistence activities, and the export of natural resources (Aarsæther, 2004; Duhaime, 2004; Duhaime and Caron, 2006). At the same time, there are limited manufacturing and processing activities taking place locally in Arctic communities; consumable products are imported to the region (Larsen, 2010).

Resource development in the Arctic is characterized by high costs: development projects must be large in scale to lower the costs of operation in order to achieve economies of scale (Larsen, 2010). The importance of the Arctic region as a supplier of resources to the rest of the world is expected to increase. Resource extraction will therefore continue to be essential to the development of the region in the coming decades (Nuttall, 2009). All of the states located in the Arctic now promote the extraction of natural resources as an essential strategy for securing national economic Growth and creating employment (Kullerud, 2011).

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In recent years, the research agenda for mineral economics has evolved and shifted focus toward producing countries. The new set of concerns it has raised includes environmental effects, the role of government policies, social responsibility, effects on local and indigenous communities, and the role of mineral exploitation in economic development (Gordon and Tilton, 2008). The agenda has traditionally emphasized macroeconomic issues, analyzing the mining sector's benefits or lack of benefits to the national economy: discussions have focused on the "natural-resource curse". The natural-resource curse refers to the paradox of countries with high ratio of natural resources tend to have lower economic growth rates compared to resource poor countries (Sachs and Warner 1995, 1999, 2001).

At the same time, research on the regional and local effects of mining operations, with particular emphasis on socioeconomic development, has not been particularly comprehensive (McMahon and Remy, 2001).

This paper supports and contributes to this new research agenda by providing an extended analysis of the effects of mining on local communities in the Arctic. Research has shown that local communities can experience significant and often rapid social and economic changes in regions where natural resources are extracted (Stammler and Wilson, 2006). Nevertheless, these industries have also provided development opportunities to local societies. This paper uses a life-cycle framework to broaden understanding of the socioeconomic effects of mining on local communities. It does so by identifying the key aspects and main concerns of each phase of operation, and the interrelation between these phases from a community-based business-development perspective.

The article proceeds as follows: First, the life-cycle of a mining project is introduced as a framework for understanding and analyzing socioeconomic value creation. Next, a review of the socioeconomic effects of extractive industries and the role of local participation are provided. Then, the socioeconomic value creation and the role of local participation of two operational large-scale mining projects in the Arctic are evaluated. The two case studies explored are the Red Dog Mine in Alaska and the Diavik Diamond Mine in Canada. The presentation of the case studies is followed by a discussion and conclusion.

2. Life-cycle framework

The life-cycle concept has existed for many years in various industries (Stark, 2011). Vernon, 1966 was the first to apply the idea to products, with the aim of explaining observed patterns of trade and investment as new industries evolved (Klepper, 1997). Product life cycle (PLC) entails predicting the course of an industry's evolution, which passes through a number of stages (Porter, 2008). Each product is managed across its life cycle, from product inception until the product is disposed of – in other words, "from cradle to grave" (Stark, 2011). Since its initial conceptualization, life-cycle theory has been further refined into more specific ideas such as PLC, industry life cycle (ILC), and product life-cycle management (PLM). The central idea is now accepted widely, and has become conventional wisdom in business (McGahan et al., 2004).

The interdisciplinary approach to life-cycle theory stretches to include studies of technological changes and technical performance, strategic challenges that are unique to each stage, entrepreneurship, and economics (McGahan et al., 2004). Cusumano et al. (2006) introduced the service parameter in firm and industry evolution, where products generate service opportunities in a variety of industries. The products are defined as the core elements, and services are defined as complementary elements. The holistic role brings products, services, processes, activities, skills, practices, techniques, and standards together (Terzi et al., 2010). There are different viewpoints on life cycles that contribute to variations in life-cycle interpretation (Stark, 2011). These include the market-oriented approach, comprised of four stages, introduction, growth, maturity, and decline; the five-stage manufacturer approach, imagination, definition, realization, support, and retirement; and the industry approach, fragmentation, shakeout, maturity, and decline (Stark, 2011; Kotler and Keller, 2006; McGahan et al., 2004). Essentially, the cycle has three main stages: beginning of life (BOL), middle of life (MOL), and end of life (EOL) (Terzi et al., 2010).

The basis for defining a mining project's life cycle is adapting the three main stages – BOL, MOL, and EOL – to a mining project. It begins with an exploration stage, which is the BOL. When the project matures, it enters the exploitation stage, or the MOL. Eventually, the mineral deposit becomes exhausted or is no longer feasible for exploitation, which leads to its closure or the mining project's EOL stage.

However, the three essential stages of a mining project's life cycle can be further subdivided (Storey and Hamilton, 2003; Moon and Evans, 2006; AMAP, 2010; GEUS, 2013). There is a two-level distinction, namely the core level and the complementary level, as proposed by Cusumano et al. (2006). Together, these comprise all elements relating to a mining project's life cycle. Thinking in terms of life-cycle processes is important for identifying where outputs that will affect socioeconomic value creation may occur, such as direct and indirect employment and interaction with supporting industries. It is necessary to distinguish between the output that creates value for the local community where resources are extracted and the output that creates value outside of the community. The duration of each stage varies widely from project to project (Porter, 2008). The duration of the project's life, therefore, depends strongly on the specific project and the mineral commodity. The proposed life-cycle model for a mining project is illustrated in Fig. 1.

The core level includes five phases, which, in combination, constitute the life cycle of a mining project. The exploration and planning phases are the BOL. The construction and operation phases are the MOL, and finally the closure phase is the EOL. The initial life-cycle phase is exploration, which includes activities such as Geological mapping, drilling, testing and sampling. The following phase is recognized as the planning phase, with a focus on feasibility studies and a regulatory approval process. It includes technical studies and cost analysis to prove the commercial viability, the environmental and social effect assessments for the regulatory application and review process, and community hearings. Emphasis is placed on identifying potential effects and management strategies to assist decision makers. The local communities are often allowed to participate in the dialog and negotiations between the mining company and local or regional authorities during the planning phase. The entire project is designed and prepared during this phase. This phase is followed by construction, during which infrastructure related to mineral production is established, and production facilities and camps are constructed. The next phase in the life-cycle model is operation, during which the raw material is physically extracted.

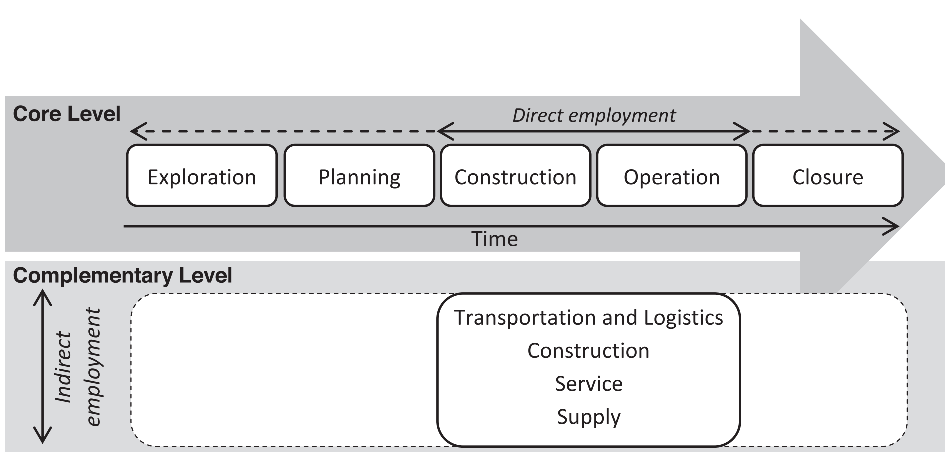

Fig. 1. Life-cycle of a mining project.