Intraw

International Raw Materials Observatory

Fostering international raw materials cooperation

Analysis of Industry and Trade

Operational report: summary

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Abstract

This report contains the transactional analysis on Industry and Trade of mineral raw materials in reference to five countries: Australia, Canada, Japan, South Africa and the USA. This is the outcome of INTRAW Work Package 1.4, mapping the context, the evolution and the performance of industry and trade in these reference countries. The aims of this report are to review the mining and raw materials competitive context and framework among the reference countries.

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More information

The full report is available at http://intraw.eu/publications

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1. Extended summary

The specific aims of this report include the characterisation of industrial clusters related to raw materials in Australia, Canada, Japan, South Africa and the United States (USA) and the way these clusters affect trade and global competition.

With the exception of Japan, all reference countries have rich mineral endowments. Australia is the world leader in the production of brown coal, lead, rutile, zircon, nickel, uranium, and zinc. It ranks among the world top-five producers for bauxite, copper, gold, iron ore, ilmenite, silver, tantalum, industrial diamonds, lithium, and black coal. Canada is the world leader in the production of potash and it ranks among the top-five global producers for uranium, aluminium, cobalt, tungsten, and platinum group metals (PGMs). South Africa is the first in the production of PGMs and has also significant production of gold, diamonds, and iron ore. The USA also have a rich mineral endowment, but they currently prefer imports over domestic production. The USA are one of the biggest economies in the world, and they produce 21 of the 65 non-fuel mineral commodities used in the national economy. However, domestic production meets less than 50% of the demand and the USA are 100% reliant on imports for some rare elements or metals, such as indium, niobium, and tantalum.

This analysis is based on: a) desk research; b) collection of insight offered by the panel of international experts on industry and trade that is cooperating with INTRAW; c) organisation of data and information on each country in a structured way; d) validation of data and information collected by raw materials experts from each reference country.

The results are presented by country. For each country the following six chapters are provided:

1. **The Industry in a Global Context.** This includes a global overview of the territorial organisation, the governance regime and the mineral raw materials industry structure, including the mining and processing activities. Recent data on strategic and significant minerals exploited and processed is provided in detail, highlighting the relation of this sector with the general economy. Energy and industrial minerals used in agriculture are not considered and will be referred only in the context of the analysis and whenever the sources of statistical information do not provide disaggregated data. Recycling of metals is also addressed, to facilitate the understanding of the evolution of the dependence on external sources of mineral raw materials in each reference country;
2. **Economic and Market Assessment.** This chapter includes an economic analysis considering not only trade but also production and reserves of selected mineral raw materials, expenditures, taxes/royalties and internal consumption of minerals. Considering the lack of accurate data on domestic consumption the estimates are based in the apparent metal consumption rate. This chapter also includes a brief reflection on the reasons behind the country's ranking in mining investment attractiveness and competitiveness;
3. **Assessment of the Regulatory framework.** This chapter provides a general overview over the legislative framework pertaining to the mining industry and the mineral raw materials supply in each country;
4. **Assessment of Raw Materials Supply.** This includes considerations on the (perception of) supply risks of mineral raw materials, providing insight on the strategies each country is using to ensure a stable supply of strategic and critical minerals;
5. **Strategic Analysis.** This chapter identifies the Strengths, Weaknesses, Opportunities and Threats (SWOT) of the minerals industry in each country. The SWOT analysis evaluates the

internal and external factors that are favourable and unfavourable to reinforcing the position of the minerals raw materials industry. This structured evaluation informs the analysis of the industry competitive context, highlighting the factors that shape the competitiveness of the mineral raw materials trade of mineral raw materials;

6. **Conclusions.** This chapter summarises the key drivers behind successful industrial development and trade of mineral raw materials.

Energy and agricultural mineral raw materials are not within the scope of INTRAW, and therefore are not addressed in this report. Since the five reference countries produce, process and trade mainly metallic minerals, industrial and construction minerals are largely produced and consumed domestically, and for this reason are not relevant for the purposes of this report.

It is important to highlight that information on minor metals (e.g. cadmium, gallium, mercury, indium), usually produced as by-products of base metals, is scarce or absent. This is the case because many of these metals had little or no economic value in the past, and only recently become valuable (or critical) for some new industrial processes. In addition, the recovery of many of by-product metals normally happens during the smelting operation and the information on recovery rates is not disclosed by the smelters. These metals are being used in electronics and information technologies and are attracting increasingly attention by governments, including the EU, Japan and the United States.

In some cases, the statistical data on resources and reserves are unclear, likely because of unclear concepts in some compilations. Therefore, the figures on the percentage of the world reserves and on the life expectancy of mining until depletion must be considered with caution.

The methodology for the analysis of the mineral raw materials industry and trade follows the economic model developed by Michael Porter in his book *The Competitive Advantage of Nations* (Porter, 1990). This model, also known as the *Diamond* model, addresses industry competitiveness and economic development, highlighting the role of industrial clusters to explain economic prosperity in certain countries and regions.

The main findings can be summarised by country as follows:

AUSTRALIA

Australia is one of the largest mineral producers in the world. Australia holds some of the world's largest economic demonstrated resources (EDR) for several minerals. The major explored non-energetic minerals are bauxite, copper, gold, iron and manganese ore, mineral sands, nickel, tantalum, zinc, lead, and silver, where Australia is ranked first in the world. There are also known resources of several critical metals, which place Australia in a strong strategic position as supplier of these raw materials.

Australia is able to provide about 56 elements of the periodic table and is prospecting actively for others. Even considering this significant availability of minerals, Australia is considered an underexplored continent, which suggests that an enormous potential still exists. A future challenge is the ability to provide a sustained supply of minerals that are regarded as critical raw materials, due to their strategic importance. Australia is one of the best positioned countries in the world to help meet the worldwide demand for most of these minerals, nevertheless this will require finding new deposits and new ways to exploit existing assets.

As an export-oriented mining country, driven by a rich mineral endowment, Australia directly exports more than 90% of its ores and about 98% of the concentrates produced. Australia has ten active bilateral Free Trade Agreements and is working on another seven. The preferred trade partners are mainly the Asian markets, promoted in part by geographical proximity.

Australia's economy is the 22nd most competitive in the world according to the World Economic Forum, and is considered an innovation-driven economy. The mining industry makes an important contribution to this competitiveness (e.g.

Western Australia was considered in 2015 the most attractive jurisdiction for investment in mining, out of 122). The importance of mining is reflected directly in its contribution to the gross domestic product, the creation of direct and indirect employment, and its position as the largest export sector for Australia.

The position of government towards mining is generally favourable and the country is open to foreign investment. Australia is engaged in various joint ventures worldwide and benefits from the proximity of the Asian market for its mineral trade. This advantage can also be a risk, increasing Australia vulnerability to volatility in these markets (e.g. the current crisis in the iron ore sector).

The regulatory framework is stable and each State regulates its own mining industry largely independently. However, the Commonwealth Government controls offshore resources and has powers over the environmental approval of mining projects. In addition, the interests of Aboriginal Australians are protected by a specific Act and their rights must be considered in areas where native titles over land have been recognised.

Mineral recycling is already a developed activity. If metal 'direct' recycling is considered (for materials such as iron, steel, aluminium or copper), Australia already shows a good performance, with recycling rates of 90% of the total waste produced. In recycling of electronics waste (a secondary source of several critical and precious metals) Australia is taking the first steps, encouraged by government policies.

One significant risk to the Australian mineral sector is competition from other countries, where the exploitation of important minerals, such as iron or bauxite, can be made at lower costs and, therefore, with higher profitability. In addition, the strong dependence on the Asian markets for the export of the major metals produced can result in constraints due to declining or potentially unreliable demands.

Australia's mineral industry is one of the most competitive in the world because of the strong influence of several factors including (but not only): 1) a rich mineral endowment; 2) strong relation with Asian markets; 3) stable legislation (access to exploration permits); 4) the availability of a skilled workforce (enhanced by labour immigration, when necessary), and 5) the government support and engagement with the mining sector. The mining cluster

in Australia includes the mining and processing operations and extends to the mining equipment, technology and services companies (METS). METS businesses cover the entire value chain, and work across several minerals and more than one phase of the mining life-cycle. This cluster is transforming from an endowment cluster to a knowledge based cluster. Evidence of this transformation comes also from the success of the internationalisation of Australian mining companies, who became global firms, technology-driven, pursuing a leading cost position.

CANADA

Canada is the third largest producer in the world of minerals, exporting 80% of all exploited ore. It ranks in the top five countries in the global production of 11 major minerals and metals: first in potash; second in uranium and cobalt; third in aluminium and tungsten; fourth in platinum group metals, sulphur, and titanium; fifth in nickel and diamonds. It produces more than 60 elements of the periodic table, which contributes significantly to the national economy. Canadian economy was in 2014 the 15th most competitive economy of the world, according to the World Economic Forum (WEF, 2014). Canada is an example of a mineral exporting economy that relies on endogenous resources. The mining industry is one of the most important industrial sectors in the country and the 4th largest contributor to the country's gross domestic product (GDP), with values around USD 54 billion in 2013 (7%).

The regulatory framework of Canada is stable and the mining permitting process is fast and simplified (although this varies from one territory or province to another). Government Policy has until fairly recently been a major driver for Canada's mining industry, as the Government shared the costs of many large scale regional infrastructure projects in remote areas. More recently, Government fiscal policy mechanisms, such as flow-through shares and loans from agencies, such as Export Development Canada, have become more important drivers for the development of the mining industry.

These fiscal mechanisms were fundamental for the successful establishment of a strong cluster of junior mining exploration firms, providing to these firms (via the Canadian Mineral Exploration Credit and a flow-through shares mechanism), the capital they could otherwise not obtain from banks.

The industry structure is consolidated, with a large number of multi-national and junior companies of Canadian origin working worldwide. Canada is the country with the most exploration enterprises operating overseas, having about 800 firms active in more than 100 countries. The Canadian mining cluster includes integrated global miners, specialised investors and financial services, several industry and professional associations, a huge mining supply sector (equipment, technology, services), many processing plants, and specialised government agencies acting at provincial or territorial levels. This cluster is clearly a knowledge-based cluster, covering the entire value chain and showing geographic specialisations on specific minerals or activities, spreading all over Canada.

Canada attracts investment to the minerals sector by providing full access to geoscience information and statistics on minerals and metals. Foreign investors can also repatriate profits, have no currency restrictions, no import or export restrictions, and benefit from low withholding taxes. Investment flows are facilitated through the Toronto Stock Exchange. The majority (57%) of the world's public mining companies are listed on the TSX and TSX-Venture Exchanges. Together, the two exchanges handled 48% of global mining equity transactions in 2013, and accounted for 46% of global mining equity capital for that year.

With the (soon expected) entry into force of the Trans-Pacific Partnership and CETA trade agreements, Canada will become one of the world's countries with freest trade agreements, leveraging its capacity to supply mineral raw materials to all developed and developing countries.

Canada's metals recycling sector is mature and extensive and includes the capital intensive primary and secondary smel-

ters. Primary smelters are well equipped to recycle complex metallic composite materials, such as e-Waste, and this will certainly foster the recycling of electronic waste in the near future.

The major concerns for Canada's mineral raw materials sector include the strong dependence on the USA market and the weakening demand from China. To deal with raising concerns over sustainability issues, the industry developed an externally verified performance system for sustainable mining practices with the launch of the Mining Association of Canada's (MAC) initiative *Towards Sustainable Mining*, reinforcing Canadian miners' reputation in safety and sustainability.

The continued discovery of mineral resources suggests the great potential for mining that Canada contains. Considering its rich mineral endowment, and also the stable political and social framework, Canada's role as a trustable supplier of mineral raw materials will be reinforced in the future, providing many critical commodities to foreign countries.

JAPAN

Japan's domestic mineral reserves are depleted, or are not economically or technically feasible to exploit, with the exception of gold (with one of the most valuable gold mines in the world) and limestone. The mining sector has no importance for the country's economy. To the contrary, the manufacturing industry is one of the most developed in the world, working with cutting edge technologies and producing products with high added-value, demanding a stable and constant supply of diverse mineral raw materials. This is guaranteed through a sophisticated mineral processing sector, that imports ores and produces a variety of mineral-based end products that feed complex downstream industrial clusters, including the production of vehicles and machinery, electric and electronic equipment, circuits, parts, and communication electronics.

The sophisticated demand (requesting product quality, consistency over time, and compliance with standards) led to a refinement of mineral processing methods and technologies, which made Japan a specialised producer of high quality metal alloys and metal products.

The structure of the mineral processing industry is consolidated and functional, working in large groups that cover the whole value chain of a product within a circular economy approach, where recycling and re-use of materials are taken into account in product design and development.

The development of Japan as a 'processing country' has been enabled by a successful long-term policy of securing a stable supply of mineral commodities, particularly via securing imports. Such mineral policy was enacted via multiple parallel strategies encompassing: i) systematic development of domestic mineral resources (onshore and offshore); ii) active promotion of exploration and exploitation of overseas mineral resources (onshore and offshore) through economic cooperation with mineral-rich developing countries via resource diplomacy and commercial agreements (e.g. with Australia) and via exploration in international deep-sea floor resources; and iii) national stockpiling in Japan and abroad of minerals.

International cooperation is actively supported by the Government through JOGMEC. This agency conducts overseas geological surveys (on land and on the deep-sea floor) to help Japanese companies secure mineral interests, provides equity capital (for asset acquisition), loans and liability guarantees for metal exploration and development by Japanese companies, works in the development of human resources, and develops joint ventures between Japanese and foreign companies.

Japan's resources policy includes not only securing the supply of primary raw materials via agreements with other countries, but also direct investments of private capitals in overseas mines. Over the years, Japan has invested into base metals, rare metals, and rare earths mines in Asia, Australia, North and South America, and Africa. Most of these investments have been made with the objective of securing an influential share of ownership in the target companies. Recycling is also

part of Japan's resources policy. Japan has probably the most sophisticated recycling industry in the world, with recycling rates of metals above 98%. Recycling is considered from the product conception stage on together with resource efficiency considerations.

The strong technological and innovation culture in Japan is a fundamental driver for the development of its industry. Together with the active involvement of the government, the social ethics, and the sophisticated organisation of industries it explains the success of Japan's mineral processing industries.

SOUTH AFRICA

South Africa's mining industry has successfully developed as a commodity export-led one and it has evolved based on an exceptional mineral resources endowment. The country has profited from substantial reserves of gold, platinum group metals, diamonds, coal, chromium, and manganese. The gold, platinum group metals, coal, and iron ore mining sectors remains crucial in terms of foreign exchange earnings for the economy. Over the past 20 years, with the growth of South Africa's secondary and tertiary industries, the relative contribution of mining to South Africa's gross domestic product has declined. However, as a net exporter, the mining sector remains the single most important earner of foreign exchange for the economy.

The mining industry evolution was based on a legal framework favourable to big mining companies and a monopolised structure. This changed in the post-apartheid era, with the reversion of mineral rights to the State, allowing new entrants into the market by releasing new exploration and mining licences. A stable fiscal framework, with no significant post-apartheid changes, has been instrumental in enabling the success of this change. Short permitting times and security of tenure also facilitated this (permitting currently takes on average 12 months for exploration licenses, and the conversion between the exploration and the mining permit is straightforward).

South Africa benefits from sophisticated financial services, well-developed regulatory systems, research and development capabilities, and an established manufacturing base. However, the country's position in the Fraser Institute's Investment Attractiveness Index ranking has fallen

from 53 in 2013 to 64 in 2014. This reflects several challenges that are affecting the mining industry in South Africa, namely low productivity, labour conflicts, high energy costs, energy and water shortages, and political uncertainty. At the same time, there is social unrest and some organized groups have called for mines to be nationalized, and there are ongoing debates about licenses, royalties and ownership. The government already rejected the nationalisation of mines and is discussing proposals to ensure the country would benefit more from mining, without disrupting the sector.

To capture the country's mining potential and improve the industry's competitiveness, South Africa needs to address problems that are rooted in the apartheid era: productivity and workforce capabilities must be improved through training programmes; industry-labour relations must be normalised through appropriate policies for labour disputes and labour arbitration; the domestic demand must be stimulated; and the energy infrastructure needs to be renovated. All these key aspects must be framed by stable government policies, since regulatory ambiguity leads to investors shying away.

UNITED STATES OF AMERICA

Even though it has lost position relative to other international, more attractive locations for mining investments (e.g. Canada, Finland, Australia), the USA remain internationally important as a mining nation. This is due to a stable mineral legislation, that has been in place for over a 100 years, that has favoured resource exploration and development, and has been supported by well-defined protection of property rights. Other factors of importance have been:

- The mineral ownership rights scheme, that separates surface and mineral rights and encourages exploration;
- A large domestic market;
- Availability of capital markets and risk finance;
- A skilled workforce;
- A well-developed services industry; and
- Access to land, water, energy and a well developed infrastructure network.

Most companies operating in the USA work in the domestic market. The majority of the mining companies are small or midsized, but there are also a few globally competitive companies with some degree of vertical integration and control over supply chains. The regulatory system is complex and permits take a long time to obtain, which hampers the development of the domestic mining industry. In these processes State governance is quite influential, crossing economical, environmental, and social regulations. Apart from the important mineral endowment, the USA has built extensive trade relationships in order to import those minerals that are not available in the country or that are cheaper to buy than to produce. The USA rely on imports of several minerals, and for some of them they are 100% dependent on imports (19 minerals in 2014). The dependence on other countries and recent experiences with trade restrictions imposed on the supply of rare earths directed political attention to mineral supply risks. Concerns over supply risks and the strategic value of specific metals could trigger a growing cycle of the mineral sector in the USA. Access to low cost energy (natural gas) could increase the intensity of mineral processing operations in the USA, enhancing the domestic added value. This is happening in the steel industry and might spread to other mineral supply chains, especially to those considered strategic to the USA industry and security. In this context, the attention to efficient use of resources and recycling (particularly rare metals and minerals) will increase.

CONCLUSIONS

This report was prepared to offer a systematic analysis of the mineral industry and its agents in five reference countries. The objective was to collect information on best practices and to understand the competitive context of the minerals industry in countries that, for their performance, are considered the most advanced in the world.

The countries within the scope of this study are Australia, Canada, Japan, South

Africa and the USA. In all of them the mineral sector is representative and fundamental for the sustainability of developed economies.

With the exception of Japan, all these countries have rich mineral endowments. Australia, Canada, and South Africa are ranked as major producers of a wide range of non-energy minerals, some of them considered strategic, and have economies strongly based on this industry.

Australia is the world leader in the production of brown coal, lead, rutile, zircon, nickel, uranium, and zinc. It ranks among the world top-five producers for bauxite, copper, gold, iron ore, ilmenite, silver, tantalum, industrial diamonds, lithium, and black coal. Canada is the world leader in the production of potash and it ranks among the top-five global producers for uranium, aluminium, cobalt, tungsten, and platinum group metals (PGMs). South Africa is the first in the production of PGMs and has also significant production of gold, diamonds, and iron ore.

The USA also have a rich mineral endowment, but they currently prefer imports over domestic production. The USA are one of the biggest economies in the world, and they produce 21 of the 65 non-fuel mineral commodities used in the national economy. However, domestic production meets less than 50% of the demand and the USA are 100% reliant on imports for some rare elements or metals, such as indium, niobium, and tantalum.

Japan's development has been enabled by a successful long-term policy of securing a stable supply of mineral commodities, particularly via securing imports. The sophisticated demand of the Japanese industry (requesting product quality, consistency overtime, and compliance with set standards) led to a refinement of mineral processing methods and technologies, that made Japan a specialised producer of high quality metal alloys and metal products. In order to be able to face the scarcity of raw materials, Japan has pioneered a circular economy approach, where recycling and re-use of materials are taken into account already in product design and development.

All these countries show, from the second half of the XX century, a coupled evolution, matching complementary comparative advantages (e.g. rich mineral endowments and large manufacturing industries), bringing together raw materials suppliers and consumers.

Australia has a very rich mineral endowment and it evolved as an export-oriented economy, where mineral exports correspond to around 55% of total exports. This has been fundamental to the growth of the Japanese industry. Japan benefits from the geographical proximity to Australia for obtaining ores and coal that support the country's 'processing economy', boosted by cultural values that favour productivity and continuing improvement.

The same occurred with Canada and the USA. Minerals and energy extracted in Canada have been propelling the USA economy, until recently the biggest in the world. Canada developed a sophisticated mining cluster, which includes all types of services, from junior exploration companies to leading mining equity financing. The USA opted for relying on trade (mainly from the neighbouring countries) to supply an increasingly sophisticated manufacturing industry, driven by a technologically advanced market economy, instead of developing the exploitation of domestic mineral resources. The preferential trade relationship between Canada and the USA was reinforced by the integration of both economies under NAFTA.

South Africa has also evolved as a raw materials supplier, supporting Europe's economy. Today the EU still is the biggest commercial partner of South Africa, despite the geographical distance between South Africa and Europe. This situation certainly is a reflection of the weak economies of its neighbouring countries and the cost-effectiveness of sea-transport vs. land-transport.

Key Critical Success Factors (CSF) for a strong mineral industry that emerge from the analysis of Australia and Canada include:

1. Rich and diverse mineral endowment, with large ore deposits;
2. Stable rule of law (security of tenure, protection of property, reliable legal system);
3. Stable mining regulatory framework;

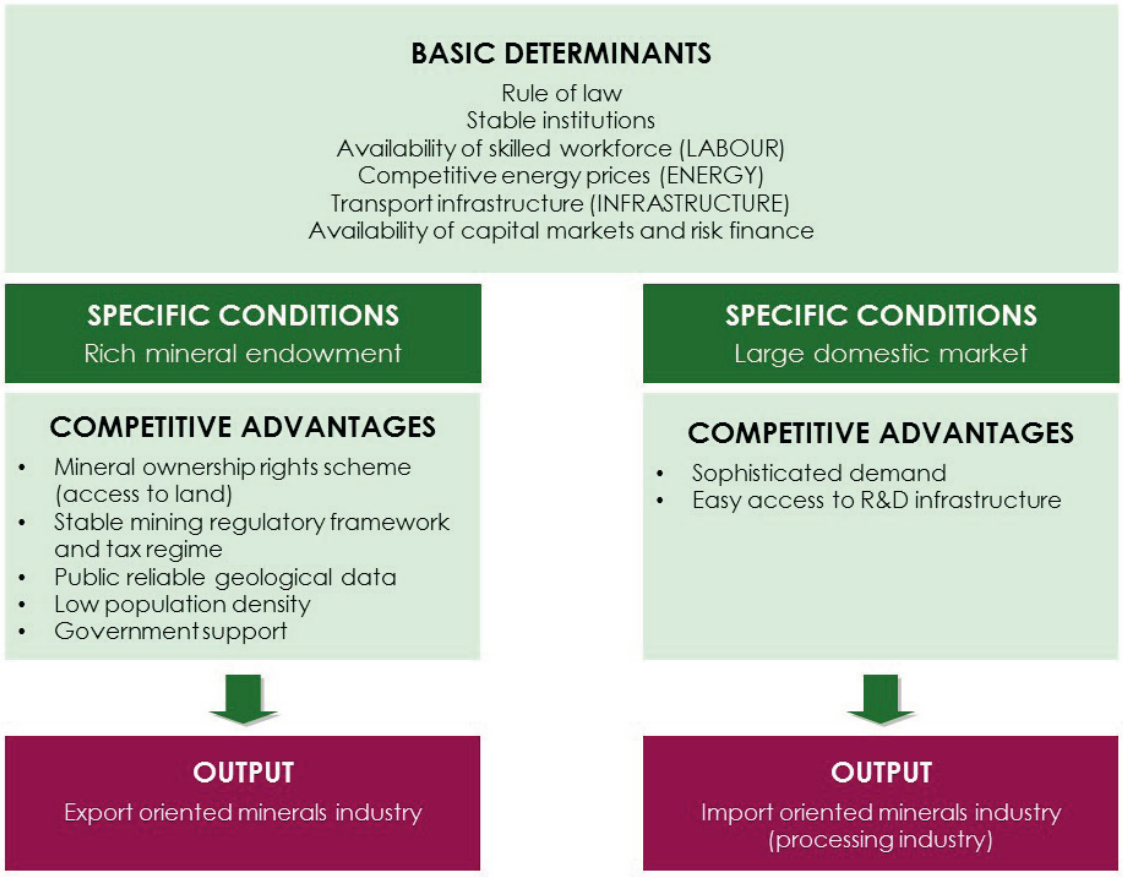

Figure 1: Outline for basic factors determining the development of a minerals industry.

4. Proximity to consumers of mineral resources;
5. Absence of trade barriers;
6. Facilitated access to land (low levels of competition between different land-uses;
7. Stable political and societal context;
8. Reliable transport infrastructure (roads, railways, ports);
9. Efficient access to capital;
10. Competitive energy prices;
11. Availability of a skilled workforce.

Key CSFs for a successful mineral industry that emerge from the analysis of Japan and the USA include:

1. Free trade agreements and active economic co-operation with raw materials producing countries;
2. Stable institutional and societal environments;
3. Competitive energy prices;
4. Large domestic market with spending power;
5. Sophisticated R&D infrastructure;
6. Availability of skilled and well-educated workforce;
7. Highly industrialised economy, based on the manufacturing of knowledge-intensive and high-quality, high value-added products.

Note that the CSFs of the reference countries are essentially endowment driven for the export orientated countries and knowledge driven for manufacturing, trade oriented countries.

Figure 1 defines a basic framework beneath a developed mineral industry, taking into consideration basic determinants and country-specific settings. This encompasses indispensable conditions and defines, based on factor conditions, two distinct pathways that determine, if a minerals industry development is export oriented or import oriented.

The USA are, among the countries analysed, the single one that could combine both approaches. However, since the USA prefers trade over exploitation, it suggests an evolution trend that favours specialisation, thus supporting a conception

of regional competitiveness based on business strategy economics instead of natural endowments.

The analysis of the five reference countries, complemented by insights collected from the INTRAW panels of experts, draws attention to the following determinants of the minerals industry competitiveness.

Factor Conditions:

1. Rich mineral endowment (or no mineral endowment - Japan);
2. Stable legal framework;
3. Stable taxation framework;
4. Sparsely populated areas/no social conflicts;
5. Skilled and well-educated workforce;
6. Access to reliable transport infrastructure;
7. Strong education and R&D culture.

Demand Conditions:

1. Proximity to market;
2. Sophisticated demand of downstream industries (pushing all stages of the value chain).

Context for firm strategy and rivalry:

1. Stable rule of law (security of tenure, protection of property, legal system;
2. Access to land/defined mineral ownership scheme;
3. Free trade agreements and active economic co-operation;
4. Simple mining permitting processes;
5. Competitive energy prices (leveraging vertical integration);
6. Access to risk finance.

Related and Supporting Industries:

1. Developed supporting industries (mining equipment, technology and services sector);
2. Availability of public reliable geological data.

Because 'developing' and 'emerging' economies are also competing for mineral resources, and because the number of chemical elements utilised by the industry (especially in high-technology fields) is increasing, all sophisticated economies are now facing import dependencies for some raw materials. Although competition for mineral raw materials pushes for an increased integration of raw material suppliers and consumers, resource nationalism and the emergence of new players is affecting the current balance of supply / demand and disrupting supply chains. In this new framework, the determinants for the competitive context of the minerals industry will certainly change or have different weights in the future. Most probably, the importance of endowment factors will increase and the response of the five reference countries to this new framework corroborates this. All the reference countries are now actively seeking for the expansion of trade agreements, alongside country-specific approaches. Australian mining companies are seeking to cut operational costs, improve margins (which is boosting research and development), and expanding their geographical influence (searching for new markets). The Australian government is investing into the exploration of new mineral bodies (both common and rare mineral commodities) and remains supportive to mining. Japan's government is investing into research with the aim of substituting scarce chemical elements in industrial processes and is actively supporting Japanese investments in mining countries at different locations. Japanese firms are also investing into the recycling industry (the most developed in the world) and into improving the efficiency of raw materials uses. Canada's provinces actively encourage mining (in some cases smoothing the permitting processes) and Canadian junior exploration companies are seeking out deposits of valuable and scarce raw materials, in Canada and all over the world. The government of the USA is assessing supply risks and matching concerns of other countries (e.g. Japan and the EU) where mineral commodities have an important role in the economy. South Africa is trying to diversify its export markets and to enhance the domestic added-value, despite the legacy of apartheid, which left pronounced social inequalities and a shortage of skilled labour.

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