

INTENSIFIED RESTRUCTURING OF THE GLOBAL INDUSTRIAL SYSTEM AND REMODELING THE COMPETITIVE ADVANTAGE OF NATIONS

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Abstract: The global financial crisis of 2008 has profoundly changed global economic patterns. In response to the profound changes in the global economic environment and in order to position themselves for future economic development, all countries have engaged in significant industrial restructuring. This has led to a new round of industrial adjustment, transfer and upgrading, as well as profound adjustments in the modes of economic growth. It has also changed the pattern of international competition to some extent. Emerging economies in particular have exhibited "eye-catching" performance in overcoming the crisis, with robust economic recoveries and apparent enhancements of national competitiveness. In the current and forthcoming periods, global industrial upgrading will need more extensive technological support. Technical innovation is a key factor in enhancing the competitive advantage of nations. It will become an important driver for new and innovation modes of industrial development and global industrial benefit adjustments. All countries of the world should make timely adjustments to their economic structures, expedite innovations in industrial technology, and enhance core competencies so as to increase their international competitiveness.

Key words: industrial structure; financial crisis; technological innovation; competitive advantage of nations

The Financial Crisis and Changes to the Global Industrial Structure

Traditional industries, hi-tech industries, and modern service industries have become the three pillars of global industrial development in the world today. The

traditional industries, with fossil energy as their foundation, have reached their peak; hi-tech industries, represented by electronic information technology, are at a high plateau stage; and modern service industries, represented by finance, are entering an expansion period.¹ However, these backbone industries are also faced with contradictions in development. Traditional industry has encountered bottlenecks in the availability of natural resources; the path to industrializing and commercializing high and new technologies is not smooth; and an overreliance on modern service industries can easily lead to virtual economic inflation. Such contradictions in industrial development are magnified by the global financial crisis. In the post-crisis era, there has been a strong call from the international community for a change in the direction of industrial development; the world is eagerly waiting for a new industrial revolution to achieve breakthroughs in global industrial development.

Developed countries are too “impatient” in their industrial development

Developed countries have always taken the lead in trying to get high returns from industrial development through accelerated industrial upgrading and the creation of new spaces for development. However, the excessive pursuit of benefits by developed countries has triggered an “impatience syndrome” in industrial development. During the process of increasing the percentage of Third Industry enterprises in their industrial systems, the developed countries threw enormous amounts of capital into high-return industries and the financial sector. Due to a lack of effective investment guidance and market supervision, as well as fuel added to the fire by various financial derivatives that burst the bubble of virtual economic development, real industries lost their motive power for technological innovation due to a lack of supporting resource factors. This is the intensification of the contradiction between insufficient technological innovation and overdevelopment of virtual industry that caused the international financial crisis that has swept across the entire world. The “impatience syndrome” in the industrial development of the advanced countries is also reflected by excessive offshoring of domestic industries. More and more industries are transferred from developed to developing countries; this includes not only conventional labor-intensive industries, but also some high and new technology industries. Lacking new industries to fill the void created by offshoring, large amounts of overseas investment and enterprise/industry transfers have thrown developed countries into the plight of de-industrialization.

Industrial development in developing and underdeveloped countries is in a state of “confusion”

Developing and underdeveloped countries are in the habit of introducing foreign capital and technologies to stimulate the upgrading of their domestic industrial

systems. Too often, they merely copy what developed countries have done. Of course, they are held back by the industrial systems in developed countries, because developing countries lack the foundation and ability to create technological innovations. The traditional pattern of industrialization is facing resistance due to the persisting lack of resource factors and increasingly serious environmental problems. The vast developing and underdeveloped countries should never adopt the way of extensive development for industrialization, or carry it out by sacrificing the environment. They must rely on strength in technological innovation to find a path of industrial development suitable for their national conditions. The developing countries' long dependence on developed countries has made them hesitant to seek their own path of industrial development and caused them to fall into "confusion" regarding the direction of future development. This highlights the contradiction between a country's strong desire for fast economic development and the lack of prowess necessary to accomplish it. During the current financial crisis, the emerging economies represented by the BRIC countries have grown stronger. They have sought to improve their position in international competition and tried to break the restrictions set up by the developed countries; they have even taken leading roles in some industrial sectors. Therefore, in the complicated environment of international industrial development, the question of how to select industries that are most likely to improve a country's competitive advantage becomes a top priority. The outbreak of the financial crisis and the possibilities that appeared afterwards have provided opportunities for these countries to overcome their "confusion."

Imbalance of industrial benefits between developed countries and underdeveloped countries

For many years, global industrial development has followed the path of upgrading from labor intensive to capital intensive and then to technology intensive industries. This pattern relies on technological change and innovation to break bottlenecks in industrial development and open up new fields. As new industries replace the old, the industrial transfer path, which runs from developed countries to developing countries and finally to underdeveloped countries, strengthens the control over global industries by the developed countries. It allows them to enjoy the high earnings from new industries while leaving underdeveloped countries and regions dependent on support from developed countries and regions. Through this lead-follow pattern, the contradictions in global industrial development have resulted in an irrational industrial division of labor. The innovative research and development activities of the developed countries are now at the high end of the industrial chain, while the processing and manufacturing functions of the underdeveloped countries are at the lowest end. Such inequality of positions in the

global economic order has led to a disproportionate division of benefits, with most of the profits going to developed countries. The trend will be for this gap to grow ever larger. The conflict of interest between the developed and underdeveloped countries is also exhibited in the imbalance of production and consumption and the imbalance between resource possession and resource consumption. Developed countries have always been in the dominant position of taking profit; thus, the rise of the underdeveloped countries creates strong pressures to rectify the imbalance.

Profound Adjustments and Breakthroughs in the Global Industrial System

Although the global financial crisis of 2008 began with the bursting of the virtual economic bubble, one might say that it was really the product of intensified contradictions in global industrial development and the destructive reorganization of the global development pattern. Technological innovation is stimulated by crisis. Under crisis conditions all countries begin to rethink their industry selection and positioning. Thus the financial crisis has unlocked a new period of development for global industrial innovation.

Technological innovation will become the main driving force for industrial development

The effects of global economic crises are not solely destructive. They also stir up new rounds of innovation and revolutions in science and technology. For example, the world crisis of 1857 triggered the second technological revolution marked by the rise of electric power, and the world crisis of 1929 triggered the third technological revolution marked by breakthroughs in electronics, aerospace and nuclear energy. Both examples show that technological revolutions and economic crises accompany one another. Each technological revolution creates new industries that drive economic growth and new technological paradigms.² Technological innovation is the way to overcome the adverse effects of the 2008 financial crisis, for only innovation can open up new fields of industry, find new outlets for investment, and create new economic growth points. Technical innovation is the way to lead the global economy out of crisis and achieve recovery. Presently, all countries and regions are in an effort to transform their modes of economic development by focusing on strategic emerging industries and using technical innovation as the major force behind a new round of economic growth. The traditional model of relying on large-scale resource factor inputs to drive industrial development will be changed and more emphasis will be put on the efficiency and sustainability of industrial development.

The current industrial division of labor will be reorganized

The outbreak of the financial crisis postponed economic growth in the developed countries, and the recovery process in those countries has been restrained, while developing countries, particularly emerging economies, have distinguished themselves as new engines for world economic growth. Thus an era of competition for new industrial heights has opened up. In the post-financial crisis period, developed countries adjusted their science & technology and industrial strategies one after another. For example, the US proposed raising its R&D input percentage to 3 percent of GDP, trying to realize breakthroughs in new energy, basic science, stem cell research and aerospace; and the EU announced the investment of 105 billion Euros in the green economy by 2013. Although currently developed countries enjoy certain technical advantages in creating new industries, the ravages of the financial crisis have made it difficult for them to maintain technological dominance. In this respect, the vast developing countries, emerging countries in particular, have already achieved certain technical breakthroughs in building new industries, and they have greatly increased their R&D input. Through industrialization and key technological innovations, their status as industrial powers has improved, and the long-standing unequal pattern of the international division of labor is now poised for significant readjustment.

More attention to developing real industries

Excessive dependence on the virtual economy represented by finance and real estate is the direct cause of the financial crisis as well as the economic bubble and hollowing out of the developed economies. This highlights the vital role of real economic development represented by advanced manufacturing. In an attempt to stimulate recovery from the financial crisis, US president Obama proposed that the US adopt a sustainable growth pattern by the end of 2009, characterized by export-driven growth and increased manufacturing. This sent the signal that the US was returning to the real economy; it has already begun to stress domestic industries, especially the development of advanced manufacturing. "Reindustrialization" has become an important strategy for revitalizing the US's competitive advantage. Many developed countries, as well as emerging countries and markets, are emphasizing development of an innovation-based real economy. They consider fostering the competitive advantage of the manufacturing sector to be an important means for future success in international competition. This indicates that the return to and revival of the real economy will be a long-term trend and that real industrial development will regain its central position in the global economy.

Profound Changes in the Global Industrial Division of Labor and the Competitive Advantage of Nations

This global financial crisis that started in 2008 has had a deep impact on the ability of the developed countries to dominate the world economy, and it has slackened the pace of development. However, emerging economies represented by the BRIC countries have grown quickly and have come to share many common interests in world economic and development issues. The connections and dialogue among countries with emerging economies have grown deeper and have made profound changes to the global economic structure and pattern of interests. Due to their increasing strength, the emerging economies are seeking to advance their global economic and political status, and this will shake up the pattern of international competition that has long been dominated by the developed countries. The latter have made every effort to maintain their competitive position. This, combined with the struggle for competitive status by underdeveloped countries, will make the competition between nations fiercer than ever as the emerging countries aggressively challenge the established world order.

Changes in the competitive strength of nations

In the present era, when science and technology lead socioeconomic development, the competitive advantage of nations has shifted from focusing on resource and cost advantages to focusing on technical advantages. For many years, the developed countries maintained their strong competitive advantage by relying on innovation to drive economic growth, this included innovation in both the real economy and virtual economic sectors dominated by finance. It is true that the developing countries have certain comparative advantages in factor costs and resource supplies, but it is very difficult to turn these into competitive advantages due to the international restrictions set up by the developed countries and the transformation and upgrading of the international market demand structure. Before the outbreak of the global financial crisis, there was a distinct and stable hierarchy between the strong and weak competitors, but the crisis disrupted this pattern. Developed countries began looking to innovation while consciously avoiding the speculative bubbles that are brought about by over-innovation in the financial sector. Instead they sought greater competitive advantage through industrial innovation and shifting away from an excessive emphasis on tertiary industry in favor of advanced manufacturing. Developing countries accelerated their pace of innovation in the development of traditional industries, trying to maximize the conversion of comparative advantage into competitive advantage and also developing their presence in high and new technology industries by rapidly upgrading their industrial sectors. By breaking out of their overreliance on

comparative advantage based on low costs, the developing countries are closing the gap in competitive advantage between themselves and the developed world. As shown in a recent OECD research report, the sum of GDPs of the developed countries as a ratio of total global output has fallen from 60 percent in 2000 to the current 51 percent and is expected to drop to about 43 percent by 2030.³ World Bank economists think that the economic footprint of the developing countries will overtake the advanced economies in 2015 at the soonest. By 2030 the economic strength of the BRIC nations is expected to have reached the level of the Group of Seven.

Fierce competition between development modes

In the current international system, all economies are linked together by a complicated web of interests; therefore, problems affecting single or several economies soon spread to and threaten the entire economic system. The financial crisis threw the international economy into disorder and caused imbalances. In the post-crisis era, the ebb and flow of international economic strength has led to calls for construction of a new international economic order to better balance the interests of all countries. This includes reforming the current international economic and financial governance structure and streamlining the international development order. For example, Joaquín Almunia, one-time Commissioner for Economic and Monetary Affairs of the European Commission, now serving as the European Commissioner for Competition, has said that in the post-crisis era we need reform, a flourishing economy, and a more effective market mechanism, and we need to strengthen supervision over the financial markets and make joint efforts to solve the problems of the 21st century. European Commission Chairman José Manuel Barroso has said, “We need a new global financial order.”⁴ The need to transform the neoliberal globalized economic model has been commented on by Joseph Stiglitz: “The new free market fundamentalism is a political dogma; it has never been supported by economic theory. And now it seems it is obviously not supported by historical experience. After learning this lesson, perhaps now a gleam of hope can shine through the gloomy world of economics.”⁵ “To allow developing countries to have more say in international issues, the US credit and consumption pattern, characterized by household over-indebtedness, should become a thing of the past, while emerging nations, especially in Asia, must build a freer basis for international development in order to decrease their reliance on the markets of developed countries.”⁶

As the economic position of the developing countries continues to improve, they are going to play an increasingly important role in the international economic arena, but there is still a long way to go to establish a new order for the international economy. As the fight for international standing between countries

grows more ruthless, it gives rise to trade protectionism. In aspects like climate and environmental protection, contradictions and friction between developed and developing countries will further intensify, and competition under the new international economic order will become more reckless.

Shifting of national competitive strategies in each country

The financial crisis did not end the economic competition among countries and regions. On the contrary, it has made a country's ability to fight against the crisis and to recover economically into a new indicator for weighing national competitiveness. The two most authoritative national competitiveness assessment organizations, the World Economic Forum (WEF) and the International Institute for Management Development (IMD), have both used the impact of the financial crisis as important assessment factors in reports released during the past two years. The great changes made to the global competitive order by the impact of the financial crisis show that under globalization the old independent national development pattern has become a thing of the past; no country can break away from the complicated international network of interests and relationships. Because of the interrelatedness of all countries, competition among them must no longer be a zero-sum game in which only one party wins and all the others lose; it must be a positive-sum game in which all countries benefit. Competition will also change from a single mode to diversified modes.

First, the key factors of national competitiveness will shift away from focusing too much on sheer economic strength to placing more emphasis on multiple dimensions of competitiveness such as economic efficiency, the economic structure, potential for development, and a nation's ability to innovate. This is competitiveness understood as a unity of multiple strengths in the economic, social and cultural spheres.

Second, the rising strength of the developing countries will erode the power of the developed countries in international competition. The developed countries will have to give way in some respects, such as relaxing the unfair international trade rules and restraining their tendency to resort to armed force. In this way, the global competitive environment will be improved. But developed countries will not give way easily; they will press on with more subtle competitive tactics that favor their interests.

Third, the enhancement of competitive strength and improvements in the international standing of emerging countries, combined with intensified competition with developed countries, will cause competition within emerging countries to escalate, and the tendency of international competition will be towards multi-polarization.

Fourth, a nation's ability to innovate is the decisive factor in its competitiveness; therefore, technological innovation will become the common choice of all countries in their pursuit of enhanced competitive advantages. Thus, in addition to comparing actual strength, competition among countries will focus more on the enhancement of competitive potential and long-term sustainability via continuous innovation.

Policy Advice on How to Accelerate the Restructuring of Global Industries and Remodel the Competitive Advantage of Nations

Industrialization is the inevitable result of development of the social productive forces and the material basis for enhancement of those forces; it is the driver of national competitiveness and the main source of core competitiveness. Technological innovation improves national competitiveness only if it is created in an industrialized context and employed in rebuilding and enhancing current industries or establishing new industrial sectors. History's three revolutions in science and technology have promoted the progress of industrialization following a pattern in which significant technical breakthroughs in the laboratory led to industrial applications and then to the establishment of important industrial sectors, thus creating economic great powers one after another. The UK, USA and Japan were quickly transformed by and owed their rise to the three industrial revolutions, and this allowed them to secure their competitive positions in the world. Undoubtedly, the aftereffects of the financial collapse and the resulting global economic crisis will be with us for a long time to come. The world has pinned its hopes of overcoming the crisis on a new industrial revolution represented by such emerging industries as alternative energy. As the main support of industrial revolutions, technological innovation becomes especially important in the current period. Innovation can break open bottlenecks in industrial development and give the world economy a new vitality and creativity that will change the balance of competitiveness among all countries, thus constructing new patterns of competition for the international economy.⁷

Technological innovation forms the path for rebuilding national competitive advantage. During this process, the strength or weakness of a country's capacity for industrial development, its technical capability, its level of industrialization, and the quality of its support for technical creativity will all directly influence the effects of industrial innovation. According to Michael Porter's theory on the competitive advantage of nations, technological innovation will again be affected by factors like government policy, market demand, enterprise organization and related industrial development.⁸ Supported by these factors, technological innovation will drive the reconstruction of traditional industries and create new

industrial sectors; as a result, it will promote upgrading of the industrial structure, accumulation of competitive advantages and the formation of national competitive advantages. There are several ways to enhance technical innovativeness and promote the rebuilding of national competitive advantages, as given below.

Increase investment in and create a supportive environment for technological innovation

The high yield from technical innovation requires the support of large-scale investment. Faced with the shock of the international financial crisis, the major developed countries increased support for technological innovation. For example, the US invested USD 18.9 billion in energy transmission and distribution research, USD 21.8 billion in the energy conservation sector, USD 20 billion in research and promotion of electric automobiles, and USD 777 million for establishing 46 energy frontier research centers. The UK planned to invest GBP 15 billion within ten years in biomedical research; South Korea planned to invest KRW 6 trillion in research and development of new green energy technologies. Besides intensified support for technological innovation, governments can encourage and instruct enterprises to increase their own inputs, and they can encourage private investment in the relevant sectors through better policy making. In this way, governments can create a large-scale foundation of support for innovation. Regarding the direction of capital input in research and development, the percentage of input in fundamental research should be increased in order to build up the foundation for independent innovative ability. Furthermore, national innovation systems should also be strengthened in order to enhance service ability and promote successful conversion of original innovations into industrial applications, thereby guaranteeing a favorable environment for innovation.

Reinforce development of strategic emerging industries and continue to promote optimization and upgrading of industrial systems

The outbreak of the global financial crisis hastened the arrival of an intense global drive for innovation in science and technology. Key technologies are poised for revolutionary breakthroughs that will surely push the development of a series of emerging industries. Returning to the real economy helps the strategic emerging industries to be the “effective medicine” against the crisis. Major developed countries have all adopted unprecedented economic stimulus measures to speed up breakthroughs in key technologies and adjustment of their industrial structures. For instance, the US government’s “reindustrialization” strategy has emphasized alternative energy, broadband networks and bioengineering industries; it has promoted electric automobiles and actively fostered the nanotechnology industry. The EU has stressed the development of a “green economy,” and Japan has focused

on the development of two big industries, energy and health. Although the strategic emerging industries show different emphases in different countries, they are all based on high and new technologies, and technological innovation is their driving force. The vast developing countries have also quickened their steps in developing emerging technologies and industries, trying to seize the initiative in new economic growth by developing new technologies, fostering new industries and creating new economic growth points. The energy released by upgrading industrial structures and reorienting them towards development of strategic emerging industries will be condensed into the core competitive advantages of these nations, and they will become the most important sources of their national competitive advantages.

Make enterprises the key players in technological innovation and enhance their vitality

Enterprises are the places where industrial development happens, and they are the most active factors during market economic development. An enterprise is the practice field for the industrialization of technological innovations. Industrialization in the developed countries shows that enterprises lead the tide of technological innovation. Enterprises such as GE, Boeing, DuPont, Mobil, Microsoft, etc., have all become large multinational corporations. They have each become the dominant players in their respective fields of electronics, aerospace, chemical engineering, energy and computing, and all are leading the direction of industrial development. Enterprises are also the places that are most able to attract outstanding scientists. Take, for example, Bell Laboratories of AT&T and the IBM Research Center. Both organizations employ Nobel Prize winning scientists. The three revolutions in science and technology occurred under the leadership of enterprises that originated the relevant technical innovations. The market orientation of technical innovation can be maintained and the industrialization of scientific and technological achievements quickly realized only when enterprises are made the key players. The availability of enterprises to play decisive roles in technological innovation is critical for the complete industrialization of innovations. Enterprise development, especially high and new technology enterprises, should receive active support. Through institutional innovation, large-scale enterprises and large enterprise groups can be established to act as the main force for innovation. Porter found in his observations of ten industrialized countries that industrial clusters are a universal phenomenon during the process of industrialization.⁹ In all advanced economies, different kinds of industrial clusters can be found; therefore, it is advisable to instruct enterprises involved in related technologies to centralize. This expands the clusters of high and new technology industries, particularly strategic emerging industry clusters, thereby promoting the enhancement of national competitive advantages on a large scale.

Emphasize international cooperation in technical innovation while enhancing independent innovative ability

The practices of importing technology and imitating the innovations of others have put developing countries in the position of followers rather than leaders of industrial development. The financial crisis is a valuable opportunity for developing countries to shake off the technological control by developed countries and narrow the gap between them. To seize this opportunity, the ability to innovate independently must be developed and enhanced. Developed countries have already established sound independent innovation systems that did not undergo material damage during the financial crisis; instead, they were consolidated and strengthened. Developing countries and emerging countries should accelerate the construction of independent innovation systems by establishing market-oriented technological innovation clusters with enterprises as the key players. These systems should integrate industry-university collaboration and implement financial policies that support independent innovation. Capital input should be increased to support technologies with independent intellectual property, so that the opportunities in the new round of technical innovation can be seized and core national competitive advantages established. While emphasizing independent innovation, international scientific-technical cooperation and exchange should be done at different levels via multiple channels, and it should follow the principle of competing under cooperation and cooperating under competition. Industry incubation and tackling of major technical problems through international cooperation among countries with complementary technological abilities can bring “win-win” results. Borrowing and learning from the advantages of others can quickly enhance the competitive advantages of countries and regions.

Notes

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