

Text 2

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INTRODUCTION

The international economy played a major role in promoting the spread of economic growth in the nineteenth century. The flows of trade, capital and labour, which linked countries together economically, not only provided the means whereby the benefits of economic growth, in the form of higher real incomes, could be transmitted from country to country, but they were also the mechanism through which the technological and social innovations that are the essence of modern economic growth could be diffused. As a result, the economic growth of most countries came to depend as much on their ability to take advantage of the opportunities for trade and for the acquisition of new knowledge and additional factors of production presented by the international economy as on the quantity and quality of the economic resources domestically available to them. It is for this reason that any discussion of the nineteenth century international economy must include an examination of its function as a potential 'engine of growth'.

Obviously, the international diffusion of modern technology and the stimulation of economic growth through an expansion of foreign trade are economic processes that are not independent of each other, if only because export-led growth implies some measure of technological and social change. Nevertheless, it does simplify our discussion of the international economy as a mechanism for transmitting economic growth and technical change between countries in the nineteenth century if we treat the two processes separately. Separate treatment is further justified by the fact that the spread of industrialization throughout Europe and North America, and the export-led growth characteristic of primary producing countries, represented significantly different responses to the economic opportunities presented by the emergence of an international economy in the century or so before the First World War.

The nineteenth century world economy is best viewed as being composed of a centre and a periphery, with growth at the centre building up economic pressures tending to diffuse the development process to the periphery. Initially, Britain stood at the centre of this growth process, but as the century progressed, continental Europe, and in particular Northwest Europe, came to play a larger part in fostering the spread of economic development overseas. Britain's central role in the world economy during these years rested on a technological revolution that had begun in the second

half of the eighteenth century with the Industrial Revolution, and continued between 1820 and 1880 to transform a predominantly agrarian economy into the world's first industrial nation. But imitators were not lacking and, partly through a flow of capital and skilled labour from Britain, the new industrial technology spread first to continental Europe and then to the US, so that by the 1870s, when Britain's rate of industrial growth began to slow down, these other countries began to play their part in the process of transmitting growth to the less developed regions of the world.¹

The peripheral regions were incorporated in this international growth process through a steady and persistent increase in the demand for primary products, which many of these areas were well able to produce. Industrialization in Britain soon exposed her limited range of natural resources and her growing inability to feed a rapidly growing population. Increasingly, Britain was forced to rely on other countries to supply her mounting needs for foodstuffs and industrial raw materials. To a lesser extent the other industrializing countries of Europe also came to depend on overseas sources of supply of primary products. The growing pressure of industrial demand on the centre's natural resources and supplies of foodstuffs and raw materials, and the resulting tendency towards rising prices, prompted a search for cheaper supplies in the periphery and an outflow of capital and skilled labour to develop peripheral sources of supply. In this way, a cumulative process of growth was initiated in a number of countries overseas by the relation between the export demand for primary products and the inflow of foreign capital and labour that was associated with the expansion of the export sector. Particularly favoured by these developments were the US and, later, the regions of recent settlement, including Canada, Argentina, Uruguay, South Africa, Australia and New Zealand, each of which, at different times and to varying degrees, came to depend on growth through primary product exports and the inflows of foreign capital and labour associated with it. At the other end of the spectrum were those peripheral countries which remained largely unaffected by these revolutionary changes, or those which became 'enclave economies', that is, countries in which foreign demand and the new technology served to revolutionize the export sector while leaving the rest of the economy virtually unchanged.

The failure of the expansion and modernization of the export sector of the enclave economy to spark off growth in the rest of the economy is only one of the problems arising out of the international record of economic growth in the nineteenth century. There are many others. Why, for example, did economic growth spread to only a limited proportion of the total world population? What accounts for the slow spread of industrialization? For even in Europe and the US, rapid industrialization occurred only after 1870, more than a century after the new technology had emerged in Britain. More pertinent to the present discussion is the question of whether these 'failures' in the diffusion of economic growth reflected weaknesses in the functioning of the international economy or whether they were the result of

¹ But, as Rondo Cameron has stressed, 'It is necessary ... to distinguish between the mere diffusion of technology and the distinctive pattern of industrialization that occurred on the continent as a result of this diffusion'. ('A New View of European Industrialization', *Economic History Review* (Feb., 1985), p. 10). Cameron goes on to argue (pp. 22f.) that, besides the British model of industrialization, there were several others in which such factors as the availability of coal and the needed human resources formed two basic ingredients, with international investment and financial institutions performing subordinate roles.

the existence of other obstacles to the spread of economic development. These questions, and many others like them, are the subject of a continuing and lively debate, for they are matters of enormous importance to the study of the economic problem of under-development, and to cover adequately the issues they raise would require another and much longer book than this. All that is possible here is for us to offer a few general observations on these issues so that the broad nature of the problems they raise and their relevance to the functioning of the international economy are more easily appreciated.

THE SPREAD OF INDUSTRIALIZATION

It is a matter of general observation that the diffusion of technology is closely related to the problem of mobility – of goods, people, ideas and behaviour. It is also apparent from what has been said so far in this book, that mobility in this sense was greatly enhanced during the nineteenth century by innovations in transportation and communications and in the field of international finance, which greatly facilitated the large-scale movement of goods, men and capital between countries. These flows of economic resources were, in turn, important channels for the diffusion of the new industrial technology, since physical capital embodied it, immigrant artisans and entrepreneurs possessed the required technical skills, and imported goods provided opportunities for adaptive imitation.

Given the opportunity for adopting new methods of production presented by the international economy, the spread of technical innovation also required an economic incentive. Probably the most effective stimulus to innovation is the market to be supplied: both its size and the rate at which it is growing. A large and rapidly expanding market creates an environment that is highly conducive to technological advance and to all forms of innovation, including the adoption and adaptation of foreign techniques.

THE CONTRIBUTION OF THE INTERNATIONAL ECONOMY

The emerging international economy was itself an important form of market expansion in the nineteenth century. Without legal barriers and potential problems created by exchange rate uncertainty – which, as we have seen, were minimal in the late nineteenth century – foreign trade is in principle simply an extension of domestic trade; and expanding opportunities for the international exchange of commodities did encourage the spread of industrialization. In Britain, industrialization was initially based on a rapidly expanding export of cotton textiles, and later it came to depend increasingly on exports of iron manufactures and coal. In the US before 1860, raw cotton exports played a part in supporting early industrial development in the country; and industrialization in Germany late in the nineteenth century was also closely tied up with an expansion of manufactured exports. Even in Russia and Japan, where governments created domestic markets for industrial goods through their own demands for military and railway equipment, the ability to develop an export trade, in wheat for Russia and in cotton textiles for Japan, was necessary to provide the foreign exchange needed to service the inflow of foreign capital or to purchase the foreign machinery essential to industrialization. Whether the demand for industrial goods was satisfied directly through an expansion of manufactured

exports, or whether it was created indirectly through the growth of primary products exports leading to a rise in domestic real incomes, expanding foreign markets created an environment highly favourable to technological diffusion.

The growth of markets, both at home and abroad, is closely related to improvements in transportation, since poor transport facilities automatically restrict the size of the market thus limiting the scope for the use of modern technology. For this reason, good transport is perhaps the most powerful single means for accelerating the importation of modern industrial techniques. In this respect, foreign investment was often of vital significance, since much of it in the nineteenth century went into railway building on the Continent and in North and South America and Australasia. Some of this capital also went into the development of shipping lines, the construction of docks and harbours, improvements in communications and the provision of other ancillary services necessary for an expanding foreign trade.

The size of the domestic markets of some countries was also increased by immigration, which allowed population to grow faster than it would have done if dependent only on natural increase. Moreover, where the immigrant population could be used in combination with unexploited or unused economic resources, per capita real incomes often rose (thus further increasing market size) because a larger workforce permitted greater specialization and the use of more productive techniques. Furthermore, as in the US and elsewhere, part of the immigrant workforce could be utilized in constructing the transport network so important for the growth and exploitation of domestic and foreign markets.

Finally, for a number of countries within Europe the movement towards larger domestic markets was aided by the gradual reduction of internal barriers to trade by such trade liberalizing measures as the freeing of the Rhine to all shipping, and by the setting up of customs unions, such as the German Zollverein. At the same time the spread of free-trade policies after 1850 provided most countries with expanding opportunities for the international exchange of goods and services. Later in the nineteenth century, however, the widespread adoption of protectionist policies, while reducing the size of foreign markets, encouraged industrialization in some countries by preserving the domestic market for local producers.

On the supply side, a country's rate of capital accumulation is obviously a major determinant of its capacity to absorb new ideas and new methods of production. Where, for example, technical change is embodied in capital equipment, a country's rate of capital investment is all-important, since, in general, the more investment the greater the degree of technological progress. Capital shortage therefore may hinder technological diffusion in a number of ways. For example, it will place limits on a country's stock of social overhead capital, especially transport facilities, with all that that implies for the growth of the market. The need for relatively abundant supplies of capital is also stressed, where innovations in techniques cannot be made singly but require simultaneous development in a number of industries. Moreover, the fact that techniques can rarely be borrowed without adaptation further adds to the capital cost of introducing the new methods of production. Finally, the fact that industrialization in the nineteenth century was accompanied by population growth and urban development meant that there were heavy demands on capital in the form of

housing, public utilities and the additional tools and machines needed to equip an expanding workforce. While, in most countries, the bulk of their capital needs were satisfied out of domestic savings, the availability of foreign funds to finance the construction of social overhead capital – especially transport facilities, communications and public utilities (the demand for which was particularly heavy in the new countries overseas) – meant that domestic savings could be used largely to finance the growth of primary production and manufacturing industry in borrowing countries without this expansion being threatened by inadequate transport or the lack of other ancillary services.

For many countries foreign trade and immigration flows also partly overcame the obstacles to industrialization caused by lack of natural resources, skilled labour and enterprise. In so far as the adoption of modern industrial techniques is dependent on natural resources, geographical location or some other unequally distributed endowment, growth opportunities are not likely to be equally available to all countries. Limited natural resources were probably an important factor restricting industrialization in many of the smaller countries of Europe. French economic development, it has been argued, suffered from a shortage of coal. But, whatever the relevance of scarcity of natural resources as an obstacle to technological diffusion, it must have become less important with time, as progress during the nineteenth century began to make alternative processes possible, or to make imported resources effective substitutes for inefficient, highly-priced domestic supplies. Moreover, if the raw materials necessary for industrial development could be imported from abroad, so too could the necessary skills and organizational ability. Historically, the trader from abroad and the immigrant artisan have long been the main channel for the importation of foreign techniques; where the nineteenth century differed from earlier times was in the scale on which these movements of labour occurred and in the wider range of skills that people carried with them when they moved from country to country.

International Transfer Mechanisms

What prompted the greater part of the flow of labour, capital and trade between countries were differences in the relative prices of these resources in different countries. In the case of both labour and capital, non-economic considerations exerted some influence on their movement internationally, but for the most part it was differences in wage rates and the rates of return on investment that prompted the flow of factors of production from regions where earnings were low to those where they were higher. With commodity trade, too, the exchange was prompted by differences in the relative prices of the goods traded, which reflected in turn differences in the costs of production in the various countries engaged in foreign trade. In so far as the flows of goods, capital and labour took place in response to differential economic advantages of this kind, they acted as spontaneous or 'natural' carriers of modern technology and ideas. On the other hand, specific and direct attempts were often made by governments and other interested bodies to transfer technologies internationally. In addition to sending students abroad to study the new techniques, governments also encouraged the inflow of foreign skills and capital through the use of subventions to immigrant entrepreneurs and guarantees of dividends on foreign loans. Implicit in such policies was the

assumption that the diffusion of the new knowledge, either nationally or internationally, was likely to be slow in the absence of conscious efforts to encourage technological change.²

CAUSES OF THE LIMITED SPREAD OF INDUSTRIALIZATION

International

Despite the existence of these natural carriers of technology on a scale previously unmatched in history, and despite the efforts made by some governments to reinforce the market influences determining the volume and direction of these trade and factor flows, the rate at which the new technology diffused was slow, and the spread of modern industry limited. Thus, by 1913 the spread of industrialization was limited largely to Western Europe, North America and Japan. While questions concerning the slow spread of industrialization in the period up to 1913 can be answered only by a more detailed analysis of the problem than can be attempted here, the question is whether the slow rate of diffusion of modern industrial growth across borders reflected weaknesses in the functioning of the international economy as a mechanism for transmitting growth between countries, or whether it was largely the result of the existence of other obstacles to the spread of modern technology. Unfortunately we are still far from fully understanding the detailed working of the international economy as a potential 'engine of growth' in the nineteenth century, and much research remains to be done to fill the gaps in our knowledge. We are, for example, still limited in our knowledge concerning the extent to which the economic growth of individual countries was dependent on the existence of the international economy, or how a country's dependence on the international economy may have changed over time, answers to which are obviously needed if we are to be able to weigh the relative importance of domestic and international obstacles to the spread of industrialization. Because of our lack of knowledge in these matters, comment on the problem just raised is necessarily limited, but nevertheless a few general observations on it can be offered.

To begin with, if the diffusion of modern industrial technology was limited before 1913, it was partly because the supply of capital and labour available for international transfer was limited, and because not all of the countries desiring to import these productive resources were equally well placed to attract them. For a number of reasons North America, and especially the US, was particularly attractive for foreign investors and migrant labour; and Western Europe, because of its compactness and its proximity to Britain, the seat of the Industrial Revolution, was also conveniently placed to take advantage of the new technology. The fact that these two regions received the lion's share of the economic resources that did shift internationally during these years meant simply that there were fewer of these resources available for other capital and labour importing countries, and their prospects for industrial development suffered correspondingly.

² These two methods of transmitting technical knowledge enable us to draw a distinction between technological diffusion, on the one hand, and technological transfer, on the other. Whereas the former term can be used to describe a natural spontaneous process of knowledge transmission, technological transfer is based on deliberate effort (see D. L. Spencer and A. Woroniak (eds.), *The Transfer of Technology to Developing Countries* (New York, 1967)). Both mechanisms played their part in the process of economic development in the nineteenth century.

Moreover, in some countries primary production continued to be more profitable than manufacturing activities, in the sense that these countries' real income could be increased more rapidly by their specializing in agricultural and mining production and exchanging their surpluses of primary products for manufactures produced elsewhere. As long as the real incomes of primary producers were sustained by the mounting demand for foodstuffs and raw materials of the industrializing regions at the centre of the international economy, the spread of industrialization to peripheral countries was limited by the economic advantages accruing to them from the growing territorial division of labour which formed the basis of the expanding international economy of the nineteenth century.³ When, however, changing demand and supply conditions in the post First World War period resulted in a downward pressure on primary product prices, which reduced the real incomes of countries supplying these commodities, industrialization programmes became a feature of many of these countries, as their governments endeavoured to diversify domestic economic activity by encouraging the production of manufactured goods previously purchased out of the export earnings of primary producers.

National

While the international economy may have functioned in such a way as to limit the spread of industrialization in the nineteenth century, for the most part the major obstacles to the diffusion of modern technology were to be found within countries rather than between them. The available evidence for this period suggests that the diffusion of modern industrial technology between countries was much faster than its diffusion within countries. Thus, Watt's steam engine, first brought out in England in 1776, was introduced into France in 1779, into Germany in 1788, and into Italy in 1816. On the other hand, within Britain the steam engine did not come into general use until after 1850. In the other European countries, however, the lag was even greater, and in Italy the steam engine was still far from widely used even in 1913. A similar situation developed in the US, where the steam engine was introduced towards the end of the eighteenth century and quickly adopted for use in river boats. But it was not widely used in American industry until after the Civil War. Another example is to be found in the spread of the idea of interchangeable parts and standardized production. Developed in the US well before 1850, and introduced into the British government's arms factory at Enfield in the 1850s, these innovations were adopted only very slowly by British manufacturers. While further evidence of disparate rates of technological diffusion between and within countries exists – for example, in the spread of new textile machinery and modern metallurgical processes during the nineteenth century – what obviously needs explanation is the cause of this disparity. In particular we need to know why exactly, with easy international movement of inventions, a country's capacity to adopt new techniques on a wide scale should be so difficult to foster or impart.

As we have already indicated, the adoption of modern technology is partly dependent on the availability of capital, natural resources, and the necessary labour skills (initially, above all else, literacy) and organizational ability. But while limited markets and shortages of productive resources could be

³ In this context, Argentina may be cited as the principal example.

partially overcome with the help of foreign trade, capital and labour, in the final analysis the available domestic supplies of capital and organizational skills were often crucial in bringing about successful industrialization. Moreover, non-economic influences, particularly social attitudes, customs, beliefs and motivation to succeed economically, are important determinants of the rate at which new techniques are diffused throughout an economy. The incompatibility of the new industrial technology with existing institutional arrangements, the reactions of merchants and businessmen to the uncertainty and risks attached to new ways of doing things, and the concern for social and political stability are only a few examples of the forces generating the social rigidities and resistance to change likely to be encountered in an industrializing society. The existence of such forces serves to remind us that technological change is a cultural, social, psychological and political process, as well as an imitation and adoption of techniques. Yet on the question of whether major structural shifts in the socio-political fabric must precede or accompany the adoption of industrial technology, the facts, such as they are, are not unambiguous. In France, for example, a very strong concern for continuity in the social and cultural sphere meant that technical change was relatively slow and that the government did not play a major role in promoting economic development. Germany, on the other hand, achieved rapid industrialization despite the fact that the old order retained much of its force. Denmark and Sweden also appear to have created expansionary economies as much by changing the direction of their economic efforts as by altering the structure of their institutions or the habits of their peoples. In South and East Europe, however, the existence of an essentially feudal system, and the rigid social stratification which accompanied it, as well as the low social value attached to industry and profit in the culture of some of these countries, constituted insurmountable barriers to the adoption of the new industrial technology, backed up as they were by deficiencies of resources, scale of markets and education. Only Russia, in this part of the continent, succeeded in industrializing to any significant extent, and then only after the resistance of the government and other conservative forces had been overcome, largely by outside events, notably the lost Russo-Japanese War of 1904-5.

Outside Europe, the spread of industrialization to the US, Canada and, to a lesser extent, the other regions of European settlement overseas was helped by a level of receptivity to the new technology that was at least as high as that in Britain and the more industrially advanced countries in Europe, with which countries they shared a common social, economic, cultural and linguistic background. These ties were also useful in fostering periodic inflows of European capital and labour, which considerably assisted the diffusion of industrial techniques within the countries concerned.

High receptivity to the new technology was not confined to European countries or their offshoots overseas however. In Asia, Japan began industrializing rapidly towards the end of the nineteenth century, and in this respect it is interesting to contrast the experiences of Japan and China before 1914 when confronted by Western technology and economic intervention. Displaying a common policy of exclusiveness and virtual absence of contracts with foreign countries, as well as a social structure and system of land ownership that acted as a barrier to industrialization, their responses to Western intervention in their affairs were totally different. Whereas Japan adopted Western industrial

techniques rapidly and succeeded in achieving economic ‘take-off’ seemingly without any major social or cultural changes, the Chinese government remained contemptuous of Western civilization and opposed to all forms of social and economic change.

Some idea of the extent of the spread of modern industrialization by 1913 is given in Table 8.1, which contains indices of output of manufactures per head of the population for a wide range of countries. These output indices are based on the average share of manufacturing output for the period 1925-9 allocated to each country and taken back to 1913 by the use of industrial production indices. The measure of industrial output for each country was then divided by its population and the result expressed as a proportion of US output per head. Given the manner of their construction the indices contained in Table 8.1 obviously should be treated as orders of magnitude, with wide margins of error.

What the table reveals is the relatively limited spread of the new industrial technology by 1913. The US, Britain and most of western Europe were relatively well industrialized by this time, as were Canada, Australia and New Zealand, whose highly productive agriculture provided, as in the other industrially advanced countries, a strong domestic demand for manufactured goods. Elsewhere, however, in East and South Europe, in much of Latin America, and in most of Asia and Africa, the process of modern industrial developments had barely begun by the outbreak of the First World War.

Table 8.1 – Index of output of manufactures per head of population, 1913

USA	100	Poland	13
		Russia	9
Europe		Yugoslavia	6
UK	90	Romania	6
Belgium	73	Greece	4
Germany	64		
Switzerland	64	Other	
Sweden	50	Canada	84
France	46	Australia	75
Denmark	46	New Zealand	66
Netherlands	44	Argentina	23
Norway	39	Chile	17
Austria	31	Japan	6
Czechoslovakia	28	Mexico	5
Finland	27	South Africa	5
Italy	20	Brazil	2
Hungary	19	India	1
Spain	15		

Source: WA. Lewis, *Growth and Fluctuations 1870-1913* (London, 1978), Table 7.1, p. 163. For a more detailed explanation of the construction of the Table, see *ibid.*, p. 313, footnote 9.

CONCLUSIONS

The spread of industrialization from Britain to continental Europe and North America was assisted by the functioning of the international economy. The flows of capital, labour and goods and services, which linked together the countries of the world, provided the channels through which modern industrial technology diffused between nations. If the extent of this technological diffusion was limited in the nineteenth century, it was partly because the stock of capital and labour available for international transfer was limited, and partly because not all of the countries desiring to import these extra productive resources were equally well placed to attract them. But what was an even greater obstacle to the spread of industrialization was the fact that many countries, even when they received inflows of foreign labour and capital, lacked absorptive capacity, the knowledge base, institutions and flexibility necessary to take advantage of the changing technological opportunities that presented themselves. It was this weakness rather than any fundamental deficiency in the functioning of the international economy as an 'engine of growth' that accounts for the limited industrialization up to 1914. To industrialize successfully, there had to be capital formation, technical change and reallocation of resources, as well as changes in social, political and cultural attitudes to economic activity. Since in most countries the forces of inertia were strong and deeply entrenched, the spread of industrialization was necessarily a slow process.