



A Thought Leadership Paper on _____

Industrialization of the Mineral Value Chain

Mineral development as a catalyst for prosperity

Toward A New Era of Minerals

Be Part of it





As it stands now, mining has a unique opportunity to act as a catalyst for industrialization



Executive Summary

Mining has long suffered from the perception that it is a purely extractive industry, exploits the communities that companies operate in, and is slow to the uptake when it comes to innovation and new technologies.

In recent years, we've seen the emergence of new initiatives to change that perception, increase trust between communities, companies, and governments, and investment in innovation to create prosperity beyond the life of the mine¹⁾ As it stands now, mining has a unique opportunity to act as a catalyst for industrialization to:


- ▶ **Support the direct mining operations and businesses that generally only exist for the life of mine;**
- ▶ **Develop downstream activities – industrial hubs – that are currently done in other countries, such as smelting and manufacturing (e.g., battery cells);**
- ▶ **Develop other sectors beyond the mining value chain, such as agriculture, tourism, technology services, etc.;**
- ▶ **Build supporting infrastructure, including energy, healthcare, and education systems, and improve capital access.**

This allows a region, as well as the individual countries themselves, to capture more of the value of the resources while also expanding the prosperity of the local communities.

We've seen countries develop advanced economies regardless of resourcing – some doing so with significant resources, and some achieving this with little or no resources besides their people. Countries that come to mind include South Korea, Taiwan, Singapore, Chile, Brazil and Botswana, and emerging are provinces like Limpopo in South Africa.

Mining can be the catalyst for the expansion of industrialization and a region's prosperity. We must seek to create thriving and competitive communities; provinces; countries; companies; and a thriving environment.

1) <https://www.angloamerican.com/sustainability/collaborative-regional-development>



Intentional Innovation Ecosystems as a Driver of Industrialization


We need to lean into this new progressive mindset, involve all stakeholders and owners, and turbocharge the investment in innovation to position mineral development as the catalyst for economic prosperity beyond specific resource projects. We need to reimagine the mining industry, transitioning from viewing it as an extractive industry into one

that provides materials that perform certain functions (a “materials provider”). The opportunity – and the challenges – have been greatly expanded by the demand for more metals and materials, and the environmental and social expectations of how these will be extracted and processed.

To date, mineral development has led to the formation of knowledge intensive clusters around equipment manufacturing, engineering services, research, and similar fields specific to mining. The industry is now at a point to take this further, catalyzing industrialization through the larger-scale elements described above. These small “mining business ecosystems” have been driven by attempts to address issues around social license to operate, environmental regulations, labor costs and safety concerns, and the like. These innovative clusters have typically been built around radical innovations, which were paired with associated incremental innovations that had pervasive effects across and beyond the sector¹. We’ve seen successful regional collaborations around key issues such as trade (ASEAN – the Association of Southeast Asian Nations, for example) and security (NATO – North Atlantic Treaty Organization), that we can take elements from and apply to creating mining-initiated development partnerships.

We need to turbocharge the investment in innovation to position mineral development as the catalyst for economic prosperity.

¹) Calzada Olvera, B. Innovation in mining: what are the challenges and opportunities along the value chain for Latin American suppliers?. Miner Econ 2022) 51–35, 35).



Intentionally-created innovation ecosystems are a more effective way for materials developers to balance the need for new technologies and business models with the expectations of their customers, communities, and governments. The challenges the industry faces are too large for any single company or stakeholder in the value chain to address on its own. This is possible; Taiwan has successfully achieved this with the semiconductor industry. In the mid-70's, the Taiwanese government chose to focus on the semiconductor industry as a key industry. At that point in time, its economy was primarily cheap, labor-intensive manufacturing. The government pursued a unique set of policies at the right time, reforming capital markets and contributing substantial R&D support through external partnerships, while incentivizing Taiwanese entrepreneurs to tackle this challenge. Today, Taiwanese companies in semiconductor production are world leaders in their specialties, and the nation produces 65% of the world's semiconductors and nearly 90% of advanced chips. Whilst a different industry, there are many similarities to be understood – and lessons to be applied – from a government-led strategy to increase

a country's prosperity. Within mineral development, the ecosystems we see emerging have a few common elements – co-creation of value, proportional investment (including money, resources, technology), and often a small host organization. Multi-stakeholder dialogues are critical in the development and planning of these ecosystems, in order to align incentives and realize value, whether that be economic returns, access to diverse expertise, exposure to new partners or clients, etc.² Specific challenges in mining – technical, environmental, social, or financial obstacles, for example – often make it difficult for more diverse players to engage in these spaces, such as start-ups or SMEs and small-scale and artisanal miners.

Both government and mineral development companies themselves can remove some of the barriers to access and invite strategies from more innovation-intensive industries.² In this context, we embrace Peter Drucker's definition of innovation as “the creation of new value” and that the innovation can be technological, social, relating to business models, policy/regulation, or any other arena that will achieve impact.



2) Leonida, Carly and Soerensen, Aarti. Collaborate to Innovate: Nurturing the Companies and Technologies of Tomorrow. The Intelligent Miner (2022).




The Role of Government and the Criticality of Multi-Stakeholder Dialogue

The first step to catalyzing prosperity beyond the life of the mine is creating a shared vision of prosperity with all stakeholders and owners, in order to create this type of ecosystem. At the core of this is trust. Outlining clear roles for government, mining companies, communities, and downstream companies is key, as is ensuring that there's clear representation across all of the various stakeholder and owner groups. Trust is a high bar, especially when combatting historically negative perceptions. It requires radical transparency from everyone involved and certainty of legal frameworks that protect the interests of the entire group.

An excellent example of this development partner approach that particularly emphasizes the impact and partnership of local communities and Indigenous people is the Māori Economy Investor Guide (New Zealand), which provides insight into where and how potential investors can engage with Māori enterprises and build strong partnerships. Over 40 years, this has led to economic growth and prosperity by co-creating a shared vision around optimizing existing assets, investing in various downstream activities, enabling infrastructure, and technology and innovation. It's

built upon recognition of the Māori values and engagement with the commercial, adding a uniqueness to this type of partnership. Māori values include taking a long-term, intergenerational view, caring for others, and a strong connection to the natural environment, among others, are built into this approach and ensure that needs and priorities of the Indigenous owners are taken into account when it comes to new projects and development. This serves as another important example of applying lessons and insights from a highly successful approach elsewhere, to mineral development. Like the Taiwan example, these insights can provide valuable input into a regional strategy and approach.

The only way to deliver better outcomes is to create an environment built on respect and collaboration. Government should create the “sandbox” (environment) with the appropriate guardrails (constraints), so that discussions take into account the unique aspects of each development project and its jurisdiction but still adhere to a co-created set of principles. It's standardized but flexible, and creates an ecosystem where entrepreneurship and innovation can flourish and move downstream.



Central governments must be careful to avoid overly prescriptive policies and regulations that end up perpetuating issues on the ground or are too commodity-specific to be actionable, but that still provide a standardized framework.

In addition to this, a government plays a key role in creating development partnerships and industrialization of

the mineral value chain by providing the springboards that spur this type of activity. Making it easier to create new businesses, improving access to capital, investing to provide the right infrastructure, and creating hubs, often geographical, to catalyze ecosystems around specific challenges are a few ways a country can accomplish this.

There are several examples of a successful mineral development-initiated approach that leverages government partnerships. Here are two recent examples from Africa:

South Africa Impact Catalyst:

In partnership with the Government of South Africa, this is a cross-sectoral, multi-partner development initiative between Anglo American, the South African Council of Scientific & Industrial Research (CSIR), Exxaro, Zutari, and World Vision South Africa, who all share a vision of creating enhanced social impact in the mining communities in Limpopo and out to other provinces. Its aim is to establish inclusive, collaborative, cross-sectoral platforms, initiatives and partnerships to achieve systemic socio-economic impact through public-private partnerships. One of the first initiatives aimed to create a Community Oriented Primary Healthcare (COPC) in Limpopo. Its early success has seen it scale to include two other regions, designing and delivering similar large-scale socio-economic development projects. Core to its success was aligning on a shared definition of collective impact that began with a common agenda, established shared measurement, fostered mutually reinforcing activities, and encouraged ongoing communication. This approach is now being replicated in Peru, Chile, and Brazil.




Zambia Mining Social Investment Strategy:

Zambia's Vision 2030 outlines its aspirations to become a middle-income industrial economy. As part of that vision it has developed, in 2021, the Zambia Mining Social Investment Strategy, a collaboration between the Zambian government, UK AID, Prospero Zambia, and DPI. The strategy has three core pillars:

- a. Economic livelihood development
- b. Facilitation of social services
- c. Infrastructure development





This is underpinned by the core value of enhanced communication, coordination and collaboration. The process to develop the strategy involved pooling a wide range of stakeholders in Zambia and globally, ranging from mining and exploration companies, investors, financiers, key mining industry players, local communities, civil society, academia, development agencies, and local and central government. These stakeholders were engaged initially through in-person meetings,, and then in virtual roundtable discussions. The examples outlined above provide insights that The Kingdom of Saudi Arabia and the region can learn from and apply to develop a tailor-made approach for this region.

The Opportunity for Regional Collaboration: Industrial Hubs with Downstream Partners

There is also an opportunity to engage more downstream global companies (such as auto OEMs (original equipment manufacturers), battery manufacturers, etc.) to create regional “industrial hubs.” Increased societal, security, and environmental demands across the entire value chain mean downstream players are actively looking for ways to engage with mineral development, to give them greater visibility into their own supply chain and move downstream activities closer to the source. The energy transition moves the world to an energy system that is completely dependent upon materials that are mined, rather than fossil fuels. Downstream companies, from automotive OEMs to producers of batteries and wind turbines, are beginning to realize that poor understanding and/or visibility into

mining when it comes to sourcing means that their ability to deliver on their aggressive growth goals are undermined. General Motors’ aim to move to an all-EV lineup by 2035 is an excellent example of this. When governments invest the wealth created from mining activities into building the infrastructure necessary to mine these resources, in addition to the activities aligned with our expanded notion of industrialization described earlier, they’re also creating opportunity for greater downstream value. Involving those companies in the planning and development of these projects from the beginning can lead to even greater prosperity not just for the mining companies and the immediate surrounding communities, countries, and regions, but for the entire value chain. It also



creates opportunities for investment from players that typically haven't been able to or haven't been interested in investing in purely resource projects, distributing the financial burden. This reframes the opportunity to be more attractive and will positively impact both the availability and cost of capital, as well as the talent pool.

An extension of this opportunity lies in addressing the historical challenge mining has faced when it comes to countries' hesitance to work with one another. Creating "regional hubs" as described above shifts countries from a nationalistic approach to a regional one, distributing value more evenly and breaking barriers to collaboration and trust that have stifled innovation and investment in and leverage of new and unique technologies/capabilities.

Stimulating innovation unleashes the potential of a country's human capital and leverages the wealth generated from mineral development to catalyze economic prosperity way beyond the mine. Nearly all players across the value chain are incentivized to make this happen, and are willing to act on it as the world races against a ticking clock to hit energy transition targets. This industrialization of the mineral value chain requires a completely new type of public and private sector collaboration and greater level of trust, coupled with increased investment in new technologies and methods. The Future Minerals Forum is a major step in convening these types of conversations across countries and a demonstrated investment in and commitment to this type of approach.

A Call to Action

Saudi Arabia and the other countries of the region should seek to gain an understanding of the insights and lessons from similar successful strategies, like the ones described above. It should champion and catalyze a series of multi-stakeholder dialogues across the region, with the view to develop a shared vision and roadmap, building upon the 2023 Ministerial Roundtable Communique. These will create the foundation and necessary partnerships for a strong strategy and actionable roadmap. This approach assures that the burdens are not carried by those who can least afford to, and that the benefits don't go to a chosen few – creating long-term, equitable, and sustainable prosperity.





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Peter Bryant is a recognized thought leader on ESG and sustainability; the energy transition and the criticality of the minerals value chain; and broadscale innovation and digital transformation. He speaks on these topics extensively at leading conferences and for organizations, most recently speaking at COP26, the 2022 Future Minerals Forum (FMF) in Saudi Arabia, and CERAWeek 2022. He spoke at to 1,750 global oil and gas leaders at the

Baker Hughes 2020 Annual Energy Forward Meeting, and keynoted the New Zealand Prime Minister's 2019 Just Transition to Net Zero Emissions Summit. Peter is the Board Chair and Managing Director of innovation and growth strategy firm Clareo, and Co-Founder and Board Chair of the Development Partner Institute, a nonprofit focused on improved social, economic, and environmental outcomes for communities from resource development projects.



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