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Introduction

Technology transfer in the mining sector: options for the Latin American Mining Organization (OLAMI)

Michael Nelson *

The mining sector could play a decisive role in increasing the region's exports, the need for which is even more pressing because of the burden of the external debt. In this respect, a very promising development is the establishment of OLAMI, whose main tasks will consist of building up a regional mining information system and promoting the transfer of technology through vertical and horizontal integration and horizontal co-operation in the fields of finance, management, prospection, production and marketing.

In the first sections of the article, the author briefly describes the long process which culminated in the formation of OLAMI and which began with the creation of the Latin American Iron and Steel Institute (ILAFA) in 1959. Since it was set up, OLAMI has devoted itself, in its first stage, to satisfying the needs of small and medium-sized enterprises and public and private organizations concerned with policies, services or material inputs for this type of enterprise.

In the last part of the article, the author puts forward some ideas on the way in which OLAMI could organize its action in the field of technology transfer, including tasks aimed at identifying opportunities in this field, seeking those interested in such opportunities, providing them with knowledge and contacts, and facilitating investment finance. A decisive role should also be played in this process by State development corporations and bilateral and multilateral operational and technical co-operation bodies.

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The Latin American mineral producing countries, like all suppliers of basic commodities in the developing world, find themselves locked into a situation characterized by: i) declining prices in international markets, resulting largely from structural change in demand which offers little prospect of short-term recovery and ii) increasing production costs due to rising finance charges and deteriorating terms of trade in their acquisition of capital goods and production inputs. Faced with this two-way squeeze, what can the sector do, with the aid of macro policy, to use and manage the mineral endowment of Latin America so as to make a more systematic contribution to the socioeconomic development of the region? On the surface the answer may seem obvious —take full advantage of the regional market through vertical integration to achieve greater value-added; integrate vertically and horizontally intra- and extra-regionally to reduce costs through economies of scale, specialization, and transfers of technology to make possible an increase in the international market share and an expansion of the regional market; and integrate regional policies to improve bargaining power in export marketing. A fundamental issue is technology transfer (mobilization of capital, techniques and initiative) to increase the welfare of Latin American societies through exploitation of the region's mineral endowment. This is seen as a more constructive approach to the foreign debt debacle than complex financial manoeuvres to keep up interest payments at the expense of increased indebtedness. The problem is *how* to do it.

In approaching the question of how to reap the development benefits potentially available from mineral resources it is axiomatic that the key lies with those "actors" who make the critical production, marketing and policy decisions related to the mining and metallurgical sector and its interrelationship with industry in general. The challenge is the development of an effective regional organizational vehicle which can systematically promote information exchange and horizontal co-operation (intra- and interregional) within and between three levels of decision-makers:

1) *The operating level*: the entrepreneurial sector (public and private, domestic, and foreign) concerned with production, marketing and provision of inputs or technical and financial services.

2) *The organizational level*: this encompasses the agencies which implement public policies on investment, prices, taxes, subsidies, etc. and provide services (research, training and information) to the minerals sector.

3) *The policy level*. As a response to these needs, the Latin American Mining Organization (OLAMI) was formed in 1984. This paper examines the origins of OLAMI, its mandate for action, and some of the options open to promote technology transfer at the operating level (in the areas of financing, management, exploration, production and marketing) and to orient support for this process at the organizational and policy levels.

II

The origins of OLAMI

The first move in the regional organization of the mining and metallurgical sector was the creation of the Latin American Iron and Steel Institute (ILAFA) in 1959, as a result of recommendations made at a meeting of steel industries convened by ECLAC in the previous year. The initiative was taken by the Chilean Steel Institute which invited a small group of industrialists from Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay and Venezuela to approve ILAFA'S statutes, work programme and budget. There are currently 157 members, representing the principal steel producers of the region, and 492 associate members from inside and outside the region which are mainly enterprises related to the manufacture of intermediate and final steel goods or the supply of inputs to the industry and engineering, marketing and management services. Attendance at annual meetings in recent years has been in the range of 500-700. Since 1972 the Institute has sponsored three technical congresses annually and published the proceedings. In addition it carries out studies related to markets, prices, management, etc. Publications include an industry directory, a monthly magazine, newsletter, statistics, bibliography, catalogue of information, up-dates on iron and steel projects, an annual review of the steel industry, and several other annual reports.

The initiative to broaden the scope beyond iron and steel to include non-ferrous and non-

metallic minerals and metallurgical activities was taken in March 1981 at a regional seminar in Lima, sponsored by the Peruvian Ministry of Energy and Mines and the Inter-American Development Bank (IDB), on financing and co-operation for Latin American mining development (IDB, 1981). The seminar had an attendance of 140, representing mining and banking interests in 18 Latin American countries, financing institutions in Canada, the Federal Republic of Germany, Japan, France, the United Kingdom and the United States, and three international agencies. In the final session an organizing committee was appointed to propose a structure for a Latin American Mining Institute.¹ In April 1983 the committee submitted its proposals to the Peruvian Ministry of Energy and Mines and the IDB with support of four governments (Chile, Guyana, Peru and Venezuela). The principal objectives were to: promote development of medium and small mining enterprises and co-investment in binational and multinational Latin American mining corporations; support the creation of regional consulting entities in geology and engineering; disseminate information on mineral deposits, market opportunities and technology; facilitate horizontal co-operation between enterprises or

¹Terrones and others (1983).

public institutions related to the minerals sector; and review the relationship between development in the sector and mining policy and the activities of associated public and private organizations. Full membership was to be granted to Latin American enterprises engaged in the production and marketing of minerals, national geological and financial institutions, and national associations of mineral/metallurgical producers. Associate membership was to be available to professional associations, universities and technical research institutes whose disciplines were related to the sector. The work programme contemplated would require three regional offices—Central America and the Caribbean, northern South America and Patagonia. Specific activities proposed were: development of medium-scale non-ferrous metals in Central America; evaluation of gold-mining potential in Jamaica and Haiti; study of provision of highway and electricity services to gold and silver producers in northeast Colombia; feasibility of small and medium-scale mining in the Venezuelan Andes; expansion of small and medium-scale mining of gold and silver in southern Ecuador; development of river and air access to facilitate exploration of the Guayana Shield (Venezuela, Guyana and Brazil); evaluation of electro-metallurgical industries in Paraguay; development of port facilities to export minerals from the River Plate basin; extension of highways and electrification for development of mining industries in Patagonia; and evaluation of market potential for industrial minerals. Financial backing for the Institute was not forthcoming, and no further move was taken in view of decisions made in other forums on minerals over the period 1982-1984.

In the interim, action was taken in June 1982 at a meeting in Bogotá on horizontal co-operation for development of the mining sector, sponsored by the Colombian Mining Corporation (ECOMINAS) and ECLAC (ECLAC, 1982). This meeting was attended by 31 delegates and 20 observers from 14 Latin American countries, plus observers from Spain, Italy and three international organizations. In the course of discussions 90 proposals were identified either requesting or offering technical co-operation for mineral development. At the end of the meeting a decision was made, building on the recommen-

dations from the 1981 Lima seminar, to establish an advisory committee and an interim co-ordinating secretariat with a view to setting up a Latin American System for horizontal co-operation in mining. This decision was subsequently supported by a meeting of managers of mining enterprises, held in Bogotá in June 1982 (ECOMINAS, 1982).

Members of the advisory committee were to be named by interested governments (six countries subsequently nominated representatives to this committee). ECOMINAS agreed to act as the interim co-ordinating secretariat. The tasks established for the secretariat were: i) to promote implementation of the 90 horizontal co-operation proposals identified at the meeting; ii) to draft a proposal for the establishment of the co-operation system as a formal entity; iii) to identify potential sources of funding to implement horizontal co-operation; iv) to seek the participation of a wider range of countries in horizontal co-operation activities; and v) to disseminate information which would facilitate horizontal co-operation and development of the mining sector of the region.

In January 1983 a further workshop on mining development was held in Quito under the auspices of the Ecuadorian Ministry of Natural Resources and the Spanish Ministry of Industry and Energy, with an attendance of 166 representatives from eight Latin American countries, Spain and six regional and international agencies. During the workshop one session was allocated to discussion of regional co-operation mechanisms. The experience of ILAFA and of the Latin American Energy Organization (OLADE) was reviewed. A draft proposal for a regional system for horizontal co-operation was presented by the co-ordinating secretariat and commented on by a member of the organizing committee of the Latin American Mining Institute (Morcillo, 1983). In closing the session it was proposed that the initiatives for a system and an institute should be merged to form a Latin American Mining Organization (OLAMI). ECOMINAS again accepted responsibility for promoting this proposal and the Spanish Ministry of Industry and Energy agreed to provide technical and financial support. The interim secretariat of OLAMI drafted the statutes and reviewed them with interested parties in the countries of the

region. The culmination of this effort was a meeting in Lima in April 1984 convened, in association with the Peruvian Ministry of Energy and Mines, to consider the draft statutes, and the final statutes were adopted by delegates from 11 countries.² The objective established for the Organization was "... to foster co-operation among members to reach progressively more advanced stages of geological, mining and metallurgical development in the Latin American and Caribbean region, and in each of the member countries, and thus to increase their contribution to the [regional] integration process". The functions were to: i) promote the integration and development of mining and metallurgy through bilateral and multilateral activities; ii) foster co-operation between national institutions and with other regional or international agencies; iii) promote research and transfer of knowledge related to the development of mineral resources, through the collection and dissemination of information; iv) promote integration of enterprises engaged in research, prospecting, exploration, mining and metallurgy; v) analyse policies for rational development of the industry; vi) promote development of a regional capital goods industry for the mining sector; vii) strengthen the region's bar-

gaining position with respect to financing and marketing; and viii) improve the quality of the personnel employed in the sector through formal education, training, seminars, etc. (ALADI, 1984).

Three categories of membership were established. Active members are the geological, mining and metallurgical enterprises and other national associations or entities connected with the minerals sector, which are affiliates of the National Co-ordination Units (NCU) of OLAMI. Associate membership is granted to similar enterprises and entities from outside the region on approval of the OLAMI governing council. Supporting members are admitted at the discretion of the respective NCUs provided they "share the goals of the Organization and demonstrate willingness to support its activities". The meeting requested ECOMINAS to continue to act as the interim secretariat for eight months. During this period it was anticipated that the respective NCUs would be created and would ratify the Lima statutes. At the end of that time the First General Meeting of the Organization was to be convened in order to ratify or modify the statutes, elect officers, appoint a general secretary, designate the headquarters, and approve the work programme and budget of the secretariat.

HI

OLAMI's mandate

In fact, 17 months elapsed prior to the First General Meeting of OLAMI. During that time further activities were undertaken by regional agencies in association with the interim secretariat, which laid the ground for the Organization's future work programme.

In August 1984 the Latin American Integration Association (ALADI) and CONSIDER (Brazil) organized a regional congress on non-ferrous metals in Sao Paulo, attended by representatives

of about 400 mining-sector enterprises, to review options for increasing intra-regional trade and the specific actions required by governments to facilitate the process (ALADI, 1984).

A further workshop was held in Santiago in November 1984, under the sponsorship of ALADI, ECLAC and the European Economic Community (EEC), aimed at identifying areas where action could be taken to initiate a process of intra- and interregional exchange of financial, technical, managerial and information resources in order to generate a more dynamic relationship between the extraction and refining of Latin America's mineral wealth and the contribution of the sector, through trade and industrial devel-

² Argentina, Bolivia, Colombia, Chile, Costa Rica, Ecuador, Guatemala, Nicaragua, Panama, Paraguay and Peru. Brazil and Cuba attended as observers.

opment, to the welfare of the region's peoples (ECLAC, ALADI, EEC, 1984).

This workshop highlighted a basic issue—the need to approach the "actors" who make the key production, marketing and policy decisions related to the mining sector and its interrelationships with the industrial sector—and pointed to three avenues for initial action through horizontal co-operation:

—Mobilization of the ideas and interests of the entrepreneurial sector in order to: i) improve efficiency through vertical and horizontal integration; and ii) more effectively represent the sector's needs for public services and policies to government decision-makers.

—Assisting those who guide public policy to formulate and implement policies within the context of dynamic interaction with the entrepreneurial sector, including exploitation of opportunities and the advantages of intra- and interregional integration of policies.

—Development of services for the mining sector—research, training and information—which: i) are more responsive to the demands of those who make decisions on investment, production and marketing; and ii) exploit the economies of scale and specialization available through systematic collection and exchange of information at the regional and interregional levels.

These conclusions formed the basic framework for a subsequent meeting of Latin American mining industry associations (primarily representatives of small and medium-sized enterprises) in Buenos Aires in September 1985, organized by the Argentine Mining Union and the Argentine Secretariat of Mines, with support from ALADI, ECLAC and the EEC (Unión Minera

Argentina, 1985). The conclusions of this meeting were transmitted directly to the First General Meeting of OLAMI, held in Buenos Aires immediately following the meeting of mining associations. In essence, these became the basis for the work programme of the Organization approved by the NCU delegates from 14 Latin American countries (OLAMI, 1985).

The detailed work programme adopted by the OLAMI Management Committee in November 1985 covers the following items: at the national level the UNCs will prepare a report on the mining sector over the period 1980-1985 covering structure of the industry, costs of production, efficiency, output, reserves, labour supply and qualifications and mining policy; on the basis of the above information, collaborate with the secretariat in its activities related to development of a mining information system and promotion of technology transfer through vertical and horizontal integration and horizontal co-operation.

At the regional level the secretariat will: co-ordinate the work of the UNCs in evolving a regional information system, the initial step being the publication of a directory of enterprises (mining, metallurgy and geological and engineering services) and government support agencies in the fields of research, information and training, in all member countries; co-ordinate the work of the UNCs related to vertical integration and horizontal co-operation and promote technology transfer through studies to identify opportunities and the holding of meetings to facilitate exchange of information between relevant enterprises; organize technical seminars and congresses; publish, on a regular basis, a journal and statistical bulletin.

IV

The challenge of technology transfer

At its present stage, OLAMI is oriented primarily to serving the interests of small and medium-sized enterprises and government and private entities concerned with policy, services or material inputs for this sub-sector of the mining industry. Significant opportunities are seen for

this sub-sector to make a significant contribution to development in the region. Opportunities for diversification of production into minerals with better market prospects than the nine traditional commodities—copper, iron ore, zinc, bauxite, silver, lead, gold, nickel and tin—which

comprise 95% of the region's mineral exports are generally well suited to this scale of operation. Furthermore, these enterprises face constraints in financing, management, implementing vertical or horizontal integration, and knowledge of production techniques and marketing procedures which do not apply to the transnationals or the giant State corporations. Thus, a primary option to exploit opportunities in the mining sector and its potential contribution to greater value-added through vertical integration appears to lie in the transfer of technology in the fields of financing, management, exploration, production and marketing.

The organizational structure for identifying and facilitating technology transfer has important characteristics. First, it must be a market-driven operation: i.e., it must systematically search for regional or interregional opportunities for viable and profitable technology transfer. This requires market research with a relatively sharp focus. Thus, screening the wide array of mining and metallurgical activities—wide both in terms of their diversity and geographic distribution—may lead initially to the establishment of two or three divisions (e.g., cost-saving through energy conservation in production, diversification into selected minerals, specialization and integration for production and marketing of complex products, or vertical integration in selected metals). Secondly, each division must be in a position to deliver a network of contacts and know-how to potential clients, where a profitable project has been identified. It should: i) know the range of available technologies (or be able to identify them rapidly) and be able to say who is in a position to supply them; ii) be able to

locate both the entrepreneurs who are interested in potentially profitable projects identified through market research, or in searching for such projects, and the managerial resources to implement them; and iii) have access to the sources of venture capital to supplement the investment of the entrepreneurs. In this latter area the organization itself may take a short-term equity interest to get the project started. This financing model is followed by the International Finance Corporation worldwide, by ADELA in Latin America, and by venture capital companies in developed countries. An example from Latin America is the Fundación Chile. And thirdly, if the organization is to have credibility and enjoy the confidence of its clients, it must be seen as impartial and professional in its approach. In this area the composition of the board of directors is critical.

OLAMI's mandate in promoting vertical and horizontal integration is very clear. However, the question remains: should it attempt to evolve an organizational structure or establish a subsidiary operation along the lines outlined above, or should it promote the creation of such an organization in which its own role might be minimal? However this question is resolved, there can be little doubt that a systematic effort to support technology transfer to small and medium-sized mining and metallurgical enterprises and those associated through vertical integration, possibly with backing from government development corporations and bilateral or multilateral financing and technical co-operation agencies, should make a significant contribution to the process of efficient industrialization in Latin America.

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