

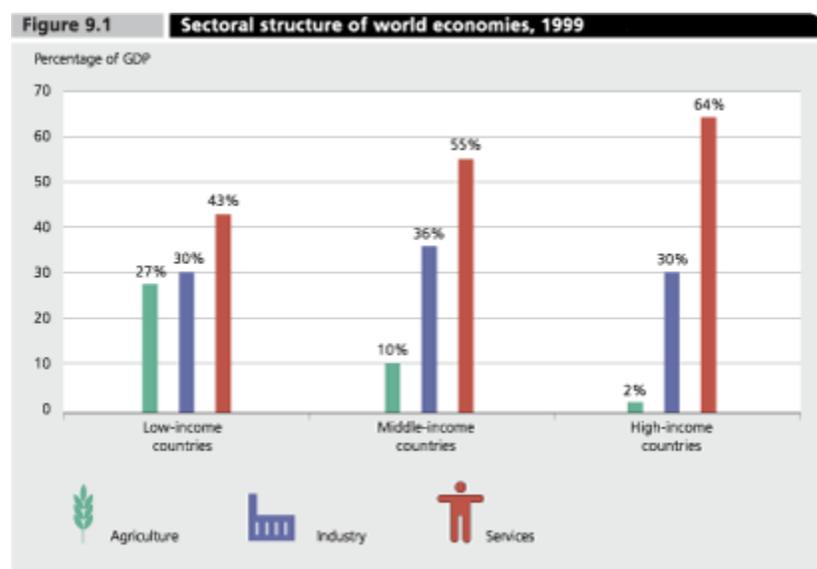
IX. Industrialization and Postindustrialization

Everything that grows also changes its structure. Just as a growing tree constantly changes the shape, size, and configuration of its branches, a growing economy changes the proportions and interrelations among its basic sectors—agriculture, industry, and services—and between other sectors—rural and urban, public and private, domestic- and export-oriented (see Chapters 10, 11, and 12). Are there any common patterns in how all growing economies change? Which changes should be promoted and which should be prevented from occurring? Think of these questions while reading this chapter and the three that follow it.

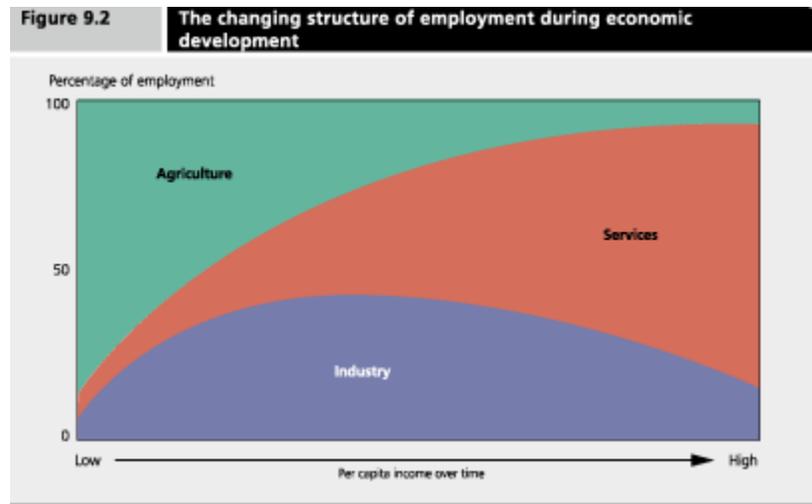
Major structural shifts

One way to look at the structure of an economy is to compare the shares of its three major sectors—agriculture, industry, and services¹—in the country's total output (see Figure 9.1) and employment (see Figure 9.2). Initially, agriculture is a developing economy's most important sector. But as income per capita rises, agriculture loses its primacy, giving way first to a rise in the industrial sector, then to a rise in the service sector. These two consecutive shifts are called industrialization and postindustrialization (or “deindustrialization”). All growing economies are likely to go through these stages, which can be explained by structural changes in consumer demand and in the relative labor productivity of the three major economic sectors.

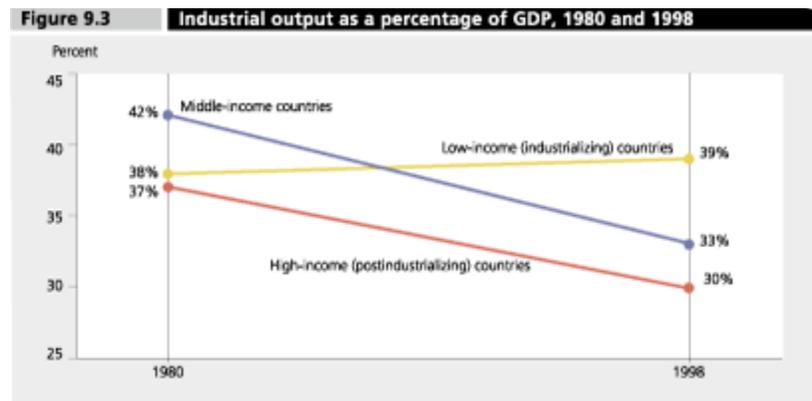
Industrialization. As people's incomes increase, their demand for food—the main product of agriculture—meets its natural limit, and they begin to demand relatively more industrial goods. At the same time, because of new farm techniques and machinery, labor productivity increases faster in agriculture than in industry, making agricultural products relatively less expensive and further diminishing their share in gross domestic product (GDP). The same trend in relative labor productivity also diminishes the need for agricultural workers, while employment opportunities in industry grow. As a result, industrial output takes over a larger share of GDP than agriculture and employment in industry becomes predominant.



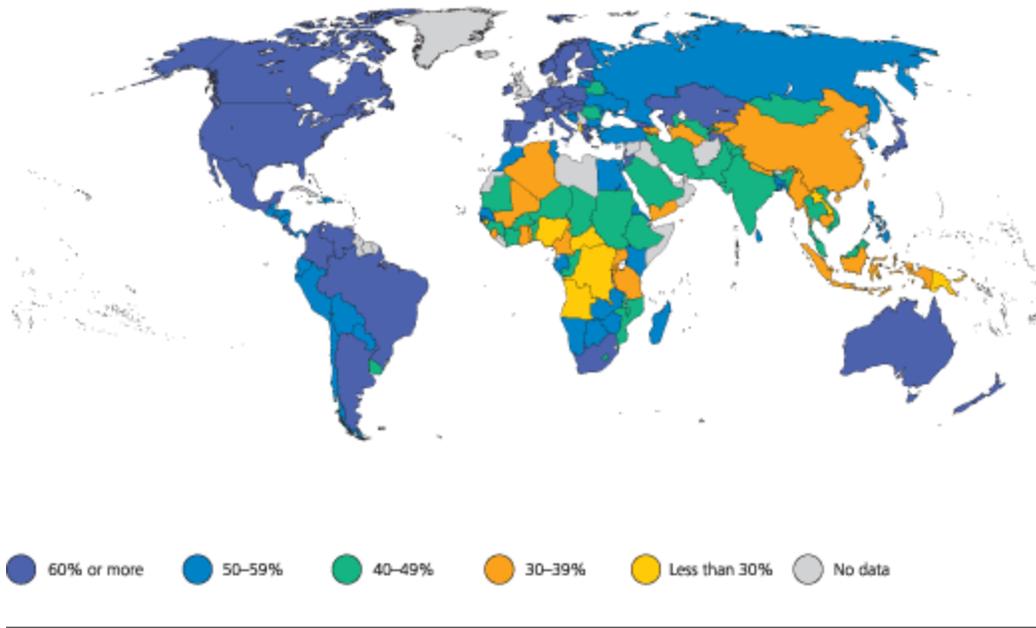
Postindustrialization. As incomes continue to rise, people’s needs become less “material” and they begin to demand more services—in health, education, information, entertainment, tourism, and many other areas. Meanwhile, labor productivity in services does not grow as fast as it does in agriculture and industry because most service jobs cannot be filled by machines. This makes services more expensive relative to agricultural and industrial goods, further increasing their share of GDP. Lower mechanization of services also explains why employment in the service sector continues to grow while employment in industry and agriculture declines because of technological progress that increases labor productivity and eliminates jobs (see Figure 9.2). Eventually, the service sector replaces the industrial sector as the leading sector of the economy.



Most high-income and middle-income countries today are postindustrializing—becoming less reliant on industry—while many low-income countries are still industrializing—becoming more reliant on industry (see Figure 9.3 and Map 9.1). But even in countries still industrializing, the service sector is growing relative to the economy taken as a whole. By the end of the 1990s services made up almost two-thirds of world GDP (see Data Table 3), whereas they had only been about half of world GDP in the early 1980s.



Map 9.1 The share of services in GDP, 1999



Knowledge Revolution

The fastest-growing part of the service sector consists of knowledge- and information-related services such as education, research and development (R&D), modern communications (telephones and Internet), and business services. This is the result of the so-called knowledge revolution that started in the second half of the 20th century--a radical speeding up of scientific advances and their economic applications in the form of new technologies as well as new consumer products. Technological innovation rather than investment per se became the main source of increased productivity, the major tool of economic competition in the world market, and the most important driver of economic growth (see Table 9.1). So developing countries striving to improve their economic prospects today should aim at investing not only in their physical capital (see Chapter 6), but also directly in their “knowledge base”-- in their capacity to create, absorb, adapt, disseminate, and use new knowledge for their economic and social development.

Table 9.1. Stages of Economic Development

Characteristics	Stages		
	Preindustrial, agrarian	Industrial	Postindustrial, knowledge-based
Leading economic sector	Agriculture	Industry	Services
Nature of dominant technologies	Labor- and natural resource-intensive	Capital-intensive	Knowledge-intensive
Major type of	Food and hand-	Industrial goods	Information and

consumer products	made clothes		knowledge services
Nature of most production processes	Human-nature interaction	Human-machine interaction	Human-human interaction
Major factor of economic wealth/growth	Nature's productivity (soil fertility, climate, biological resources)	Labor productivity	Innovation/intellectual productivity

However, the majority of developing countries face considerable difficulties in joining the global knowledge revolution because of the wide knowledge, education, and information and communication technology (ICT) gaps dividing them from the most knowledge-based economies of the world. Consider the fact that about 85 percent of global R&D expenditure is concentrated in high-income countries. Clearly, this is where most new knowledge is created. Moreover, developing countries' capacity to tap the internationally available flows of knowledge and adapt them for their specific needs is impeded by the relatively small number of scientists and engineers working in these countries (see Data Table 3) and the relatively low level of their populations' education. Consider that the average number of years of schooling received by adults in low- and middle-income countries is only about 5.5 years, compared with 10 years in high-income countries. Add to that the so-called *digital divide*—the fact that about 80 percent of the world's personal computers and almost 90 percent of its Internet users are also found in high-income countries (see Data Table 3). And you will understand that although the global knowledge revolution has the potential to solve many development problems, it is also fraught with the danger of dramatically aggravating global inequality.

In the interests of sustainable global development, the international community should help developing countries bridge the widest knowledge and information gaps by increasing official development aid and private capital flows (see Chapter 13) as well as by directly facilitating the transfer of modern technologies from developed countries, including technologies for improved agricultural productivity (see Chapter 6), education (Chapter 7), control of infectious diseases (Chapter 8), and environmental protection (Chapter 10 and Chapter 14).

Implications for development sustainability

The service sector produces “intangible” goods, some traditional—government, health, education—and some quite new, central for transition to a knowledge economy—modern communication, information, and business services. Producing services tends to require relatively less natural capital and more human capital than producing agricultural or industrial goods. As a result, demand is growing for more educated workers, prompting countries to invest more in education—an overall benefit to their people. Another benefit of the growing service sector is that by using fewer natural resources than other sectors, it puts less pressure on the local, regional, and global environment.²

Conserving natural capital and building up human capital may help national and global development become more environmentally and socially sustainable. But growth of the service

sector will not be a miracle solution to the problem of sustainability, since agricultural and industrial growth are still going to be necessary to meet the material needs of the fast-growing population of developing countries and the consumption preferences of the relatively affluent population of developed countries (such as personal cars or fashion-driven remodeling). There is an ongoing discussion about what part of today's developed countries' consumption should be seen as *overconsumption*, as meeting people's competitive wants rather than their real needs. For example, is air-conditioning a need or just a want? Do people really need so many cars or could they benefit from better-developed public transport in combination with cleaner urban air? Should rich countries attempt to limit their consumption so as to enable increased consumption in poor countries? Or should they at least try to modify the composition of their growing consumption so as to minimize its unsustainable environmental and social impacts? Anyway, there are reasons to believe that if people's needs (and wants) across the world are met by making greater use of knowledge--embodied in better-educated workers and more productive, more socially and environmentally appropriate technologies--rather than by using more of the same kinds of machines, equipment, and processes, the damage to the natural environment and the potential for social conflict can be lessened.

¹ Agriculture here refers to crop cultivation, livestock production, forestry, fishing, and hunting. Industry includes manufacturing, mining, construction, electricity, water, and gas. Services cover all other economic activities, including trade, transport, and communications; government, financial, and business services; and personal, social, and community services.

² Note that the pressure put by high-income countries on the global environment is in fact much heavier than might be suggested by the postindustrial-appearing structure of their economies. This is because in today's globalized world many natural resources extracted and industrial products manufactured in developing countries are actually consumed by the "golden billion" of people living in rich countries.