NEW RELATIONS BETWEEN NATURAL RESOURCES AND INDUSTRY IN A GLOBALIZED WORLD ECONOMY

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Abstract

Natural resources are not homogeneous in nature, having certain features in the productive process that require grouping them into different categories by different criteria. Consequently, natural resources cannot be addressed all at once, but only distinctly, according to relevant criteria selected based on the proposed goals. Changing approaches based resources (materials) to the knowledge, from quantity to quality, from mass products to new concepts of higher added value, follows a development that is based on eco-efficiency and sustainable products and services. In this respect, integrated research will become key factors towards global processing.

Keywords: *economy, mining industry, natural resources market, property rights regime, total economic value*

Introduction

The knowledge of the crisis and the clear economic value of resources may impose a series of initial constraints as short-term relatively high costs, but in the same time, such effective increases may also provide incentives for economic innovations necessary to any problem which may arise in times of crisis. Optimistic predictions are often supported by old innovations responsible for the lack of raw materials and energy.

The modern industrial economy lies in a remarkable number of options which require compliance with environmental and natural resource exploitation. The technological changes generating new substitutes increase the productivity of the old ones. The way of improving these processes include:

1. Increase production per unit of resources entered into the economic process, for example, the decrease in the amount of coal needed to generate a kWh.
2. The discovery of new metals, synthetic fibers, plastics, etc.
3. Productivity growth in mining processes.
4. Productivity growth in extraction processes and discovery of resources.
5. Develop techniques for waste reuse and recyclable materials.
6. Develop techniques for deep mining or other abundant resources.

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One of the major effects of these technological developments is the reduction of economic dependence on some expensive resources and a progressive widening of the range of raw materials used. Limiting the analysis to the crisis of these natural resources used as raw materials in the production process, we notice that they impose higher economic costs as their degree of depletion increases. This automatically requires increased fund allocation for innovation. The conventional approach is generally optimistic about the ability of the economic system to overcome such constraints of the long-term natural resources crisis in a globalized economy.

Each great discovery, from fire to nuclear energy, had good and bad parts. It depends on how it was used by humans, for or against themselves. Even the process of industrialization in itself had positive and negative aspects. It all depends on how it is done, for what purpose and how it is integrated into the social and economic structures of the respective company.

Each time something new appeared there were the **optimists**, who saw in change new opportunities for progress and the **pessimists**, who feared apparent or unexpected incidents may arise from the new created context. In reality, mankind has permanently faced slow or abrupt changes, evolving or obsolete, deeper or more superficial, but it eventually found all the resources and ability to solve these problems.

Today, for example, there are many arguments supporting the thesis that even major crisis, such as energy or raw materials, accelerate progress, forcing people to search for new "ways" in the development of new "breakthroughs", in finding new options. Every time the "costs" of such an impact are higher. Also, one has to find a new approach to these problems in their broader context, economic, social, technological, cultural and ideological. Thus, either we would not understand them or we will partially understand their meanings, and solutions would not be other than partial. There are many signals indicating that we can only go one way, that of "knowing more about the least." The too narrow view of the specialist, the "tunnel" vision, may turn into a handicap of understanding interdependencies. The attempt of a more precise evaluation on phenomena or processes with high specialization arise "barriers" in the way of noticing and handling complexity. We are in a period when we equally need integrative synthesis, holistic visions. From this point of view, the problems regarding the mineral resources depletion acquire special significance. Therefore, it is worth reflecting on the idea that as earth is finite so are its resources. This is obviously true, but the error presented as irrefutable proof of the final catastrophe is to take the finite for exhaustible. With very few exceptions, the huge volume of earth's mineral resources is not lost by extraction and use, but it continues to form an integral part of the planet's resources. They can be temporarily incorporated in inputs or consumer goods, they can be chemically combined with other elements, and however they remain indestructible.

New technologies have proven their capacity to find ways to extract resources from various geological formations. Also, through them, we can recover materials that have already been used once or several times.

However, the gloomy forecasts on the depletion of mineral resources have drawn the attention of the contemporary world by even urging economic slowdown.

Actual Content

The increasing demand for metals, directly influenced by the industrialization processes, together with the continuous reduction of the amount of metal obtained from the mining, determined and will determine the increase of mining production. In fact, in recent years at world level was recorded a trend of continuous decrease in the content of useful substances from ore mining and an increase in the size of mining mass extracted to obtain the same amount of metal which leads to higher material and energy costs. Therefore, the main restriction in metal consumption shall be in the

future the "energy cost", as total energy consumed to produce one ton of metal, from ore extraction to obtaining the basic metals (steel, aluminum and electric copper, lead and refined zinc, etc.). This cost increases rapidly as the content of metal from the mining mass extracted decreases.

The decreased useful content form the exploited deposits also involve special technologies for the recovery of a larger quantity of metals from the extracted mining mass subject to processing, which in turn leads to a considerable increase in investment, energy and production costs and raise special problems of environmental protection. Therefore, in the past few years, special attention is paid to the recovery and reuse of metals, which besides bringing energy savings help in conserving the world's metal resources.

Under these conditions, the dependence on the demand of metals at the economic development level is reduced. One important aspect these days is to save mineral resources, particularly the defective ones, to recycle and reuse them and to raise awareness of recovery. In fact, structural modification occurring in the global economy, the emergence and development of new industries with low consumption of metals, but with high volume of human resources, entail new economic policy guidelines of the states.

Also, subject to structural changes taking place in the world economy, new guidelines appear in the metal demand. Currently, we are witnessing a new phenomenon which manifests itself in a growing number of countries, namely, the gradual reduction of dependence of the industrial development on the natural resources. In countries where raw materials and energy is reduced gradually, depending on either the accelerated development of processing industries, or the stagnation or reduction of internal reserves, the share of imports in total consumption of resources is becoming greater. Illustrative of this case are Japan, the U.S. and some European countries, which cover most metal needs from imports.

New geological discoveries shall continue to enrich the picture of mineral reserves in the world, providing global demand for certain resources still remaining a difficult problem of the contemporary world due to more or less economic reasons. Newly discovered deposits generally have harder extraction conditions, being located in less accessible locations or having lower contents of useful substances, which require new technologies for the recovery of useful substances.

The increased dependence of national industries on the world commodity market may lead to imbalances and disruptions in the global economy. Given the policies of the developing countries, owning mineral resources, of protecting their own raw material base and developing processing industries to exploit the local natural riches, special importance is given to restructuration and reorientation of their economies towards top branches, with low energy and material consumption.

Despite the policy of reducing specific consumption due to the introduction in production of technical progress, the demand is reduced. At world level, both now and in the medium and short term forecasts global demand for metals, especially the base ones, is satisfied, although certain disorders may appear due to postponement of some projects, lack of funds or because of the diminishing absorption capacity of the volume of metal production by the industry. The problem of ensuring metal resources may not represent a problem even on longer term. The current situation does not allow precise answers to the question: how long the earth reserves can keep up with the rapid growth and demand for mineral exploitation?

Along with the global economic development, the new procurement possibilities for resources from different parts of the world, the countries' dependence on the world market is becoming increasingly important.

Natural availability of the different metal resources, their geographical distribution and geopolitics, the cost of their extraction and preparation, the energy consumption, transport etc., give a perfect overview on how these resources are placed according to the level of economic development. In the future we believe this proportion shall be decisively influenced by energy and extraction costs,

mainly due to the transition to ores with lower useful content, with high degree of impurities and more difficult operating conditions.

The development of national economies based on an intense industrialization process from many countries in the world economic system had led, as we stated earlier, to a growing demand for metals, tempered in recent years by the economic crisis. Whether they dispose or not of metal reserves, in their economic development process and industrialization, most countries have given special attention to metallurgy, as priority industry field ensuring the conversion of resources in raw materials necessary for other industries.

Industrial developed countries, which have reserves of metal resources (such as: U.S.A., Australia, Canada, Sweden, etc.), search, first to protect their national heritage and then to exploit as much as they can these resources. For example, the U.S.A, a bauxite importing country, despite its high quality reserves, in order to protect them undertakes extensive research to extract alumina using different substitutes like: clay, kaolin etc.

Although these procedures to obtain aluminum need more energy than through conventional processes, from bauxite, in order to reduce the dependence of these resources on the world market the countries allocate substantial funds for research in this area. Also, both by using the most advanced technologies for extracting and processing metals and by the policy of restructuring industries towards increasing those fields with low consumption, superior capitalization of metals and bigger profits are aimed.

Industrial developed countries, which do not have metal resources (such as: Japan, Italy, Switzerland, etc.) or have insufficient amounts, orient their production towards high efficiency and low cost fields. Through the high processed products these countries offer for sale on the world market, they cover the necessary expenses for importing resources. Japan is quite a convincing example, if we take into account this country has low natural reserves of metals, but is one of the biggest metal consumers. In the same time, it offers high-tech products at reasonable prices on the world market.

The developing countries, with metal resources, orient their economic policy on the one hard to develop the national first processing industry (primarily), and on the other hand to market these resources on the world market at reasonable prices. However, these countries in order to cover domestic demand for superior manufactured products have to export considerable quantities of ores.

In the new economic conditions, favored by the development of transports and capital and technology transfers, covering the need for raw materials is partly or entirely based on imported resources.

For most non-energy mineral resources, the known reserves are concentrated in certain regions or countries which represent, in fact, the most important manufacturing regions. These attract large capital investments in order to exploit these deposits. Also, the mining activities, provided with adequate social and economic infrastructure, stimulate research and development of mining on the same territories or in neighboring regions, more accessible and which offer greater economic benefits. As such, the interrelations between the three activities of research, prospecting and extraction, stimulate development, with influences both from the exploitation of mineral reserves and from the extension of exploitation, mainly in countries with tradition. These processes were slowed with the onset of the world economic crisis. Economic decrease in industrialized countries has led to lower imports and hence the appearance of commodity price fluctuations on the world markets. Therefore, the operating activities of mineral deposits and the various industrial manufacturing processes are not as closely related as before; the non-ferrous metal industry and the metal industry, for example, develop independently from the place of extraction of the respective resources.

The close dependence between the metallurgical and the processing industries, one the one hand, and the mineral resources, on the other hand, was present since the beginnings of industrial

development. This dependence was gradually reduced with the change of industrial centers and gradual depletion of rich reserves from the consuming regions, as well as the penetration of technological progress in all areas including transportation.

Changes occurring worldwide in terms of minerals supply sources supporting the industry development and the transition from self-consumption of raw materials to importers, especially over long distances, have caused many economic and technological changes. Thus, import of raw materials began to be the basis for development of certain industries in more and more countries.

Despite efforts to find new perimeters and widening the geographical area of operation, the extraction of minerals remains concentrated in a relatively small number of countries. Taken as a whole, the world's mineral production is concentrated in proportion of 70-75% in 12 countries, of which approx. 50% are developing countries. By increasing the mining capacity also the export availabilities have increased, thus creating the premises for more intense trade in this area. The ore trade flows are extended from regional and neighboring level, to large and very large distances.

Seven major producing countries (Australia, Brazil, Canada, Sweden, Russia, India and China) export more than half the world production of iron ore. It is worth mentioning that two of the seven major countries exporting metal ores decreased their production especially after 1990. Thus, the former USSR, by subdividing in independent countries, has lost its status as large producer of iron ore. In addition to Russia states such as Ukraine, Latvia, Belarus have emerged, leading to redistribution of power in the extraction and export of minerals. But Russia remains a worldwide major producer and exporter of iron ore.

Sweden, adopting a series of regulations for environmental protection, decreased both the iron ore production and the metallurgical production, considered as heavily polluting and energy-consuming.

Expanding minerals international trade has been possible due to the introduction of new technologies of concentration, agglomeration and transportation over long distances. To ensure efficient transportation from the extraction location to the consumer, a special importance was given on the quality of the ore. For example, by increasing the content of iron from 51% to 62% transportation costs of useful content are reduced with 20%. Moreover, the shipping, auto and rail capacity increased, in order to reduce long distance transport costs.

Economic development and the use of advanced primary processing technologies determined a new global division of mineral production. Thus, an increasing share of world production of mineral raw material is processed in developed countries and a relatively small amount in the developing countries, which own significant non-energy mineral resource deposits. For example, only 10% of the total production of extracted bauxite is processed and converted into alumina in the countries where it is extracted from. In the case of iron ore and manganese the part which is processed in the countries of origin is of approx. 15-30% for zinc, approx. 50% for lead and approx. 70% for nickel. On average, developing countries process locally only 30% of the extracted ores, the remaining 70% being processed in the importing countries. A special case is China which, in recent years, has experienced a strong economic growth, and reached to impact on the price of raw materials worldwide.

The big differences between countries and regions, as well as between minerals in the different levels of processing, depend on a series of factors such as: the necessary of investment and the investment power of the countries; the degree of integration of production in the respective industries; the level of required technologies and the specific energy consumption; energy capacity of the respective countries; the size and evolution of demand etc. These factors have certain mobility, an evolution according to the technical progress and level of economic development of the countries, to the pace of this development, as well as to the stability and political and economic interests of these countries and the international organizations in those areas.

The countries with mineral raw materials tend, through their economic development programs, to capitalize their natural riches by developing the respective industries, processing such wealth and gradually restricting exports of raw materials.

Achieving these goals shall be possible if the mineral processing expands and intensifies, which will influence the global trade restructuring in terms of goods flows on groups of countries and, in particular, flows of metallurgical goods. Moreover, the balance of international trade with metallurgical goods reflects the effects of the development level of some countries, but also the restructuring necessary in the world economy and in the trade relations between countries.

Increasingly strong is the desire of many developing countries, producers of natural resources, to move to industrialization by extending the processing of minerals extracted. At the same time, some developed importing countries build in the developing countries industrial units of extraction and primary processing of natural resources in order to obtain intermediates, especially through direct investment and providing long-term loans repayable in products. This support may be explained by the fact that the developed countries are interested in ensuring their supply of raw materials, while avoiding the expansion on their territories of heavily polluting and energy-intensive processes. Therefore, by the high processing of intermediates imported from the developing countries, the countries with tradition in metallurgy may obtain many economic, environmental and energy advantages.

The customs tariff system is used, frequently, by the developed countries, on the one hand to stimulate the developing countries to export raw minerals, and on the other hand to stop them – from the economic point of view – from exporting manufactured goods. Thus, tariffs increase with the transition to higher stages of processing.

The industrial development increases the demand for mineral resources. Even if we reduce the specific consumption, the recycling of materials and the use of substitutes, the demand for non-energy mineral resources shall experience significant growth, without taking into account the real possibilities to satisfy such need. Therefore, on the one hand the exploitable reserves have a certain evolution based on the research activity and geologic exploration, like that of ore extraction, and on the other hand the possibilities of expanding the supply with mineral raw materials are more and more limited.

Conclusions

It would be wrong to believe that these facts are just situational, and it would also be wrong not to notice that behind them are much deeper economic and social reasons. However, as time passes it becomes increasingly clear that it is not just about solving some practical, economic, financial, monetary, technological problems or problems regarding the economic restructuring policies or the industry, even though these are urgent and inevitable. There are “deep currents of change” which forecast changes in much wider areas, in concepts, in values mainly due to the global crisis and the global problems arising from it. Therefore, together with the immediate restructuring of fields such as industry, technology, raw materials, energy etc., it is necessary to better clarify the directions of change in multiple areas. Access to energy and raw materials is essential for a developing world. Also, the access to technologies is extremely important in a globalizing world, in order to stop the depletion of these.

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