

United Nations Conference on Trade and Development

World Investment Report

2001 Promoting
Linkages

Chapter II



United Nations
New York and Geneva, 2001

CHAPTER II.

MAPPING INTERNATIONAL PRODUCTION

The preceding chapter has reviewed the setting within which international production is evolving, documented the *growth* of FDI in 2000 and examined the performance of countries in terms of the extent to which they have succeeded in attracting FDI. This chapter turns to the *spread* of FDI and, in particular, examines it at the global, regional, national and sub-national levels and also for a few industries and corporate functions. As the mapping in this chapter shows, FDI patterns are not uniform. International production is spatially concentrated.

A. Global patterns

1. FDI patterns

Comparing the world maps for inward and outward FDI in 2000 with those prevailing in 1985 shows that the number of countries receiving or investing sizeable amounts of FDI increased significantly between these two years (figures II.1 and II.2). Thus, by the end of 2000, 51 countries reported inward FDI stocks of more than \$10 billion, compared with 17 countries in 1985 (figure II.1).¹ Similarly, in terms of outward stocks, 10 countries had invested more than \$10 billion abroad in 1985; this number had risen to 33 by 2000 (figure II.2). The maps clearly show the growth in the number of countries that have become major recipients or sources of FDI. Among them, the number of developing economies had risen from 7 in 1985 to 24 in 2000 in the case of inward FDI stocks, and from zero to 12 in the case of outward stocks. Some newly industrializing economies – led by Hong Kong (China), Singapore and Taiwan Province of China – have emerged as important hosts and home economies for TNCs. As a result, the share of developing countries as a group in world outward FDI flows rose from 5 per cent at the beginning of the 1980s, to 9 per cent in 2000 (figure

II.3). For some developing economies, the share of outward FDI in gross fixed capital formation is in fact higher than (or comparable to) that share for many developed countries (figure II.4).

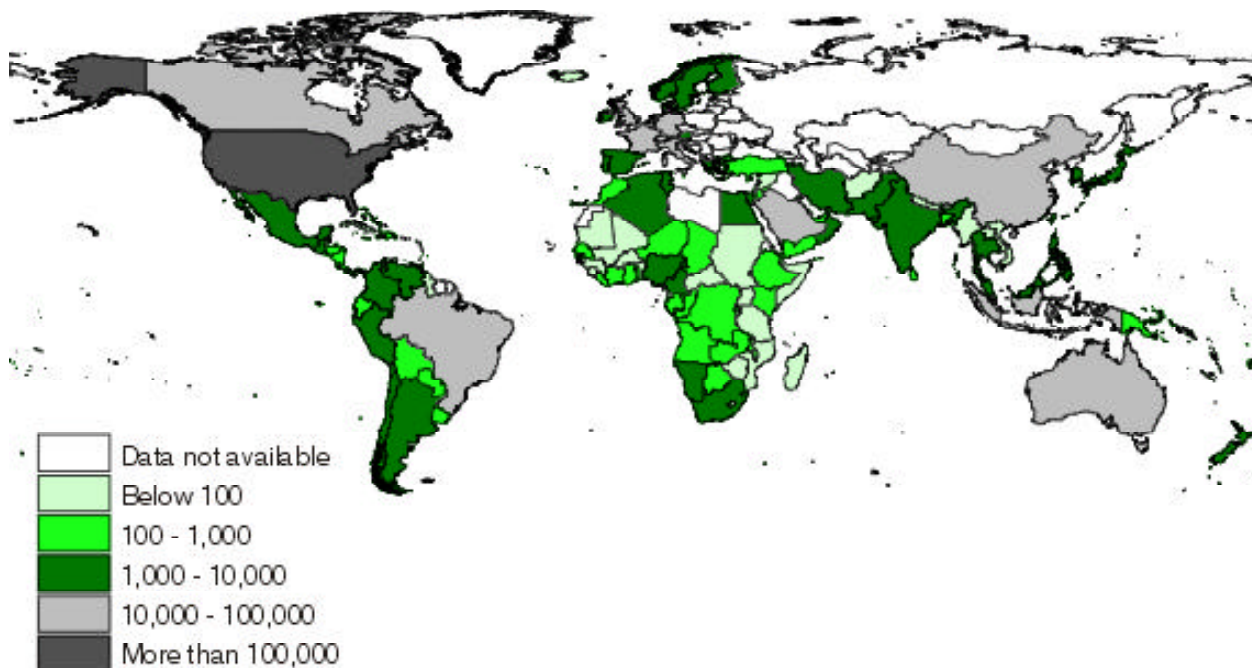
But what does the spread of FDI look like if the size of economies is subjected to adjustment? Two measures – GDP and population – can be used for such adjustment. Their use reveals different patterns (figures II.5 and II.6). In terms of FDI as a share of GDP, several developing countries are large host countries (figure II.5) – many more than those that are large in terms of absolute values of FDI. Of the 141 countries in the world hosting more than \$100 of stock per \$1,000 GDP in 1999, 106 are developing countries.² However, in terms of FDI per capita, large recipients in absolute terms such as China, Indonesia, Mexico and Venezuela appear fairly small (figure II.6).

While international production has spread more widely than ever before the share of the largest investor or recipient countries has increased or stayed constant over the past 15 years. The share of the largest ten host and home countries, for example, has risen from 70 per cent to 73 per cent for inward FDI flows over 1985-2000, and remained at 83-85 per cent in the case of outward FDI flows (table II.1). In the developing world, the share of the largest ten host economies has remained stable at 77 per cent over this period (table II.2). The level of concentration has declined marginally for FDI flows at the 30- and 50-country level. Outward FDI is more concentrated at every level – for flows as well as stocks – than inward FDI.

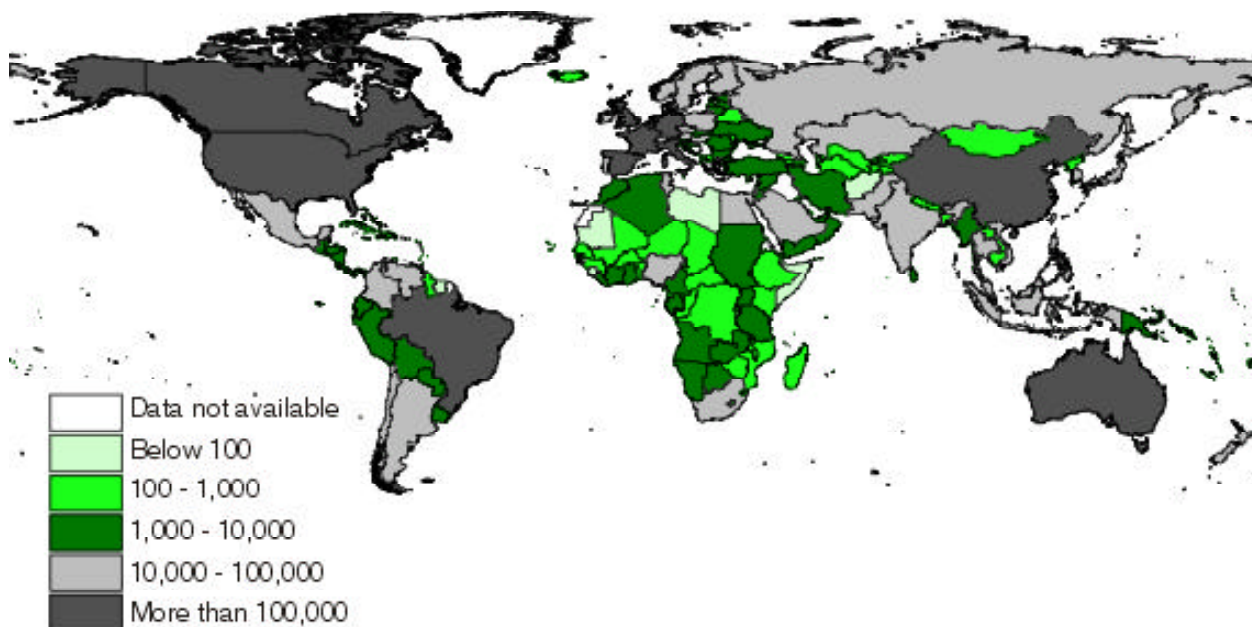
Concentration also characterizes the number of firms that are important players: even though there are over 60,000 TNCs, only a handful of them accounted, in the major home countries, for the bulk of outward FDI (table II.3). This makes it important to track the internationalization

Figure II.1. Inward FDI stock, 1985 and 2000
(Millions of dollars)

a) 1985



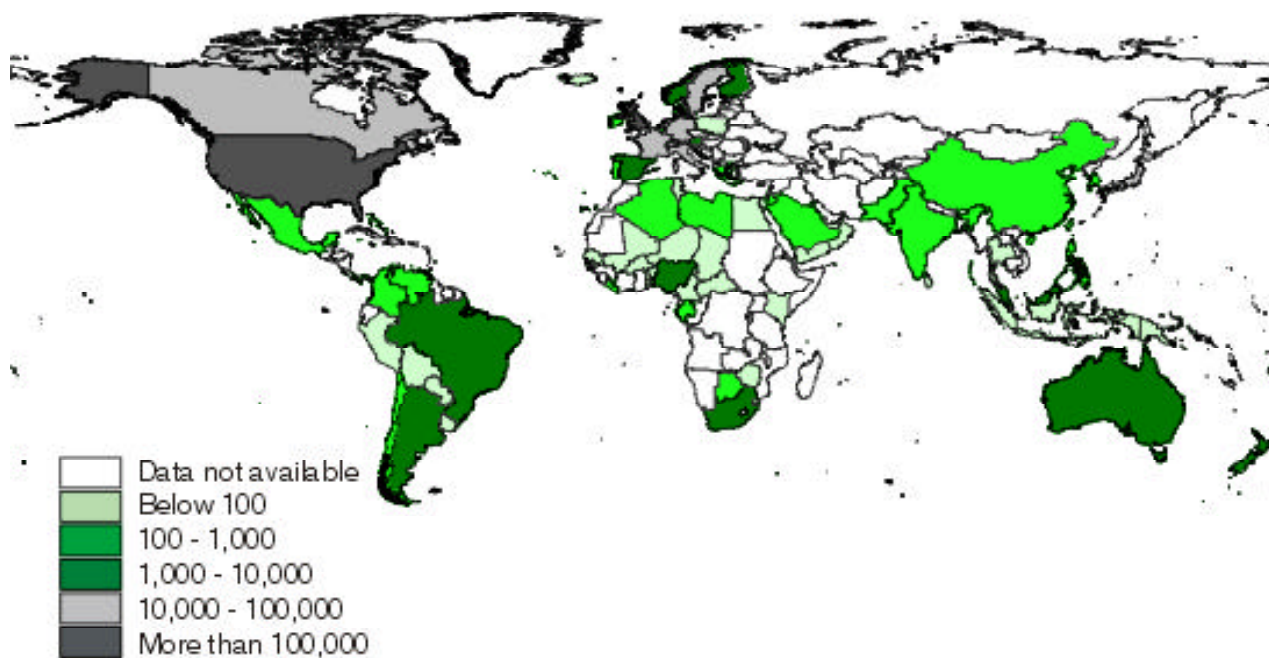
b) 2000



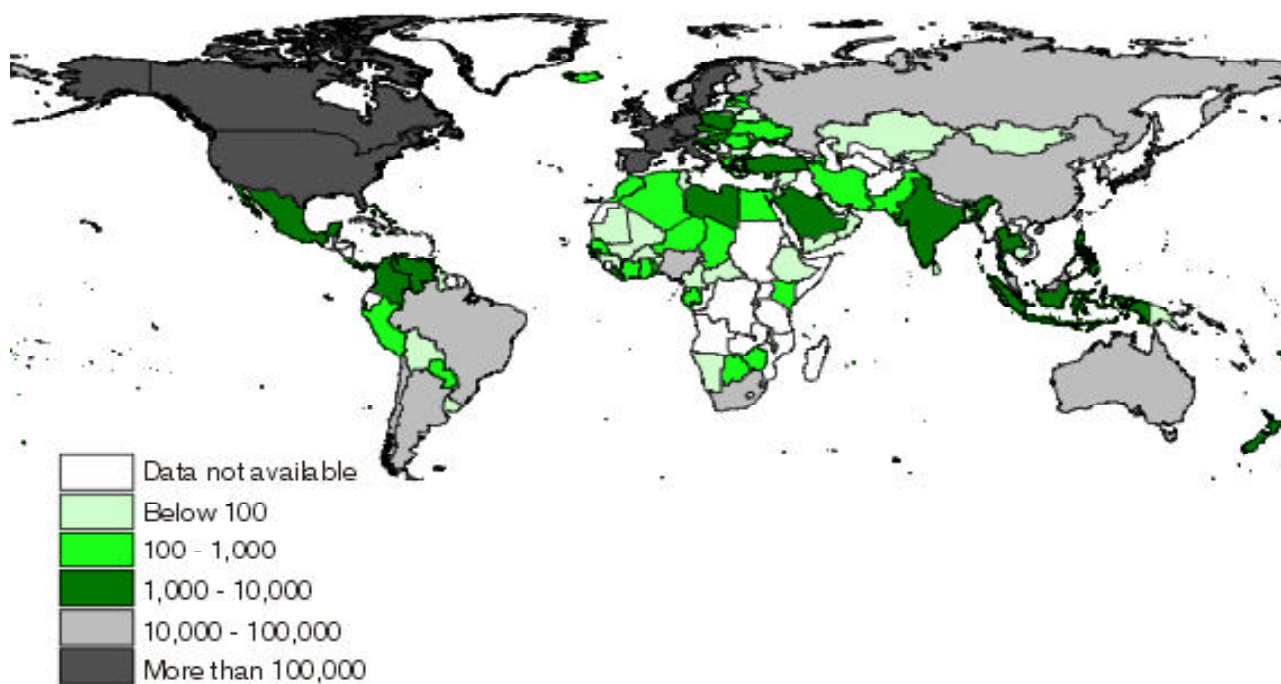
Source: UNCTAD, FDI/TNC database.

Figure II.2. Outward FDI stock, 1985 and 2000
(Millions of dollars)

a) 1985

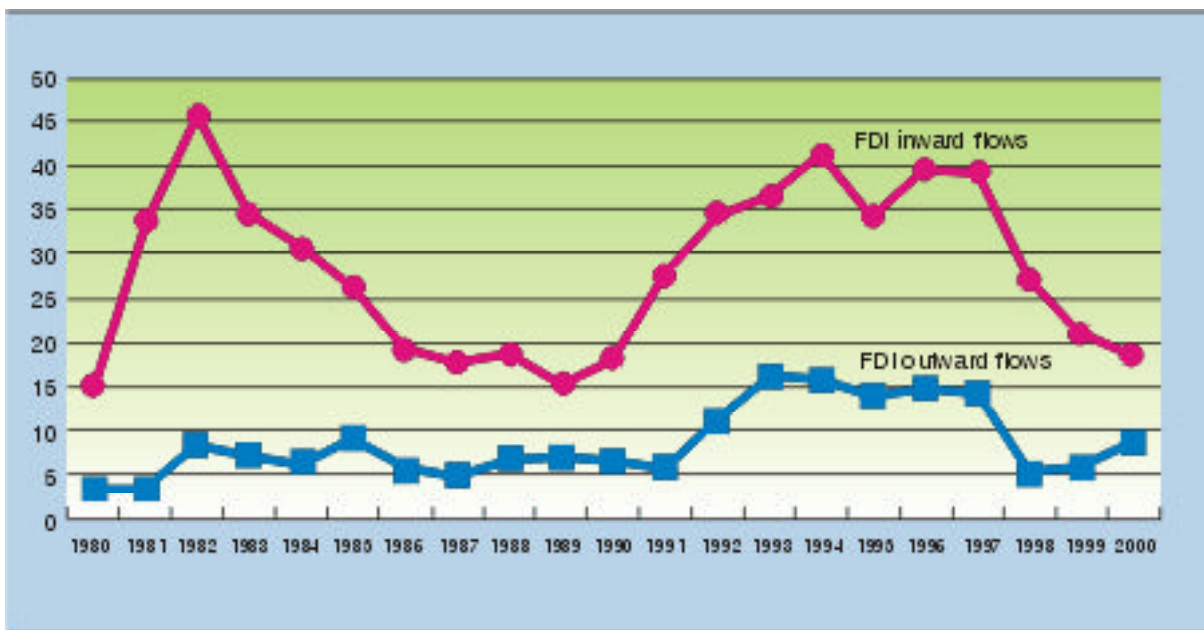


b) 2000



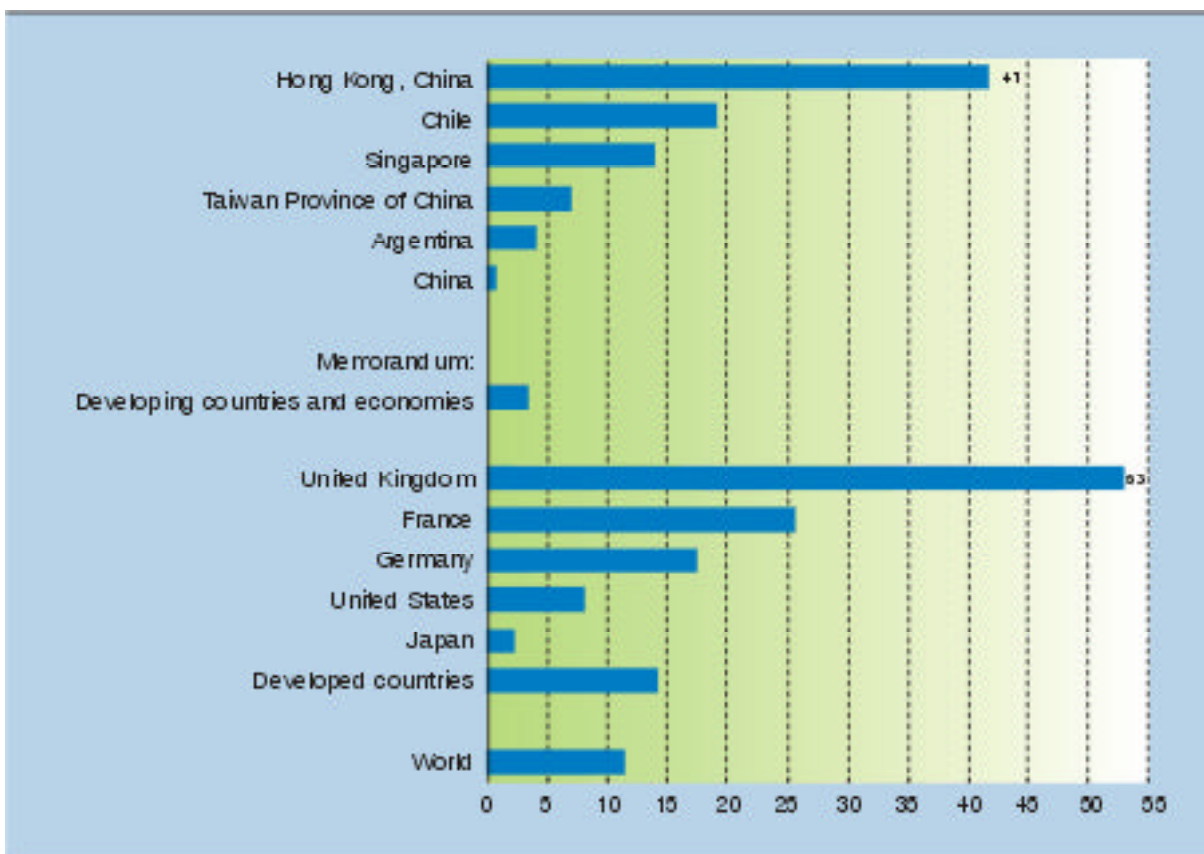
Source: UNCTAD, FDI/TNC database.

Figure II.3. Share of developing countries in world FDI flows, 1980-2000
(Percentage)



Source: UNCTAD, FDI/TNC database.

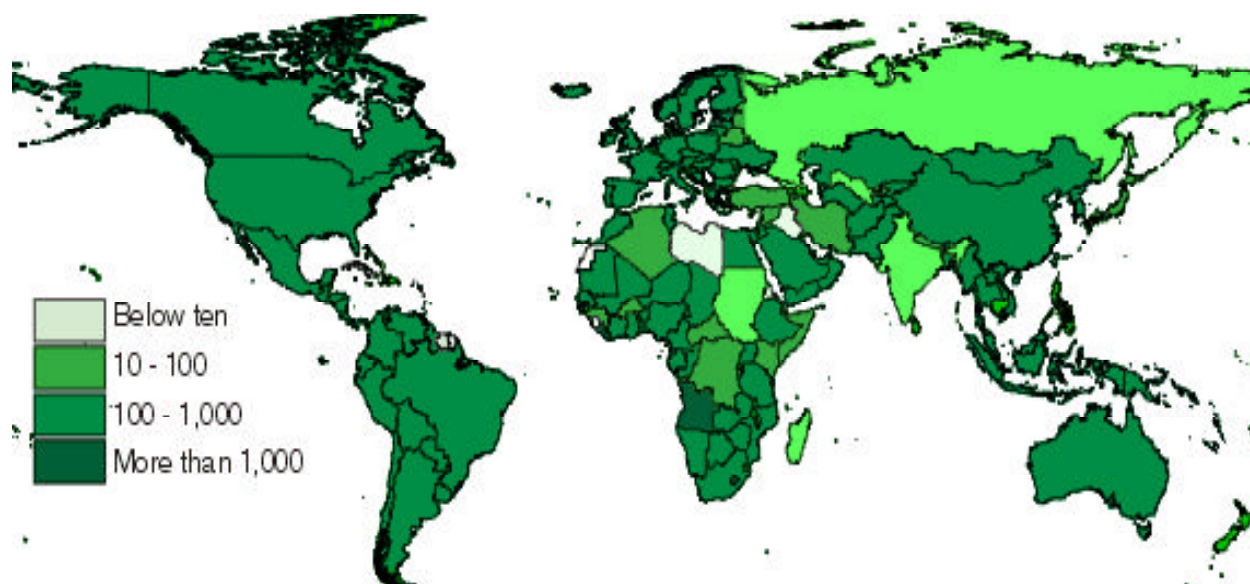
Figure II.4. Relative importance of FDI outflows from selected developing economies,^a 1997-1999
(Percentage)



Source: UNCTAD, FDI/TNC database.

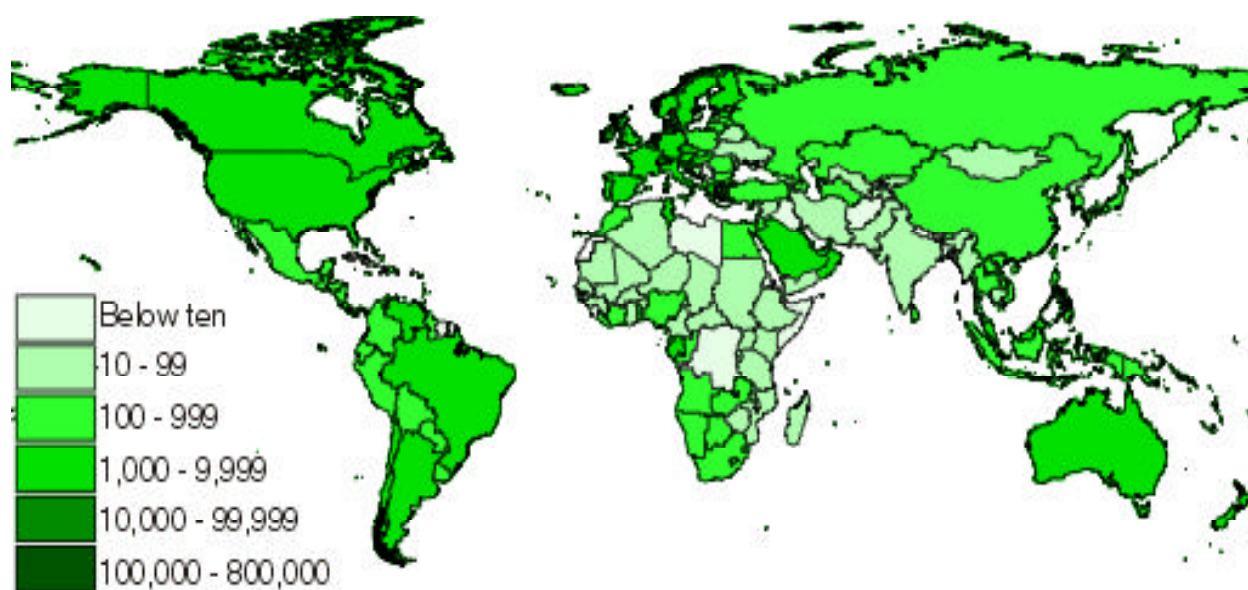
^a FDI outflows as a percentage of gross fixed capital formation.

Figure II.5. Inward FDI stock per \$1,000 GDP, 1999
(Dollars)



Source: UNCTAD, FDI/TNC database.

Figure II.6. Inward FDI stock per capita, 2000
(Dollars)



Source: UNCTAD, FDI/TNC database.

of the world's top 100 TNCs, as well as the 50 largest TNCs from developing countries and the 25 largest from Central and Eastern Europe – and this is done below in chapter III.

Table II.1. Share of the largest ten countries in world FDI flows, 1985 and 2000
(Percentage)

	1985 ^a		2000 ^b
<i>Inward FDI</i>			
United States	33.2	United States	25.1
United Kingdom	6.2	United Kingdom	9.3
Saudi Arabia	6.2	Germany	8.4
Canada	4.9	Belgium and Luxembourg	7.5
France	4.0	Netherlands	4.4
Mexico	3.4	China	4.1
Australia	3.3	France	4.0
Spain	3.2	Canada	3.6
Brazil	2.8	Hong Kong, China	3.4
Netherlands	2.8	Sweden	3.3
Top 10 total	70.0		73.1
<i>Outward FDI</i>			
United States	20.9	United Kingdom	20.1
United Kingdom	15.8	United States	14.6
Japan	10.5	France	11.8
Germany	8.9	Germany	8.6
Netherlands	7.4	Belgium and Luxembourg	8.1
Canada	6.6	Netherlands	6.0
Switzerland	4.1	Spain	4.0
France	4.0	Hong Kong, China	3.5
Italy	3.7	Canada	3.4
Sweden	3.1	Switzerland	3.3
Top 10 total	85.0		83.4

Source: UNCTAD, FDI/TNC database.

^a Average 1983-1985.

^b Average 1998-2000.

Table II.2. Share of the largest recipients of FDI flows among developing economies, 1985 and 2000
(Percentage)

Economy	1985 ^a	Economy	2000 ^b
Saudi Arabia	20.4	China	19.2
Mexico	11.3	Hong Kong, China	16.0
Brazil	9.2	Brazil	14.4
China	7.0	Argentina	6.5
Singapore	6.9	Mexico	5.6
Malaysia	5.5	Korea, Republic of	4.0
Egypt	4.7	Singapore	3.1
Bermuda	4.6	Bermuda	2.8
Hong Kong, China	4.3	Chile	2.7
Argentina	2.7	Cayman Islands	2.4
Top 10 total	76.6		76.7

Source: UNCTAD, FDI/TNC database.

^a Average 1983-1985.

^b Average 1998-2000.

The geography of international production, especially in the developed world, is substantially determined by cross-border M&As. The completed value of such transactions maintained its momentum in 2000, growing by 49 per cent to reach more than \$1.1 trillion (box II.1 and annex tables B.7-10),³ a figure that corresponds to 3.6 per cent of world GDP (figure II.7). This significant increase in M&As was the stimulus in the 18 per cent growth rate of FDI inflows in 2000. Cross-border M&As have thus become a decisive factor in determining the level as well as direction of FDI flows. Moreover, the number of mega-deals (M&As worth more than \$1 billion) increased from 114 in 1999 to 175 in 2000 (and their share in the total value increased from 68 per cent to 76 per cent (table II.4), such mega-deals can have a major impact on FDI statistics of individual countries.

M&A patterns are different from those of FDI per se. Indeed, the concentration of cross-border M&As in developed countries is higher than of FDI flows in these countries (figures II.8 and II.9). But this picture is changing too: in 2000, there were 37 developing countries that received more than \$100 million of investment through M&As; in 1987, this number was negligible. Still developed countries continue to be the major players both in terms of both sales and purchases, and developing countries are practically non-existent as large acquirers (figure II.9).

Table II.3. The share of top TNCs in outward FDI stock, selected countries, latest available year
(Percentage)

Country	Year	Top 5	Top 10	Top 15	Top 25	Top 50
Australia	1996	45.0	57.0	66.0	80.0	96.0
Austria	1998	25.0	35.0	41.0	50.0	63.0
Canada	1995	22.6	33.5	40.1	50.1	64.4
Finland	1995	33.0	47.0	56.0	69.0	84.0
France	1995	14.0	23.0	31.0	42.0	59.0
Germany	1999	20.1	29.6	36.2	44.0	55.5
Norway	1997	61.7	74.5	80.5	86.1	92.6
Sweden	1999	25.2	41.2	51.2	64.6	80.7
Switzerland	1999	32.0	47.0	56.0	67.0	81.0
United Kingdom	1999	36.0	48.7	55.8	65.3	79.0
United States	1999	13.9	22.6	28.7	37.9	52.1

Source: UNCTAD, based on information provided by governments and WIR97, p. 34.

Box II.1. Cross-border M&As in 2000

Countries with large acquisitions by or of their firms are also large home and host countries for FDI. Thus, the United States and Germany were also the first and the second largest “target” countries (annex table B.7), while the United Kingdom and France were the first and the second largest “acquiring” countries (annex table B.8). Among developed countries, Belgium is a noteworthy country in which M&A activity by both acquirers and sellers increased dramatically in 2000, as shown by a number of mega-deals involving firms located in that country (annex table A.I.4).

While the world economy has been growing at a somewhat slower pace – partly because of the performance of information technology-related industries – the growth of cross-border M&As has been led by these industries. This seemingly contradictory phenomenon is due to the fact that cross-border M&As are motivated by a combination of various factors (*WIROO*), among which the movement of the business cycle is only one. Thus, these industries (included partly under the transport, storage and communications industry and partly under the electrical and electronic equipment industry) constituted the largest target as well as acquiring sector in 2000 (annex tables B.9 and B.10). While cross-border M&As in pharmaceuticals (included in the chemical industry) more than halved in 2000 while M&A activity in automobiles remained high (annex tables B.9 and B.10). Financial firms accounted for more than 20 per cent of the total cross-border M&A sales and purchases in 2000.

Source: UNCTAD.

2. Some comparative patterns

There are interesting differences between patterns of FDI and other major macroeconomic variables at the regional level. The most obvious one emerges from comparing the inward *FDI* and *technology payments* pattern: it is entirely dominated by the developed countries which receive some 86 per cent of such payments while they account for “only” 76 per cent of the world’s FDI inflows and 68 per cent of its exports (table II.5).

Comparing *FDI* and *domestic investment* patterns⁴ reveals that the developed world and Central and Eastern Europe account for higher shares of world FDI flows than world domestic investment (table II.5). For the developing world, the picture is the reverse (table II.5). However, at least until the financial crisis in 1997–1998, developing countries had received increasing shares of world FDI compared with their shares of world domestic investment, reflecting significant increases in their international investment inflows relative to those in other countries, while domestic investment in these economies apparently kept pace with that elsewhere. Thus, the share of developing countries in world FDI stock is still somewhat higher than that in domestic investment (table II.5).

There are important differences within the developing world. The financial crisis in Asia reduced the share of South, East and South-East Asia in FDI inflows, pulling it below its share in world domestic investment. However, in terms of FDI stocks – which reflect long-term trends – the region performed better: its share in world FDI stock in 1999 was higher than its share in world domestic investment. Latin America and the Caribbean received relatively high levels of FDI in relation to its share of domestic investment in both flow and stock terms. FDI in Africa matches its (low) domestic investment rates, confirming the findings of the Inward FDI Index discussed in chapter I. In West Asia, the share of domestic investment far exceeds its share of FDI (table II.5).

The geographical patterns of *FDI* and *trade* exhibit important similarities. In particular, recent data on FDI stocks and

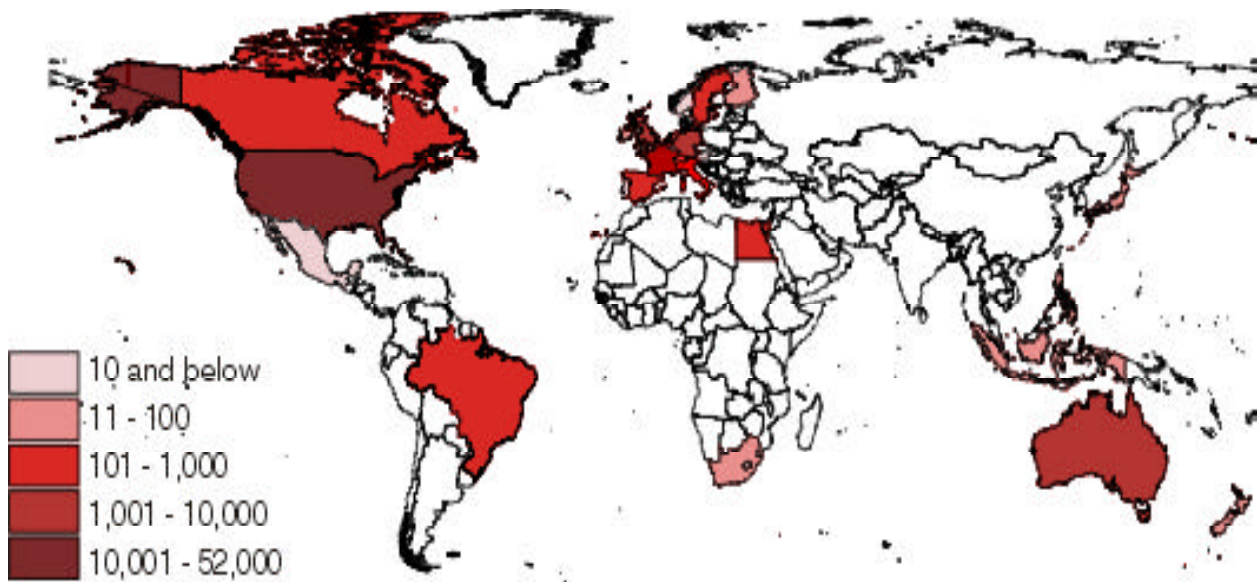
Figure II.7. Value of cross-border M&As and its share in world GDP, 1987-2000



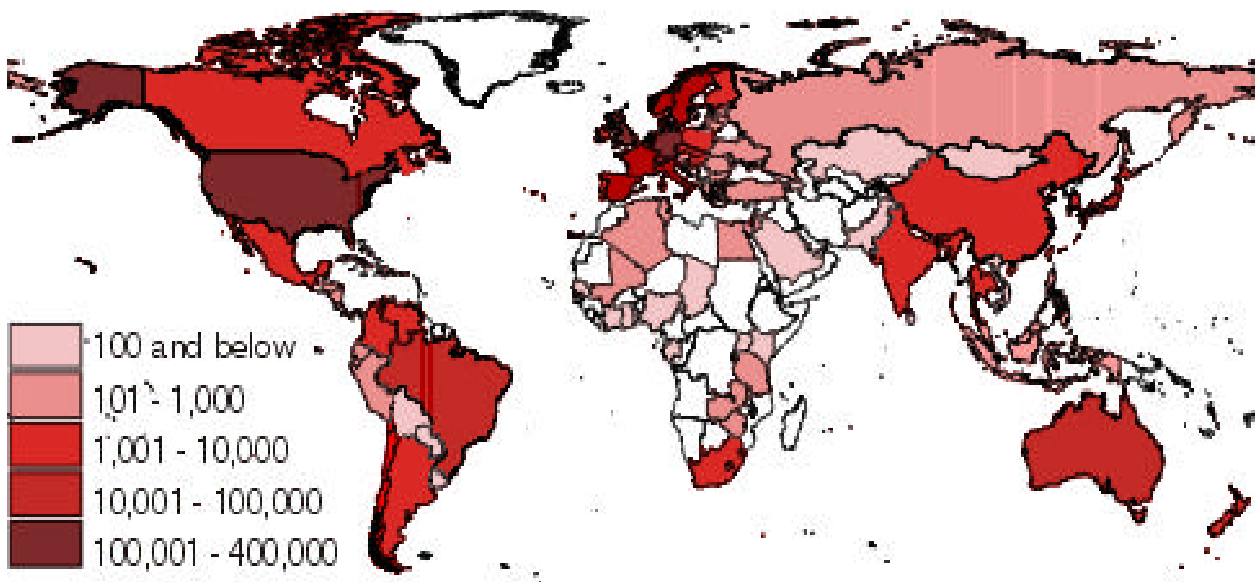
Source: UNCTAD, FDI/TNC and cross-border M&A databases.

Figure II.8. Cross-border M&A sales, 1987 and 2000
(Millions of dollars)

a) 1987



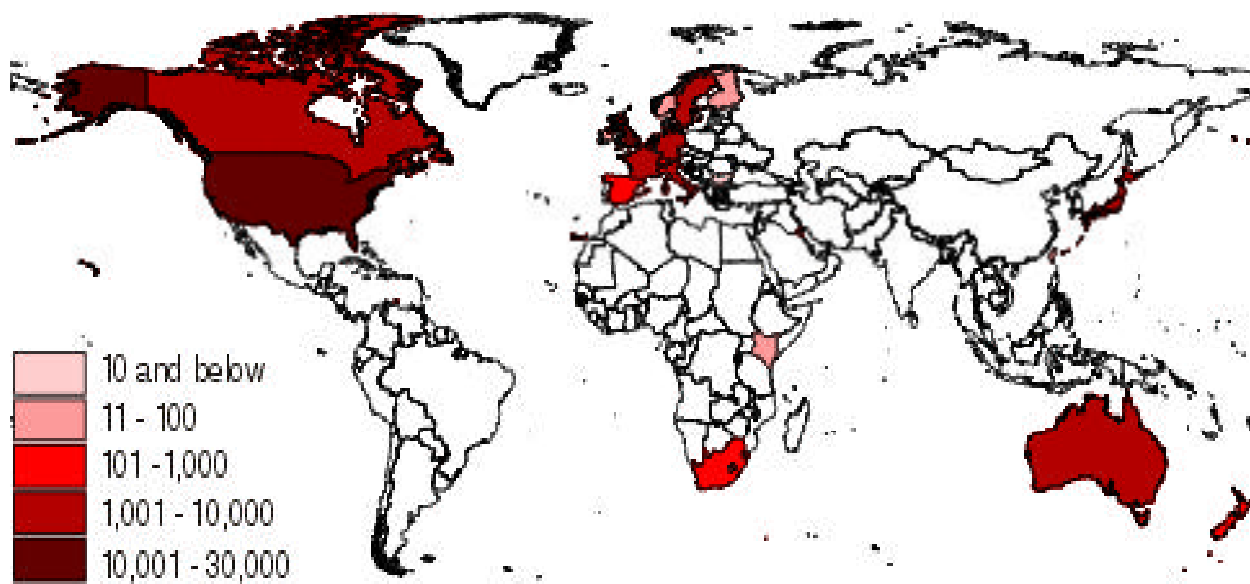
b) 2000



Source: UNCTAD, cross-border M&A database.

Figure II.9. Cross-border M&A purchases, 1987 and 2000
(Millions of dollars)

a) 1987



b) 2000

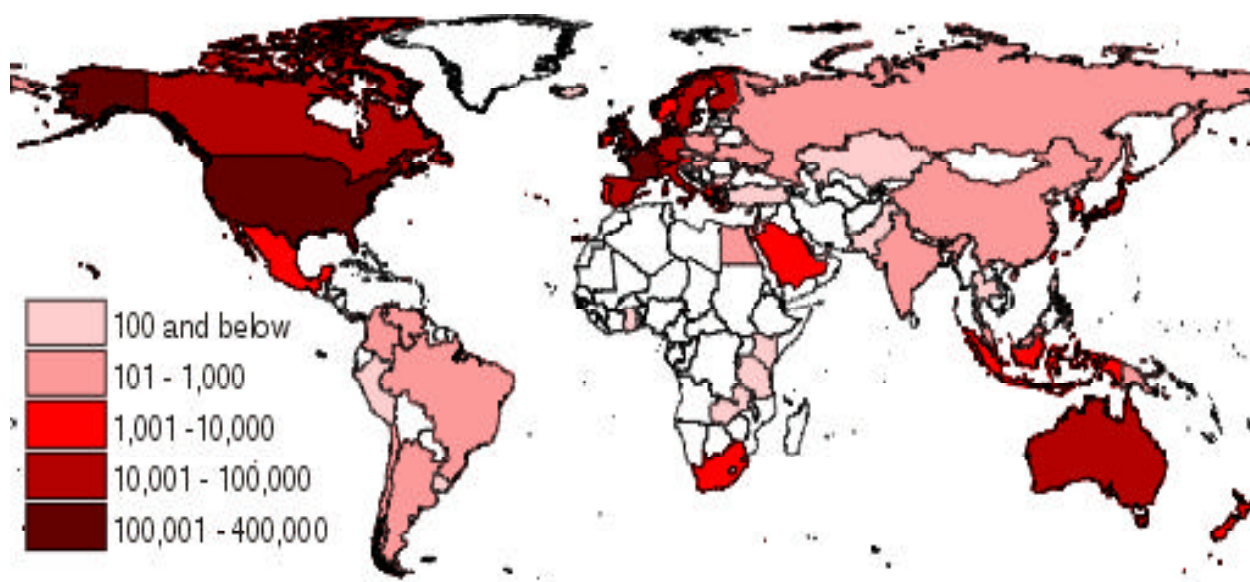


Table II.4. Cross-border M&As with values of over \$1 billion, 1987-2000

Year	Number of deals	Percentage of total	Value (billion dollars)	Percentage of total
1987	14	1.6	30.0	40.3
1988	22	1.5	49.6	42.9
1989	26	1.2	59.5	42.4
1990	33	1.3	60.9	40.4
1991	7	0.2	20.4	25.2
1992	10	0.4	21.3	26.8
1993	14	0.5	23.5	28.3
1994	24	0.7	50.9	40.1
1995	36	0.8	80.4	43.1
1996	43	0.9	94.0	41.4
1997	64	1.3	129.2	42.4
1998	86	1.5	329.7	62.0
1999	114	1.6	522.0	68.1
2000	175	2.2	866.2	75.7

Source: UNCTAD, cross-border M&A database.

exports show broadly similar patterns (table II.5), not unexpectedly since the factors affecting them overlap a great deal. Thus, advanced countries tend to both trade more and engage more in FDI than developing countries. Economic liberalization promotes both trade and FDI. Moreover, TNCs increasingly shape trade patterns, accounting for about two-thirds of world trade. About

one-third of total trade (or half of the TNC trade) is intra-firm. Thus, the direction of trade is directly affected by the location strategies and decisions of TNCs (*WIR96*).

Regional patterns of trade and FDI, however, do differ: during the middle of the 1980s (as well as at the beginning of the 1990s (Petri, 1994)), FDI outflows were more concentrated than exports. This is exemplified by the concentration ratios of trade (and FDI) by the top 10, 30 and 50 countries, as noted in chapter I (table I.4). A decade and a half later, this overall situation had not changed much (table I.3). However, *trade intensity*⁵ had declined with respect to most of the partner regions of North America and Asia during the 1990s (figure II.10). At the same time *FDI intensity*⁶ increased with respect to most of the partner regions of North America, the EU and Asia (figure II.10). The intensity of both intraregional FDI and intraregional trade has grown for the EU, but has declined somewhat for North America. Intraregional FDI has intensified significantly in Asia, but not intraregional trade. It is also noteworthy that, although North America retains strong FDI and trade links with Latin America and the Caribbean, after one decade, their

Table II.5. Geographical distribution of FDI flows, trade, domestic investment and technology payments, 1998-2000
(Annual average, percentage)

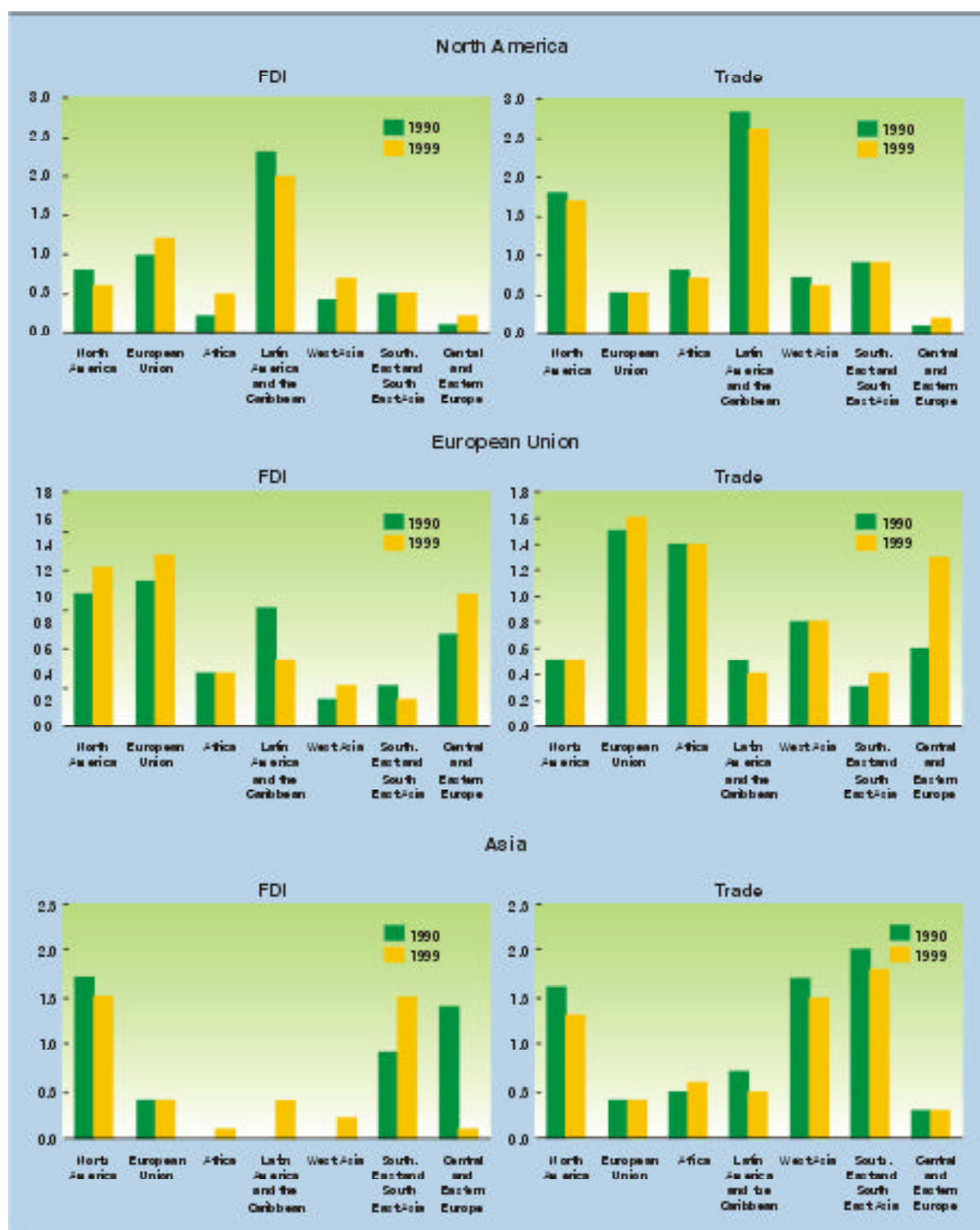
Region/country	FDI inflows	FDI outflows	Exports ^a	Imports ^a	Domestic investments ^b	Technology payments	Memorandum:	
	1998-2000		1998-1999		2000		FDI inward stock	FDI outward stock
Developed countries	76.3	92.9	68.4	69.7	74.5	85.6	66.7	87.8
Western Europe	45.8	71.5	41.8	40.4	27.9	46.0	39.6	56.7
European Union	44.3	67.9	39.4	38.2	26.5	45.7	37.6	52.1
Japan	0.8	2.8	6.3	5.5	17.1	14.2	0.9	4.7
United States	24.7	14.4	14.2	17.5	25.3	18.9	19.6	20.8
Other developed countries	5.0	4.0	6.1	6.2	4.2	6.5	6.6	5.6
Developing countries and economies	21.4	6.8	27.5	26.2	23.3	13.1	31.3	11.9
Africa	0.8	0.1	1.6	1.5	1.4	0.8	1.5	0.3
Latin America and the Caribbean	9.2	1.5	5.1	5.7	5.9	3.8	9.6	1.9
Asia and the Pacific	11.2	5.2	20.4	18.5	15.8	0.1	20.0	9.7
Asia	11.2	5.2	20.4	18.5	15.8	8.4	20.0	9.7
West Asia	0.4	-	2.9	2.8	2.6	-	1.0	0.1
Central Asia	0.3	-	0.2	0.2	0.2	-	0.3	-
South, East and South-East Asia	10.5	5.2	17.2	15.5	13.0	8.4	18.8	9.5
The Pacific	-	-	0.1	-	-	-	0.1	-
Central and Eastern Europe	2.3	0.3	4.1	4.2	2.2	1.3	2.0	0.3
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: UNCTAD, FDI/TNC database.

^a Export and import of goods and non-factor services.

^b Gross fixed capital formation.

Figure II.10. FDI and trade intensities, by region,^a 1990 and 1999



Source: UNCTAD, based on data from the United Nations Statistical Division, UNCTAD, *Handbook of Statistics 2000* and other international and national sources.

^a Calculated as follows : $q_{ab} = \frac{I_{ab}/I_a}{I^*/I^{**}}$

where q_{ab} = intensity of region a's FDI in, or trade with region b,
 I_{ab} = FDI by region a (home) in partner region b(host), or trade between region a and region b,
 I^* = World FDI stock or trade.

^b Asia as a region is composed of China, Japan, Malaysia, Pakistan, Republic of Korea, Singapore, Taiwan Province of China and Thailand.

intensity has declined somewhat. The EU has strengthened its links with Central and Eastern Europe in both FDI and trade. EU links with North America are much stronger in FDI than in trade. Overall, however, the concentration of both FDI and trade within regions and neighbouring regions (reflecting historical, cultural or political ties, as well as geographic proximity) remains a distinguishing feature. Moreover, within each region, trade links are somewhat stronger than FDI links.

Different types of FDI may affect trade patterns in different ways. Resource-seeking FDI is likely to reinforce existing export patterns of host economies where it exploits the same set of competitive advantages as local firms. It can change export patterns where it exploits different resources or changes the level of local processing. Export-oriented manufacturing FDI can, again, reinforce existing advantages (say, in low-cost labour for clothing exports), or change them by introducing technologies, skills, brand names and networks not available to local firms.⁷ Moreover, the rise of integrated international production systems provides striking examples of how FDI can alter trade patterns rapidly. Many developing countries – like Malaysia, Thailand, Philippines and Mexico – have entered areas of technology-intensive export activity previously out of their reach by attracting the labour-intensive end of high-technology TNC manufacturing. In fact, such TNC activity is the main driver of the most dynamic export growth in recent years in the developing world (Lall, 2001; UNIDO, 2001).

Domestic market-oriented FDI is, by its very nature, unlikely to affect export patterns much, at least in the short term (though it may raise import propensities where new technologies are introduced calling for inputs not available in the host economy); and, of course, it can replace imports. In the long term, however, domestic market-oriented affiliates may enter export markets once they have reaped the benefits of scale, scope and learning economies. They may also indirectly affect trade, as in the case of producer and infrastructure services affecting exports. Recent changes in trade regimes in the developing world have led

to rationalization and the upgrading of foreign affiliates, followed by the growth of new exports.⁸ In many cases, such upgrading has been outside the reach of local enterprises.

With the growing mobility of productive resources and trade liberalization, the old debate on whether FDI leads to trade or trade to FDI becomes increasingly irrelevant (*WIR96*). The real issue now is where firms choose to locate operations and how they coordinate flows of products (or services) between various locations. If they locate them at home and serve a foreign market through exports, it shows up as trade in one direction; if they locate them abroad and serve the domestic market by imports, it shows up as FDI and trade in another direction. Over time, as economies become more integrated (as within the EU), the distinction between domestic investment and FDI on the one hand and FDI and international trade on the other will become less relevant for analysis and especially for policies. The important point for policy will be which locations offer competitive conditions for economic activity.

As economies integrate, moreover, clusters of competitive activity spill over national borders. Thus, a country may have a stagnant cluster of activities in one region within its boundaries and a dynamic one that spreads over a border with a neighbour. With free factor movement, this is more and more likely as synergies develop across borders between similar activities. A quite different pattern of international cluster formation is also emerging, where countries with different factor costs form special economic zones to take advantage of these differences. The Singapore, Johor and Riau (SIJORI) “growth triangle” set up by Singapore and neighbouring provinces in Indonesia and Malaysia is an example in South-East Asia (Thant and Tang, 1996). Singapore has high wages and land costs, in contrast to its neighbours, but it is better endowed with capital, skills and contacts with international investors. Setting aside a designated area without trade, labour and investment barriers is a good way to exploit such complementarities.

B. Sub-national patterns

Economic activities have always had a tendency to cluster geographically. Firms have been attracted to sites where other firms are located to take advantage of existing external economies – markets, factors of production, specialized skills and suppliers, institutions and, especially, innovative capabilities (which were originally identified as the essence of economic clusters by Alfred Marshall, 1936). Natural clusters can be deliberately strengthened by their members to overcome common difficulties or, where the firms concerned are small, to realize scale economies. Clusters can be promoted by policies to raise locational advantages, by setting up advanced infrastructure, knowledge or skill creation facilities. While new information and communication technologies have reduced certain forces making for proximity, others continue to exist and affect location. In fact, with growing networking among firms as a means to innovate and achieve competitive advantage, the advantages of certain types of clusters have grown.

As a result, policy and research interest in clusters and industrial districts has also grown in recent years.⁹ It has been spurred by evidence on the dynamism of SMEs located in industrial districts (in the “Third Italy” as well as in many developing countries), the growth of high-technology clusters in developed countries and the use of clustering as a tool of industrial strategy. It is therefore to be expected that the location of TNCs in home and host economies reflects agglomeration forces. The following paragraphs focus on such sub-national FDI location patterns.

Home countries. The location of the headquarters of the largest TNCs indicates where global corporate power is concentrated (figure III.1). Most of the largest 100 TNCs – they account for one-third of the assets of the world’s foreign affiliates (WIR99) – are headquartered in a few countries (United States, Japan, United Kingdom, France, Germany, Switzerland). There, they congregate in a few areas. For example, among these 100 largest TNCs, 10 of the 11 largest French TNCs are

headquartered in Paris; 6 of the 7 United Kingdom TNCs in London; and the headquarters of 5 of the 18 Japanese have the same address of Chiyoda-ku, Tokyo. In fact, more than a half of the 23,000 Japanese foreign affiliates are owned by TNCs based in Tokyo (Toyo Keizai, 1998). In Austria, 45 per cent of the country’s 1,617 TNCs were based in Vienna in 1994 (ONB, 1996). Two-thirds of the headquarters of major Swedish TNCs included in a recent survey are located in Stockholm; and this share has increased over time (ISA, 1999). The geographical concentration of headquarters in certain locations is also observed for the largest TNCs based in developing countries as well as in Central and Eastern Europe (figure III.1).

The reasons for such agglomerations are not difficult to find. They relate to the economies of being close to centres of corporate, political and financial decision-making, high levels of income, access to technology and, especially, innovative activities, universities, institutions and modern infrastructure (including easy access to international air transport) and quality of life. Of course, there are also diseconomies of agglomeration as costs, congestion and social problems rise, leading to some dispersal of headquarter functions away from the major centres.

Host countries. There are similar patterns in the location of foreign affiliates. Clusters of competitive domestic firms tend to attract foreign firms to their proximity, enhancing geographical concentration and specialization. In Austria, a half of all foreign affiliates are located in Vienna (figure II.11); they accounted for 57 per cent of the capital and 51 per cent of the employees of all foreign affiliates in this country. The Tokyo metropolitan area hosts four-fifths of all foreign affiliates operating in Japan, and these accounted for some 90 per cent of total sales by all foreign affiliates (figure II.12). Ile-de-France, with 15 per cent of total FDI flows in this country in 1997, is the largest of the 22 regions of France in terms of FDI inflows (figure II.13). Three counties in Sweden – Stockholm, Västra Götaland and Skåne – accounted for over 60 per cent of employees of all foreign affiliates in Sweden in 1999 (figure II.14). In the United States, California, New York,

Figure II.11. Location of foreign affiliates in Austria, by region, 1994



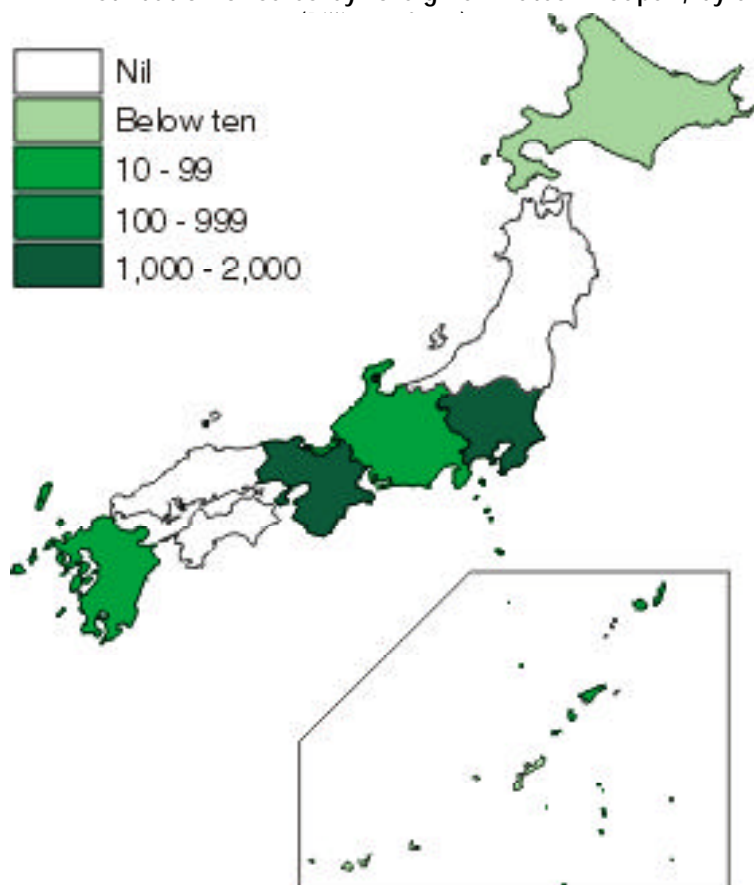
Source: UNCTAD, based on ONB, 1996.

Texas, Illinois and New Jersey are the principal magnets; these five states alone account for a half of the production of foreign affiliates (figure II.15). Similar examples can be found in other developed countries, and in developing and transition economies (box II.2).

Since clusters are clearly important for TNC location, it is necessary to analyse

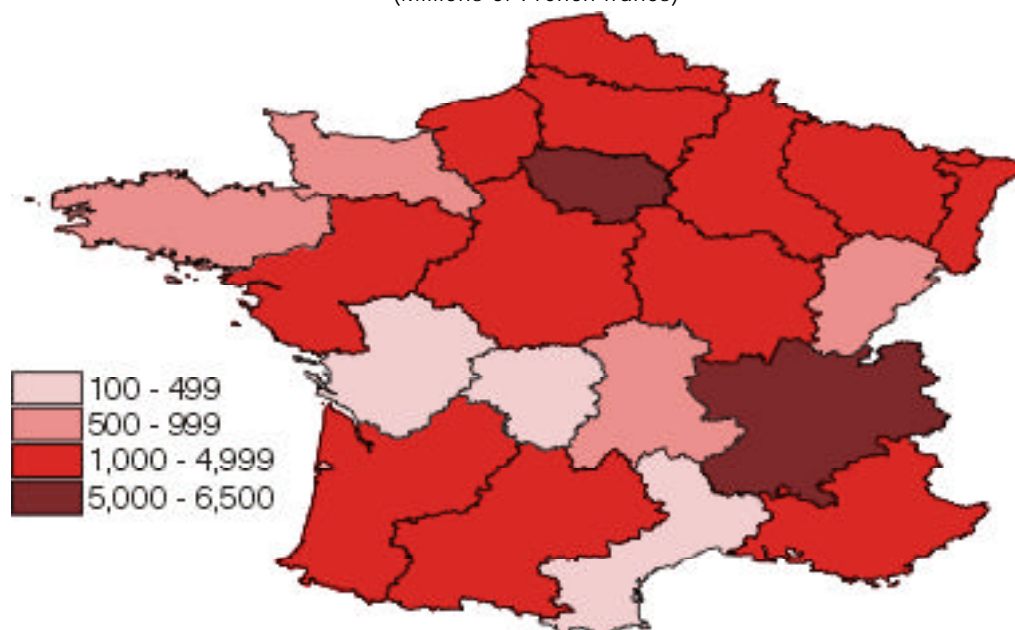
FDI at local levels to formulate relevant policies to attract it. National level factors continue to be important in certain respects, but the cluster-based drivers of investment operate at lower levels. If international investors look for agglomeration advantages when making location decisions, policy makers must fully understand this. The next section takes up these issues at greater length.

Figure II.12. Distribution of sales by foreign affiliates in Japan, by area, 1997



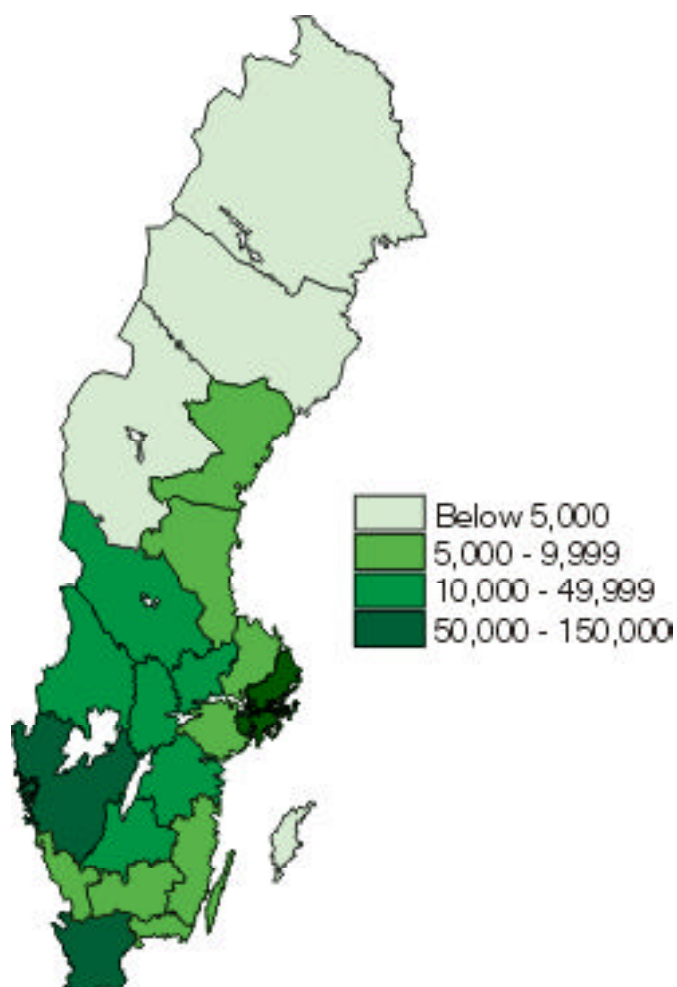
Source: UNCTAD, based on Japan, Ministry of International Trade and Industry, 2000.

Figure II.13. Distribution of FDI flows in France, by region, 1997
(Millions of French francs)



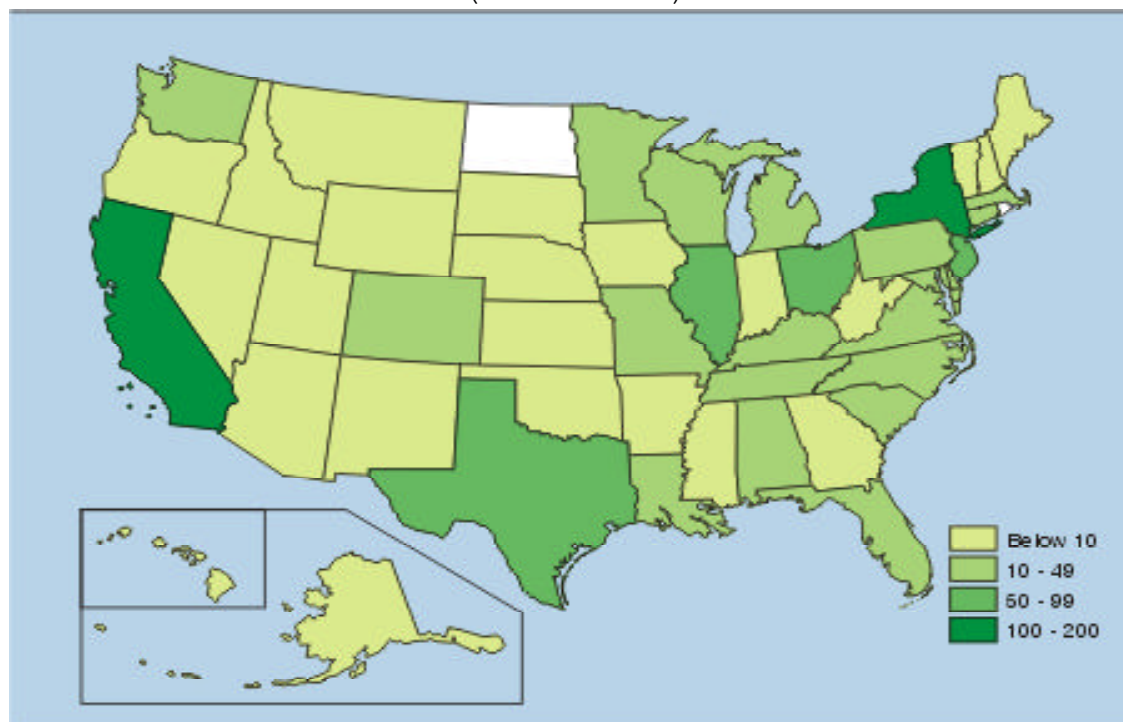
Source: UNCTAD, based on information from France, Ministère de l'Economie des Finances et de l'Industrie, 1999.

Figure II.14. Distribution of employees of foreign affiliates in Sweden, by county, 1999



Source: NUTEK, 2000.

Figure II.15. Distribution of production of foreign affiliates in the United States, by state, 1992
(Trillions of dollars)



Source: UNCTAD, based on United States, Department of Commerce, 1997.

Box II.2. Inward FDI at the sub-national level: some examples

There have been some attempts to identify the factors affecting location decisions of foreign affiliates within particular countries and to explain the uneven distribution of intra-country FDI. The focus of this research has been on developed countries, in particular the United States (Bagchi-Sen and Wheeler, 1989; Coughlin et al., 1991; Friedman, Gerlowski and Silberman, 1992; Glickman and Woodward, 1988; Head et al., 1995, 1999; Nachum, 2000; Smith and Florida, 1994; Wheeler and Mody, 1992). In the United States, foreign affiliates (compared to domestic firms) appear to favour coastal states and states with low unionization rates, low wage rates and the absence of right-to-work legislation. At the same time, however, several other characteristics of states influence the location of United States and foreign-owned establishments. These include gross state product, corporate taxes, per capita income and state budget on international activity (Shaver, 1998). Agglomeration economies (proxied by infrastructure quality, degree of industrialization and stock of existing FDI) exhibit a high degree of statistical significance and have a large and positive impact on the location of FDI (Wheeler and Mody, 1992). For a particular nationality, for example, the location decisions of Japanese TNCs in the United States were made to benefit from economies of agglomeration rather than in line with inter-state differences in endowments of natural resources, labour and infrastructure (Head et al., 1995).

Evidence on the sub-national distribution of FDI in developing countries and Central and Eastern Europe is scarce. Nevertheless, information for a few countries shows some interesting features.

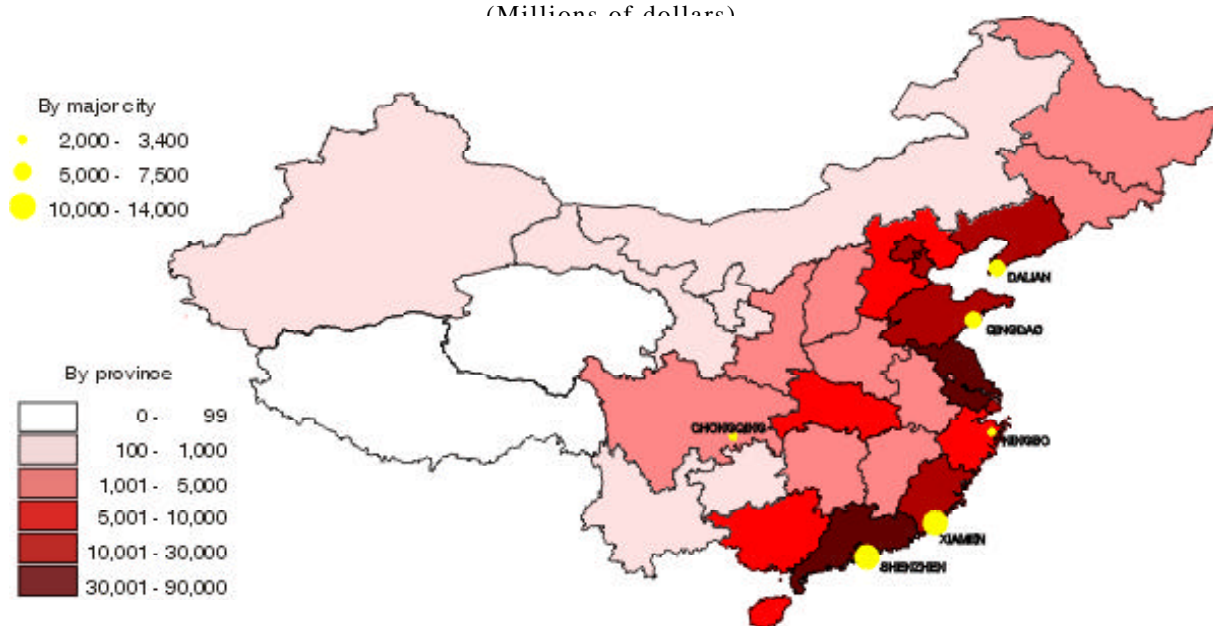
In China, coastal provinces and cities account for the bulk of FDI (box figure II.2.1). About 87 per cent of the FDI stock in 1999 was concentrated in 12 coastal regions. Guangdong is the largest region; it held 29 per cent of all FDI stock that year. Agglomerated cities (proxied by an accessibility index – the sum of the population of the city concerned divided by the square of the distance between the city and each of the other major Chinese cities) have been observed

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Box II.2. Inward FDI at the sub-national level: some examples (continued)

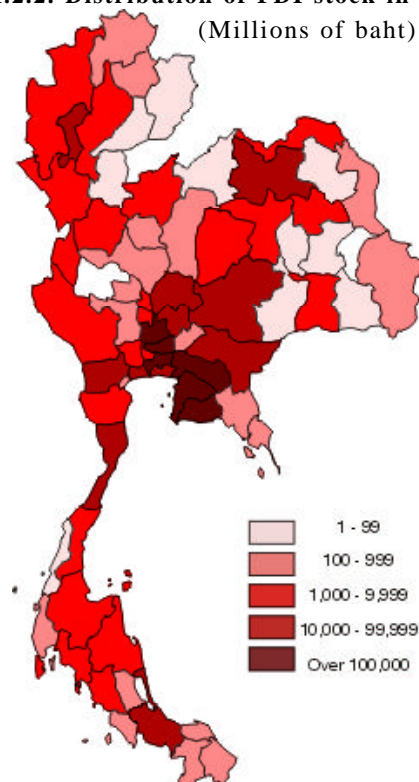
to have a better chance of attracting FDI than widely separated cities (Wei et al., 1998; Gong, 1995). In Thailand, among 68 provinces, Rayong accounted for 31 per cent of total approved FDI during 1987-2000, followed by Krung Thep (Bangkok province) (12 per cent) and Chon Buri (11 per cent) (box figure II.2.2).

Box figure II.2.1. Distribution of FDI stock in China, by province and major city, 1999
(Millions of dollars)



Source: UNCTAD, based on China, MOFTEC, 2000.

Box figure II.2.2. Distribution of FDI stock in Thailand, by province, 2000^a
(Millions of baht)



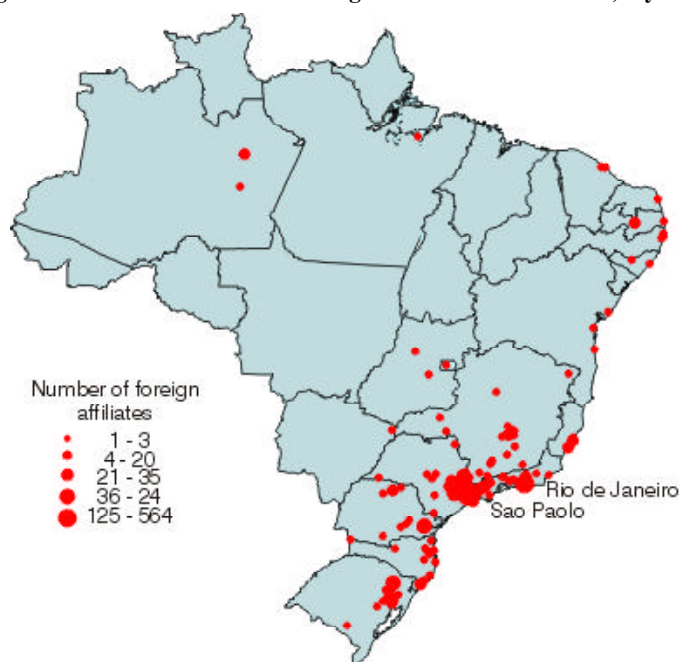
Source: UNCTAD, based on Board of Investment (BOI), unpublished data.

^a Data refer to BOI-approved investment for the years 1987-2000.

Box II.2. Inward FDI at the sub-national level: some examples (continued)

In Latin America, there is a higher concentration of foreign affiliates in Brazil (around Rio de Janeiro and São Paulo) than in Mexico (box figures II.2.3 and II.2.4). In Mexico, cities in Chihuahua, other border states with the United States and central states absorb almost all FDI (box figure II.2.4). Within the interior, Guadalajara has become the main city for the electronics industry, an industry that was started by TNCs and has remained almost exclusively foreign-owned (UNCTAD, 2000b).

Box figure II.2.3. Location of foreign affiliates in Brazil, by city, 1999^a



Source: UNCTAD, FDI/TNC database on the basis of *Who Owns Whom CD-ROM 2000* (Dun and Bradstreet).

^a On the basis of 1,285 majority-owned foreign affiliates identified.

Box figure II.2.4. Location of foreign affiliates in Mexico, by city, 1999^a



Source: UNCTAD, FDI/TNC database on the basis of *Who Owns Whom CD-ROM 2000* (Dun and Bradstreet).

^a On the basis of 1,476 majority-owned foreign affiliates identified.

Box II.2. Inward FDI at the sub-national level: some examples (concluded)

In Central and Eastern Europe, in Hungary, both foreign and total economic activity are highly concentrated in the Budapest area (box figure II.2.5); but the share of foreign activity concentrated there is almost double the share of total economic activity.* In Poland, too, foreign investors prefer a limited number of large urban agglomerations, especially Warsaw, Katowice and Poznan, though there is some spread of investment into other areas as well (box figure II.2.6).

Box figure II.2.5. Distribution of FDI flows in Hungary, by region, 1998
(Billions of Forint)



Source: UNCTAD, based on data provided by the Hungarian Statistical Office.

Box figure II.2.6 Location of foreign affiliates in Poland, by city, 1999^a



Source: UNCTAD, FDI/TNC database on the basis of *Who Owns Whom CD-ROM 2000* (Dun and Bradstreet).

^a On the basis of 1,517 majority-owned foreign affiliates identified.

These intra-country maps show with some exceptions that affiliates engaged in different economic activities tend to agglomerate in the same areas. TNCs invest there to access location advantages that are common to any activities (e.g. infrastructure, availability of efficient and effective production factors). There is a high geographic concentration in specific countries and in specific areas within the countries.

Source: UNCTAD.

* Data provided by the Hungarian Statistical Office.

C. Industrial and functional patterns

As TNCs become more dependent on other firms for a myriad of functions related to their own operations, and on external sources of knowledge for innovation, the location decisions of different firms become more interdependent. In fact, as core competencies become more knowledge-intensive, the choice of location for the production, organization and use of these assets emerge as an important competitive advantage for firms (Porter, 1994, 1998; Enright, 1995). Moreover, as the liberalization of investment and trade policy allows TNCs greater freedom to choose sites and modes of operation, TNCs are increasingly able to specialize their operations at the level of each corporate function on a global scale. And as new technologies make it possible to manage far-flung operations economically and efficiently, it also becomes technically feasible to implement such location strategies in practical terms. The following sections explore these factors at the industrial and functional levels, with some attention to the role of local clusters.

1. Industrial location and the role of clusters

Many location factors tend to be industry specific (Moomaw, 1998), though, within each industry, TNCs can and do vary in their strategies. Many of the differences in patterns of location, concentration or decentralization of investment can be traced to industry- and firm-specific conditions and perceptions. Several issues arise here. How and why do the geographical patterns of activities vary in different industries? Why is there an uneven geographical distribution of FDI by industry? What explains geographical shifts of FDI in particular industries over time?

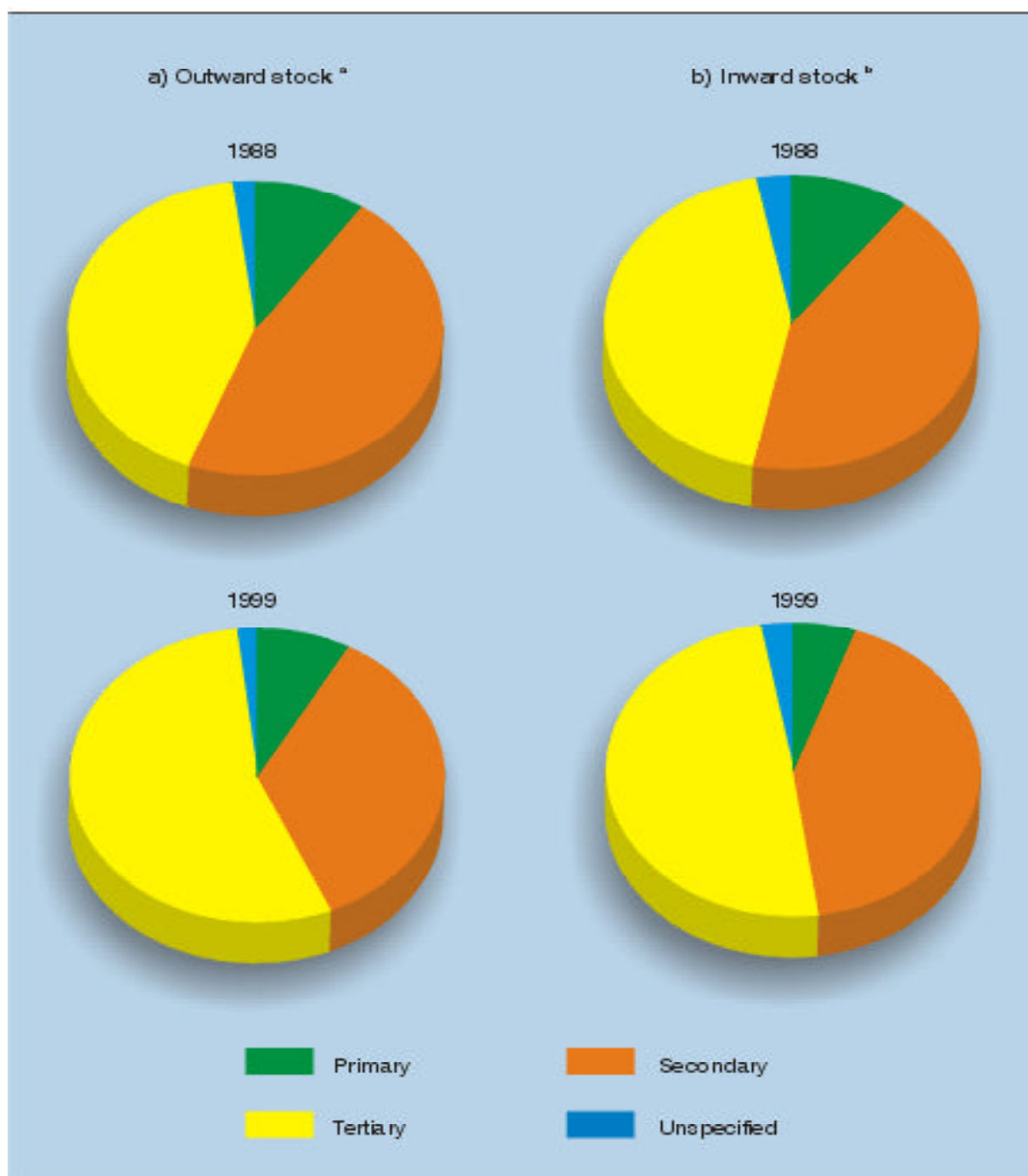
At the broad sectoral level, the share of services in FDI has risen significantly between 1988 and 1999, now accounting for about half of inward FDI stock in the world (figure II.16; for details see annex tables A.II.1-A.II.4). In developing countries alone, it accounted for some one-third of their total

inward FDI stock. The shares of the manufacturing and primary sectors in the world had fallen correspondingly, to 42 per cent and 6 per cent, respectively, by the end of the 1990s: in developing countries these shares were 55 per cent and 5 per cent, respectively (annex table A.II.4). This is a significant change from the late 1980s, when manufacturing accounted for about two-thirds of FDI in developing countries.

Several reasons explain this shift. The services sector has been liberalized for FDI participation relatively recently; in most countries the process is still under way. This has stimulated large flows of investment in activities like financial services, telecommunications and utilities, including in the context of privatization. The trend also reflects the fact that the role of the services sector in economic life has grown. Several new services (e.g. software, back-office services, call centres, data entry) are emerging in which there is considerable scope for international trade and the location of facilities. Thus, the rise in the relative importance of services FDI reflects both a "stock adjustment" to liberalization and the emergence of new services, particularly those that are tradable. This rise is likely to continue in the foreseeable future.

Within manufacturing, only two industries – chemicals and motor vehicles – have experienced a rise in their shares in total FDI. The level of geographic concentration varies by industry. Taking six industries representing different technological levels: semiconductors and biotechnology in high technology; automobiles and TV and radio receivers in medium-technology; and food and beverages and textiles and clothing in low technology; a cursory examination of the number of foreign affiliates and host countries suggests that, the more advanced the technology, the higher the level of concentration. Thus, biotechnology is the most concentrated,¹⁰ followed by semiconductors and TV and radio receivers. The food and beverage industry is the least concentrated (table II.6). Foreign affiliates in semiconductors are located in 31 countries, while those in food and beverages operate in 101 countries.¹¹ The location of foreign affiliates in these industries shows considerable geographical variation (figures

Figure II.16. Industrial distribution of world FDI stock, 1988 and 1999
(Shares in total FDI)



Source : UNCTAD, FDI/TNC database and annex tables A.II.1-A.II.4.

^a Data cover 24 countries in 1988 and 28 countries in 1999, accounting, respectively, for 83 and 79 per cent of world outward stock. Totals in 1988 do not include the countries in Central and Eastern Europe.

^b Data cover 47 countries in 1988 and 57 countries in 1999, accounting, respectively, for 82 and 81 per cent of world inward stock. Totals in 1988 do not include the countries in Central and Eastern Europe.

Note: In order to represent as many countries as possible for each year, whenever data for the given years were not available, those for the latest year available close to 1988 and 1999, respectively, were chosen. Furthermore, in the absence of actual data, approval data were used for some countries.

Table II.6. Geographical concentration of foreign affiliates in selected manufacturing industries,^a by technological intensity, 1999
(Share of total number of affiliates)

Share of industry total	High technology		Medium technology		Low technology	
	Semiconductors	Biotechnology	Automobile	TV and radio receivers	Food and beverages	Textile
Top 3 host countries	0.496	0.627	0.294	0.356	0.237	0.287
Top 5 host countries	0.629	0.710	0.440	0.502	0.353	0.401
Top 10 host countries	0.787	0.852	0.710	0.696	0.561	0.601
Top 20 host countries	0.945	0.953	0.884	0.893	0.747	0.795
<i>Memorandum:</i>						
Total number of foreign affiliates ^b	272	169	1296	253	2250	1445
Total number of host countries	31	28	55	36	101	77

Source: UNCTAD, FDI/TNC database on the basis of *who Owns Whom CD-ROM* (Dun and Bradstreet).

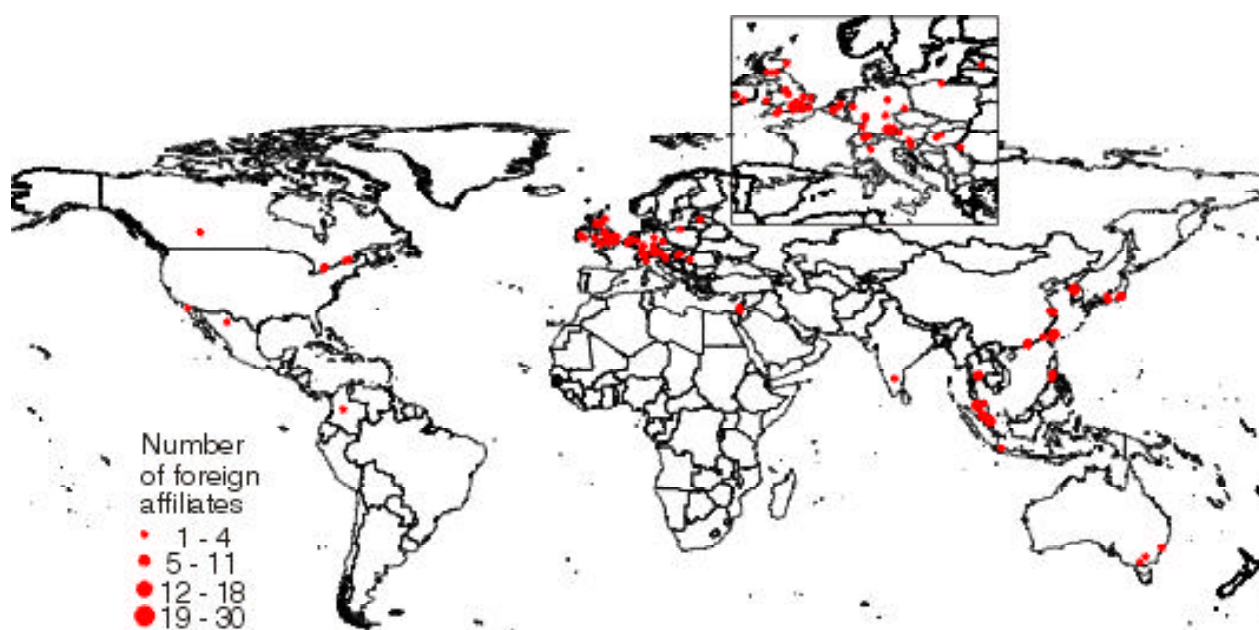
^a Calculated as the share of the number of foreign affiliates in total foreign affiliates in the world in each specific industry.

^b Identified majority-owned foreign affiliates only.

II.17-22). In high-technology industries, affiliates tend to agglomerate in selected locations in the world (figures II.17 and II.18), while foreign affiliates in the food and beverage industry are geographically more evenly spread over the globe (figure II.22).

The different degree of concentration of FDI by industry reveals that the distribution of FDI by industry at the regional and at the national levels is uneven. Within countries the locations hosting a significant number of affiliates in high-technology industries are also limited. This

Figure II.17. The distribution of foreign affiliates in the semiconductor industry, 1999^a



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 272 majority-owned foreign affiliates identified.

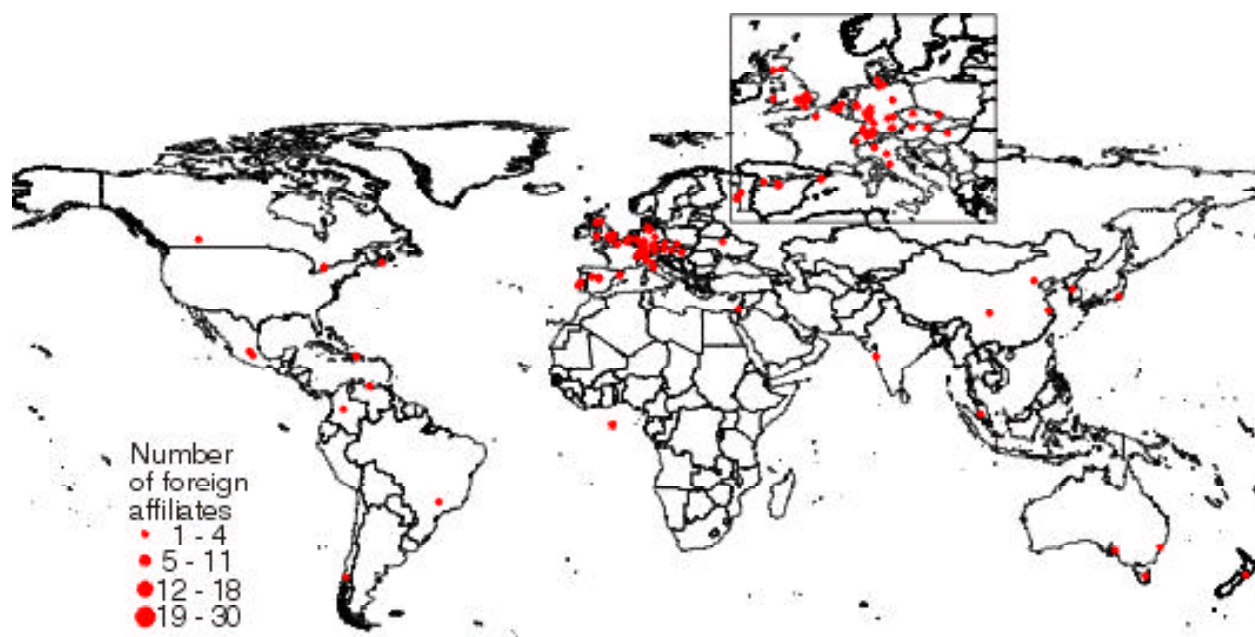
suggests that concentration at the sub-national level is relatively high in high-technology industries. These observations confirm that only locations with technological capabilities can receive high-technology FDI, and this has not changed over the years: the mapping of foreign affiliates in 1985 show patterns similar to those in 1999 (annex figure A.II.1-II.2). On the other hand, in the case of low-technology industries, foreign affiliates were already quite spread out over the globe in 1985, more so than those in medium- or high-technology industries (annex figure A.II.3-II.6). This spread, however, is not as pronounced today.

Industrial patterns of FDI location are changing over time. The concentration of outward FDI within the Triad has remained stable over time across industries and sectors. However, there has been a large increase of outward FDI in manufacturing from developing countries between 1988 and 1999 (annex tables A.II.1 and A.II.2). Interestingly, resource-rich developing countries only account for a small share of outward FDI in the extractive sector,

suggesting that the availability of natural resources is not by itself sufficient to lead to the development of internationally competitive firms.

The dominance of developed countries as destinations for FDI has been accentuated between 1988 and 1999 in most industries (annex tables A.II.3 and A.II.4). In electrical and electronic equipment and in motor vehicles and transport equipment, developing countries accounted for about 25 and 37 per cent of world inward FDI stocks, respectively, in 1988, and for 36 and 12 per cent in 1999. This may reflect the diminishing role played by the low cost of unskilled labour and by protected markets in attracting new FDI in these industries in developing countries. It does not mean, however, that established TNC bases in the developing world in electronics or automobiles are being closed. It may also reflect M&As in these industries (particularly automobiles) aiming to rationalize and cut back capacity rather than to expand facilities.

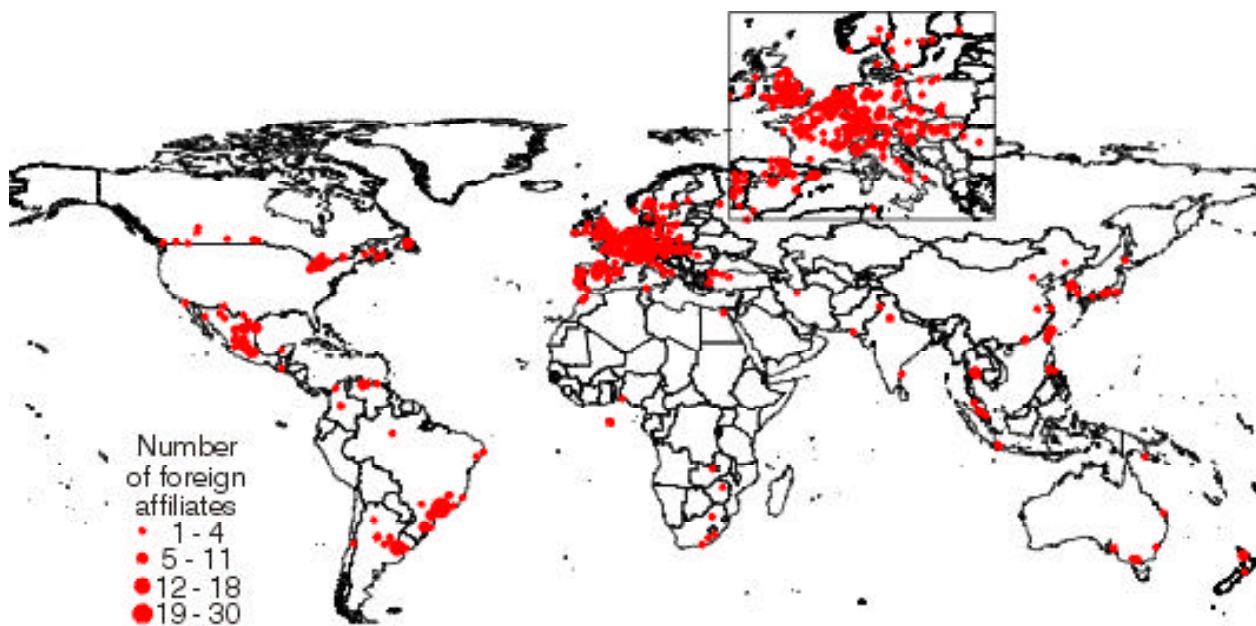
Figure II.18. The distribution of foreign affiliates in the biotechnology industry, 1999^a



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 169 majority-owned foreign affiliates identified.

Figure II.19. The distribution of foreign affiliates in the automobile industry, 1999^a



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 1,296 majority-owned foreign affiliates identified.

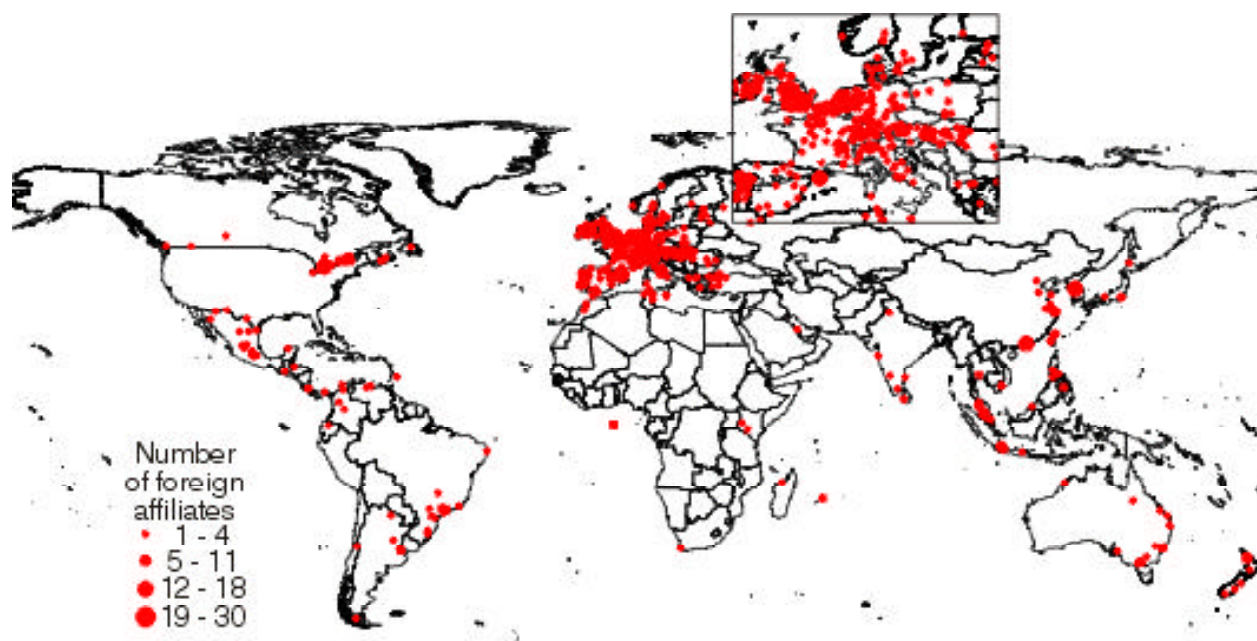
Figure II.20. The distribution of foreign affiliates in the TV and radio receivers industry, 1999^a



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 253 majority-owned foreign affiliates identified.

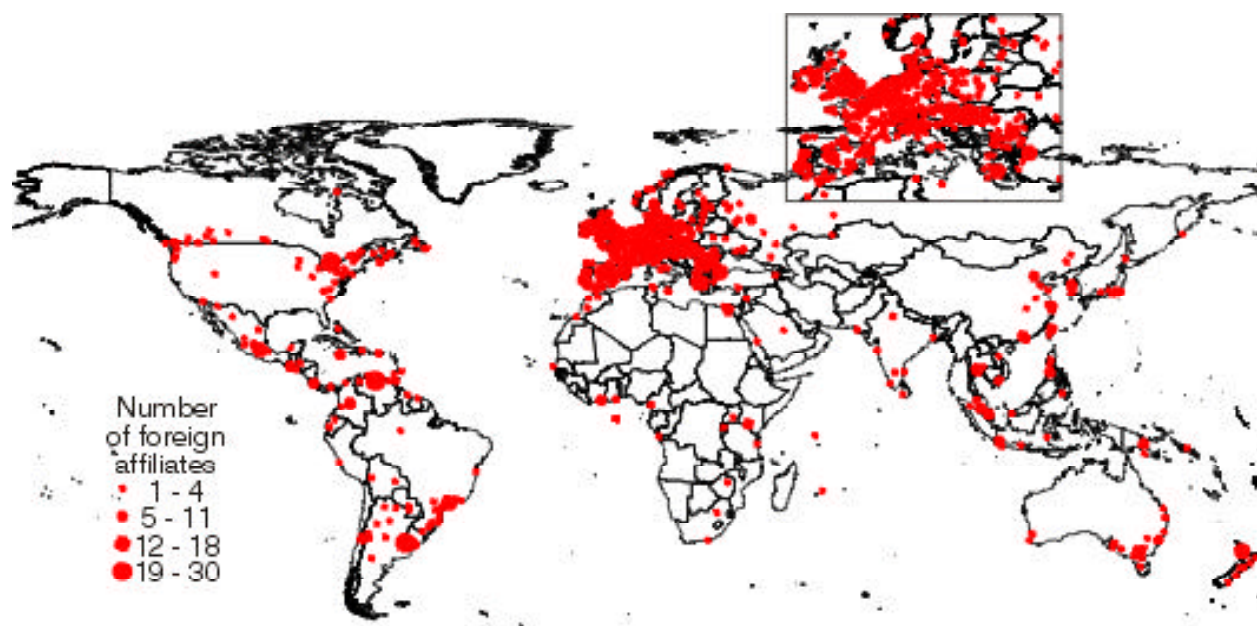
Figure II.21. The distribution of foreign affiliates in the textiles and clothing industry, 1999^a



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 1,455 majority-owned foreign affiliates identified.

Figure II.22. The distribution of foreign affiliates in food and beverage industry, 1999^a



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 2,245 majority-owned foreign affiliates identified.

The industrial distribution of FDI stocks in manufacturing differs considerably between developed and developing countries. In the former countries, chemicals is the largest recipient industry in the manufacturing sector, accounting for one-fifth of total FDI stock in manufacturing in 1999, a share twice as high as the second largest recipient industry, motor vehicles and transport equipment (annex table A.II.4). But the most dynamic industry in the developed world is motor vehicles and transport equipment, which tripled its share of total manufacturing FDI stocks between 1988 and 1999 (annex tables A.II.3 and A.II.4). Not surprisingly, the share of low-technology manufacturing has diminished in importance in developed countries. By contrast, inward investment in developing countries remains concentrated in less technology-intensive industries. In Latin America and the Caribbean food and beverages, as well as chemicals, are large recipient industries in manufacturing. Chemicals, and electrical and electronic equipment are the largest recipients in developing Asia. These industries continue to dominate inward FDI in manufacturing. Meanwhile, the relative importance of manufacturing as a whole fell considerably in Latin America and the Caribbean (from two-thirds of total FDI stock in 1988 to only one-third by the end of 1990s), while it remained stable in developing Asia (at 60 per cent).

The evidence suggests that TNCs in some industries tend to cluster in relatively small localities, often near local firms and other institutions. Biotechnology and microelectronics (box II.3) are examples. TNCs sometimes also develop new clusters in host countries that may be joined later by indigenous firms. In the United Kingdom, for example, Japanese automobile companies formed their own local clusters – Nissan in northeast England and Toyota in Derby (Dunning, 2000). In developing countries, the electronics industry in Penang, Malaysia, is an example (box II.4). Or they may join existing clusters and come to dominate them over time. This is illustrated by the City of London (box II.5) and by the media cluster of central London, which foreign firms have helped to transform into the second largest concentration of media activity in the world after Hollywood (Nachum and Keeble, 2000a, 2000b).

The attraction of TNCs to local clusters also reflects the dynamic comparative advantages of host countries. When clusters lose their competitive advantage, activities may move elsewhere.¹²

To conclude, traditional explanations for FDI location have largely focused on the factors affecting *national* location-specific advantages. While these are certainly important, it is becoming clear that more attention has to be paid to location-specific features related to *clusters* at the sub-national level. Agglomeration economies, in other words, have a significant impact on the location decisions of TNCs (Head et al., 1995, 1999; Smith and Florida, 1994). It is not only countries as a whole that compete for FDI, but also particular geographical sites within them. This has important policy implications, addressed below in the conclusions of this part of this report.

2. The location of corporate functions

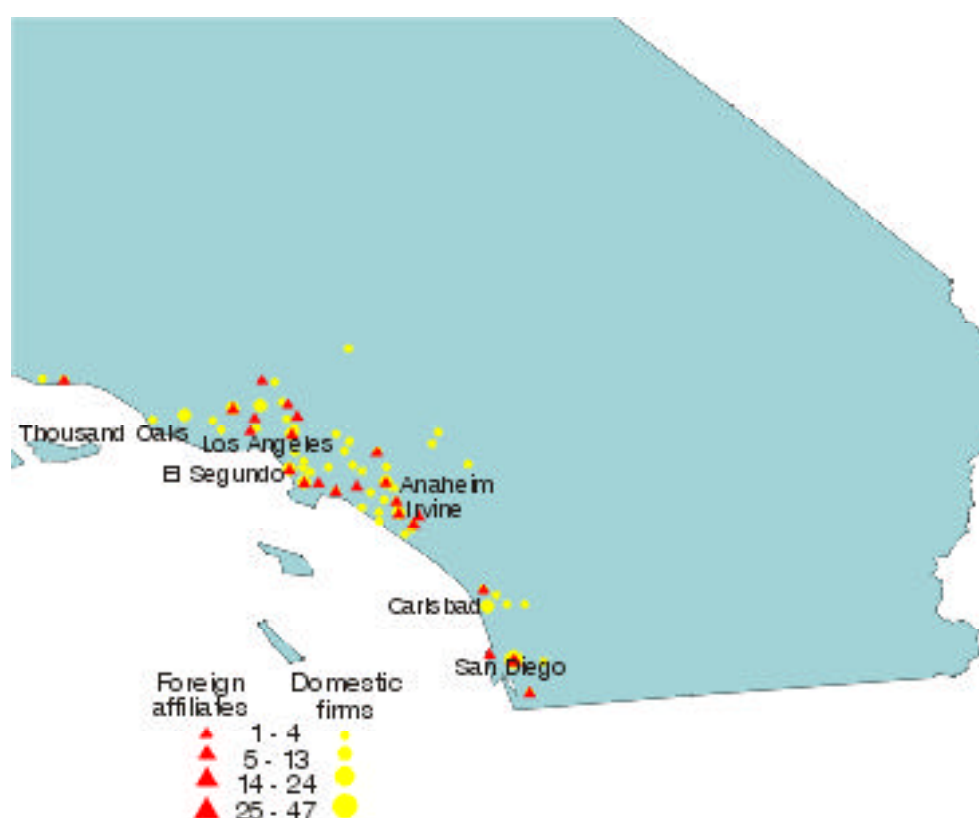
The location factors mentioned above also affect the *functions* performed abroad by foreign affiliates. TNCs, by definition, place some productive functions in host countries: resource-seeking ones locate extraction functions, and manufacturing ones locate production functions, abroad. TNCs serving host country markets place their necessary marketing and distribution functions abroad, traditionally focused on specific (limited) market segments. Historically, strategically critical corporate functions like design, R&D, strategic and financial management or the procurement of core inputs have been kept at headquarters. It is possible in theory, however, for a TNC to place each function in a different location to take advantage of different characteristics and thus optimize efficiency for the company as a whole. There is growing evidence that this is taking place.

However, not every function can be located abroad with equal ease. Some are best located in geographical proximity with each other (and near advanced economic or innovation centres), while others can be efficiently dispersed. Some need to be located close to the corporate decision-

Box II.3. FDI in high technology industries in California

A primary motive for FDI in California is to access the pool of knowledge and skills available there. Foreign firms investing in this cluster come from countries at various levels of technological development. Investors establish R&D facilities in the cluster and draw upon the knowledge-rich environment to upgrade their technological capabilities (Saxenian, 1994; Best, 2000). A number of foreign affiliates are located in this cluster (box figure II.3.1).

Box figure II.3.1. Location of foreign affiliates and domestic firms in the microelectronics industry in California, United States, 1999



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

The cardiovascular medical products industry in Orange County in southern California, a highly innovative research and production centre for cardiovascular products and related devices, is another example of a cluster that has attracted foreign investors. Some affiliates started with greenfield plants close to existing firms, others tapped directly into the knowledge base by acquiring successful start-up firms. The presence of large foreign firms like Siemens and Hoffmann-La Roche, in turn, has drawn the cluster into a global network of linkages, further raising its competitiveness by broadening its industry base and contributing to the generation of external economies (De Vet and Scott, 1992).

In both of these cases, TNCs are instrumental in tapping, inducing and sustaining agglomeration. TNCs buy material and service inputs, with affiliates and local firms establishing interlinkages of functional and spatial interdependence (Scott, 1992).

Source: UNCTAD.

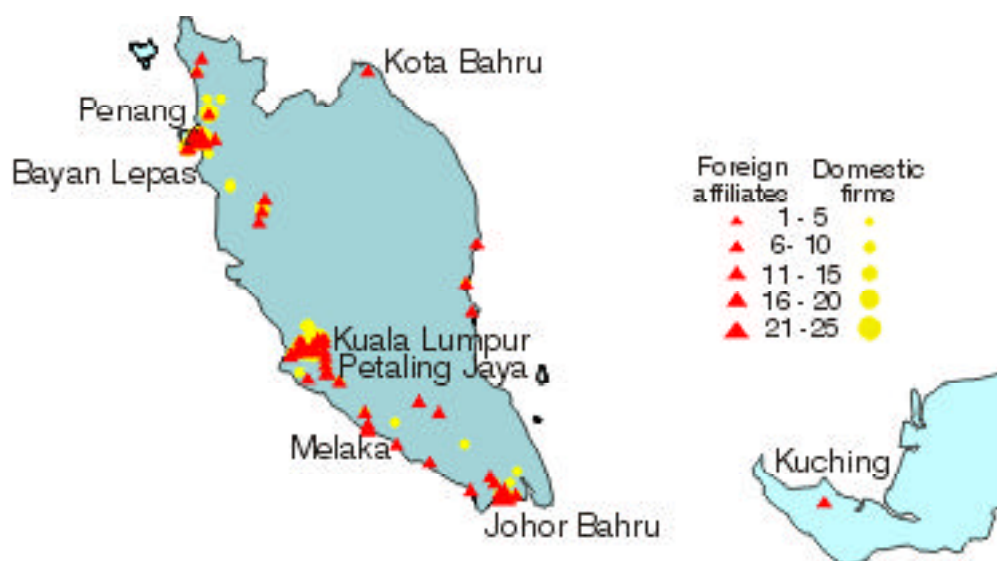
Box II.4. FDI in the electronics industry in Penang, Malaysia

Although the electronics cluster in Penang was initiated by the Government, it was largely developed by TNCs that have struck roots in the local economy. The cluster began when foreign electronics firms set up assembly plants in the early 1970s, attracted by the cheap, trainable and English-speaking labour force (UNCTAD, 2000c). The success of the early investors led to a steady stream of new TNCs, many of them global players in the electronics industry.

While foreign firms still dominate this cluster (box figure II.4.1), it has over the years contributed to the development of local suppliers, notably in areas such as metal stamping and precision tools, contract manufacturing and assembly operations, production of plastics and packaging materials. Most of these suppliers have been spin-offs from TNCs, with former employees leaving after acquiring technical and marketing expertise to set up their own firms (UNCTAD, 2000c). Some TNCs encouraged and supported these spin-offs with know-how and purchase contracts, and have retained significant linkages with them (Driffield and Mohd Noor, 1999).

The development of the cluster has been strongly supported by the local authorities. The Penang Development Corporation is playing a proactive role in attracting investors, supporting local suppliers and building support institutions for training and so on (see Part Two).

Box figure II.4.1. Location of foreign affiliates and domestic firms in the electronics industry in Malaysia, 1999



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

Source: UNCTAD.

making centre, while others do not. Some enjoy large scale-economies and so need to reach a critical minimum size to serve global or regional needs efficiently; others can be divided into discrete stages and be located far apart according to cost considerations. All these factors are, moreover, changing over time. The maturing of international

networks and new communications and organizational technologies are altering the optimal location of each function. The need for proximity has diminished with the ability to link sites across the globe in real time. Specialized skills are more readily available, and in some cases their cost can be far lower, in some host countries. The need to tap new

Box II.5. FDI in financial services in the City of London

The City of London is an interesting case of foreign firms joining a traditional cluster, initially benefiting from it and later coming to dominate it. The origins of the City of London as a cluster of finance-related activities date back several centuries (Nachum, 2000). Financial TNCs started to enter the cluster in the 1980s, at that time dominated by competitive, internationally-oriented and often very large United Kingdom firms. The main reason for the entry of foreign firms was to gain access to the intangible (but immobile) assets and externalities contained in this concentration. Physical proximity was essential for this.

Over the years, the foreign players increased their standing and acquired many incumbent firms. The dominant players in the City are today foreign-owned. The London affiliates typically occupy central positions within their corporate systems, often having managerial responsibility for the global operations of the parent companies or acting as European headquarters.

There were 537 foreign banks in London in 2000, constituting about two-thirds of all authorized banks based in the City of London. The combined assets of foreign banks in London in 1999 amounted to £1,386 billion, compared with £1,254 billion in the case of United Kingdom banks (British Invisibles, 2001).

Foreign banks (initially overwhelmingly of United States origin) have been operating in London for over a century, but have arrived in large numbers only since the 1950s. Their presence has significantly increased from the 1980s onwards; nearly a half of them (44 per cent) were established after 1980. A large part of this growth resulted from investment by Japanese banks.

Although attracted to the cluster of local firms and by the strong economies of agglomeration that it provided, the competitiveness of this cluster is largely dependent upon the performance of foreign, rather than indigenous, firms.

Source: UNCTAD.

sources of innovation can make it imperative to place advanced technological functions in several locations. The old model of TNCs retaining critical functions at headquarters and letting affiliates reproduce other functions in each host country is giving way to a more coherent and integrated location pattern (*WIR93*).

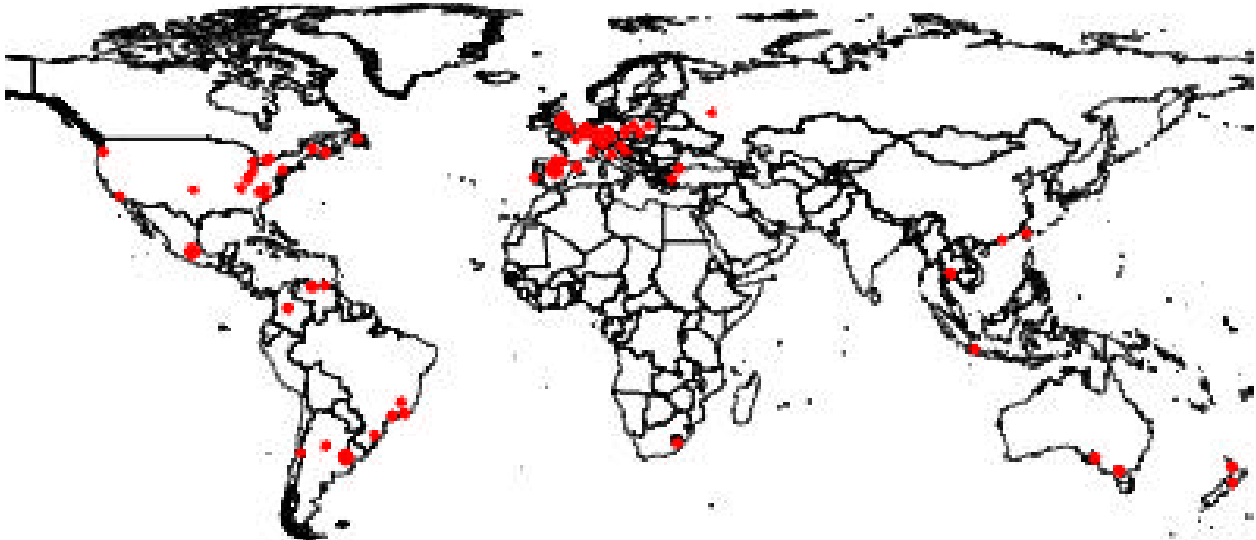
The automobile (figure II.23) and electronics industries (figure II.24) provide good examples. Special service functions like R&D, finance, insurance and so on are being placed in a few locations, while production is scattered over a larger geographical range in different regions. The pattern of distribution, marketing and sales differs between the two industries. In automobiles, most marketing affiliates are located close to major markets, reflecting a separation between manufacturing and sales. In electronics, production units also often undertake sales activities; thus, there are not as many affiliates engaged purely in the latter function as in the case of the

automobile industry. A comparison of the current patterns in the distribution of functions in these industries with those prevailing in 1985 shows a distinct evolution in the establishment of foreign affiliates (annex figures A II.7 and A.II.8). In 1985, few R&D, other professional services and financial services affiliates were located abroad in either of the two industries. They were established only relatively recently. Equipment and part suppliers had followed automobile companies abroad by 1985, but they were not as dispersed as today. Similarly, only few foreign affiliates were engaged in distribution, marketing and sales in the electronics industry at that time. This suggests that integrated international production systems were not yet well established in the mid-1980s.

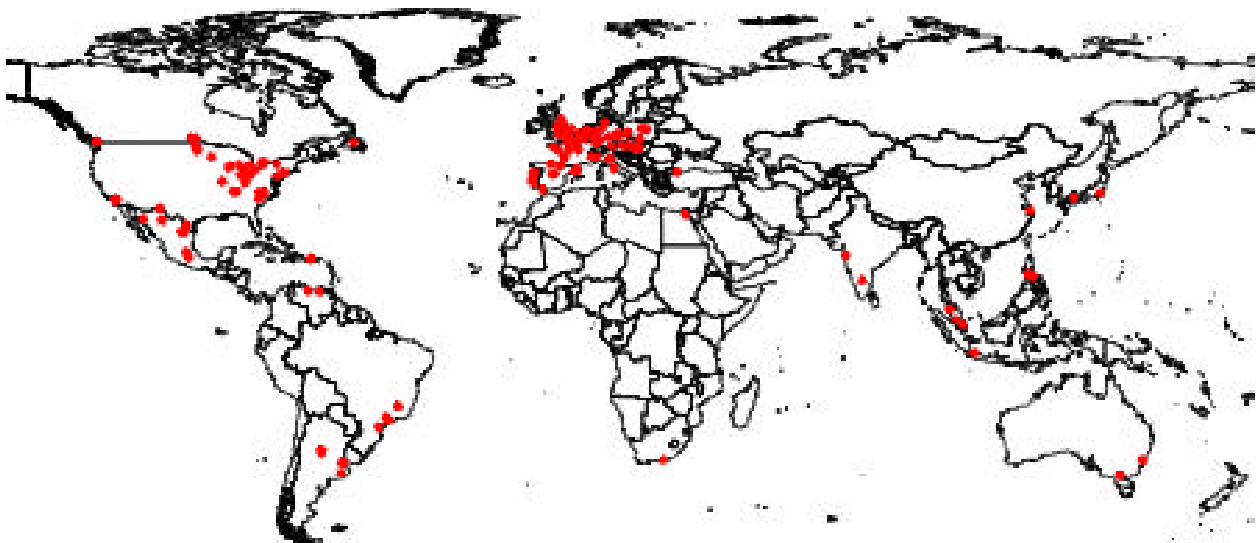
Regional headquarters. TNCs sometimes separate managerial from other functions and establish regional headquarters overseas. These regional headquarters are given an important administrative or

Figure II.23. The distribution of foreign affiliates of the largest ten automobile TNCs,^a by function, 1999

Assembly



Equipment and part supplies



Distribution, marketing and sales

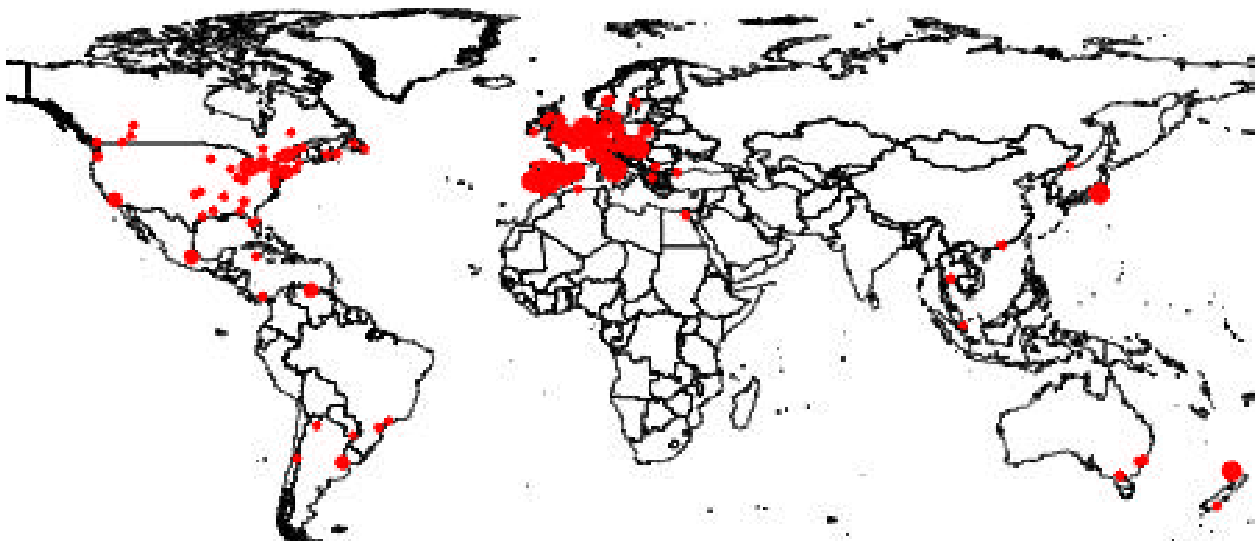
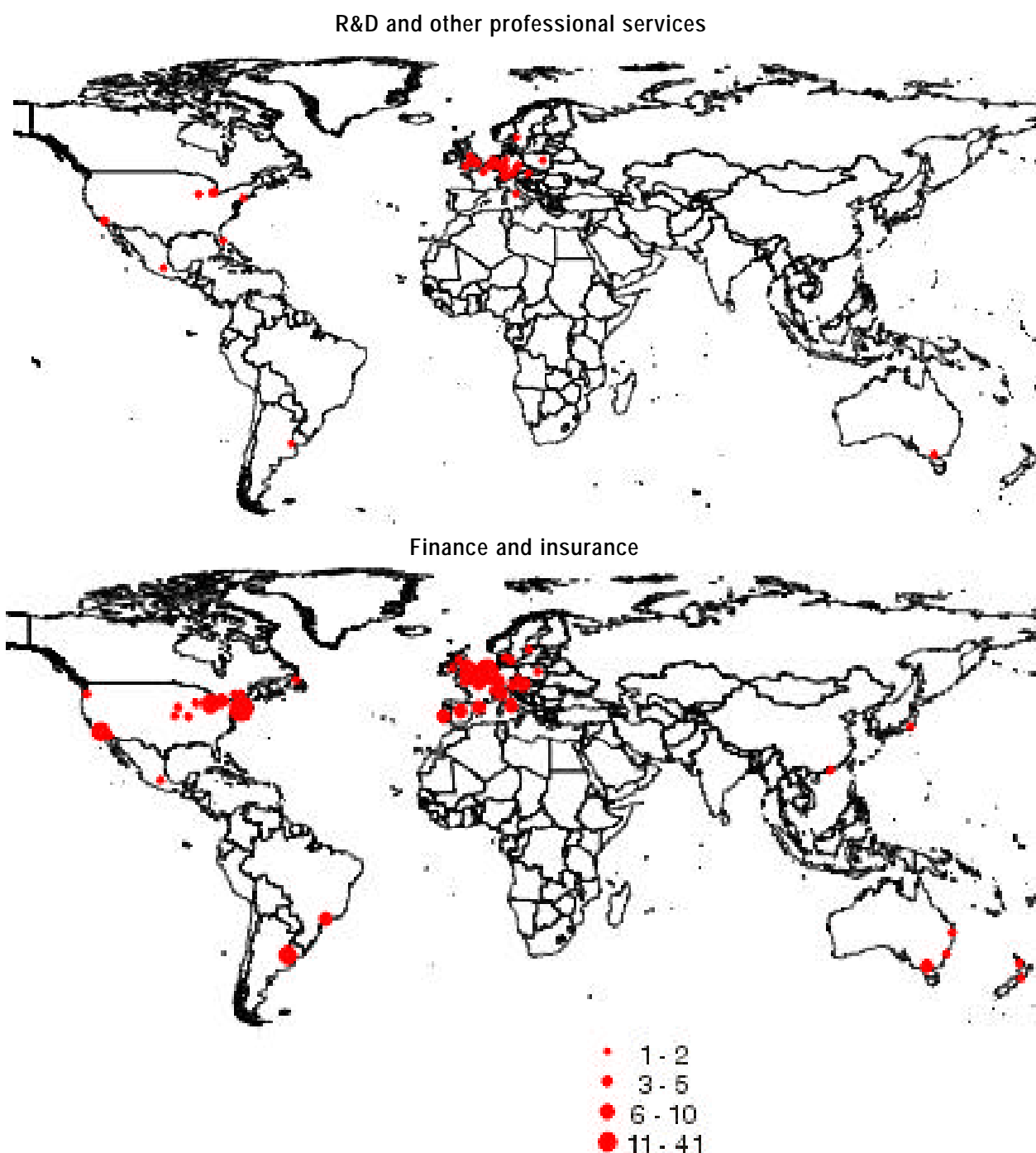


Figure II.23. The distribution of foreign affiliates of the largest ten automobile TNCs,^a by function, 1999



Source: UNCTAD, FDI/TNC database, based on *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 1,775 majority-owned foreign affiliates identified for ten large automobile TNCs (DaimlerChrysler Ag, Ford Motor Company Inc, General Motors Corporation, Giovanni Agnelli E.C. Società In Accomandita Per Azioni (FIAT), Honda Motor Co. Ltd., Nissan Motor Co. Ltd., Peugeot Sa, Renault, Toyota Motor Corp. and Volkswagen Ag.).

Note: The SIC codes used for the different functions are the following:

Assemblers: 3711-3713.

Production equipment and parts: 3519-3592, 3824, 3999, 2221-3499, 3613-3699 and 3714.

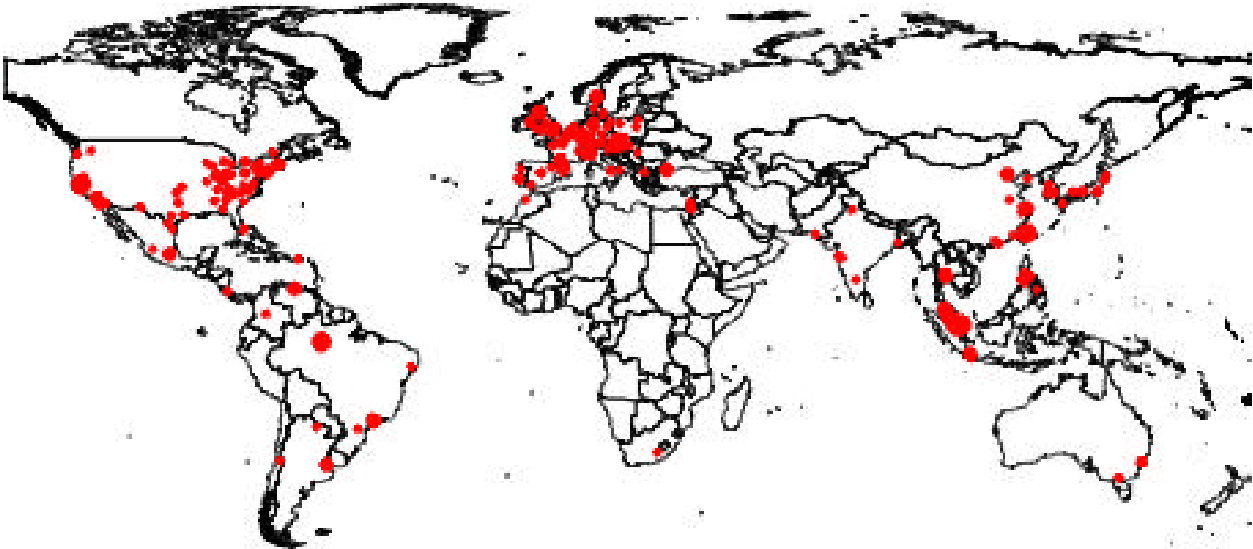
Distribution, communication and wholesale/retail: 4013-4789, 4813-484, 5012-5013, 5511-5599 and 7513-7515.

Research and development (R&D) and professional services: 8731-8734, 8711-8721 and 8741-8742.

Finance and insurance: 6011-6411.

Figure II.24. The distribution of foreign affiliates of the largest ten electronics TNCs, ^a by function, 1999

Production of equipment and parts

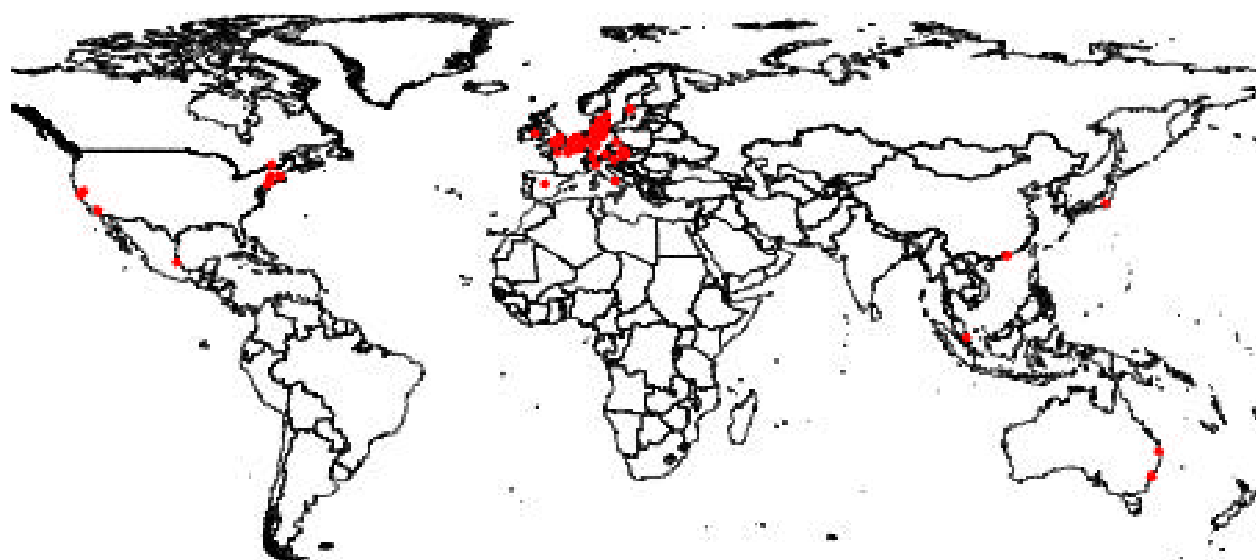


Distribution, marketing and sales

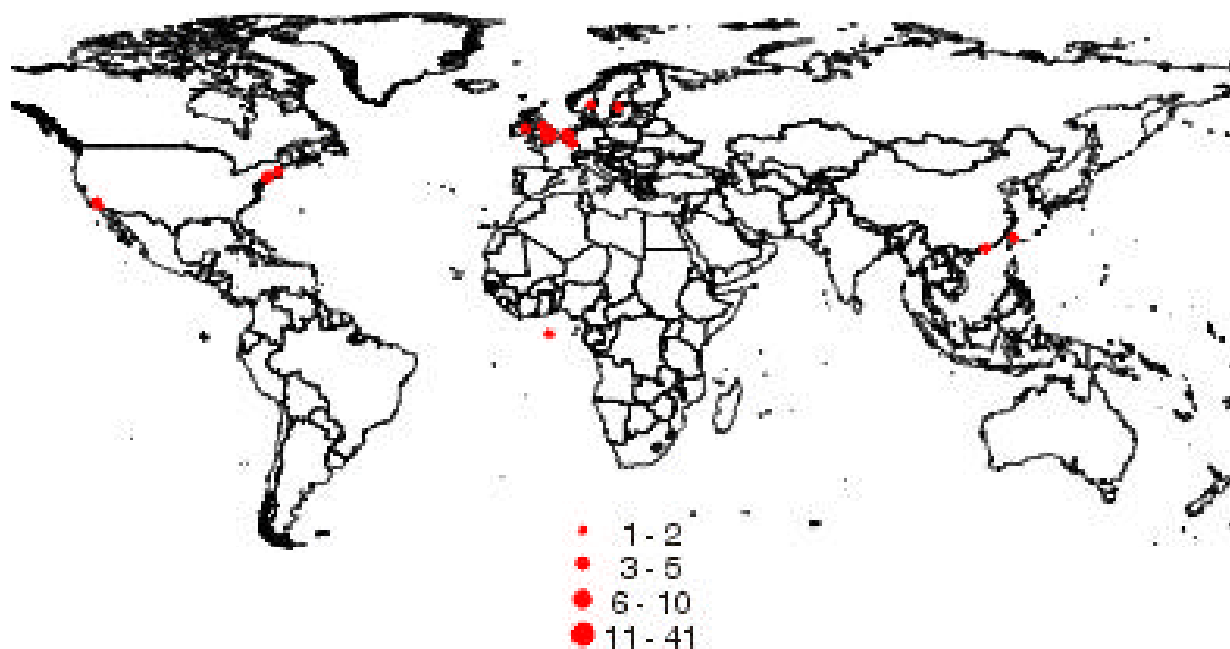


Figure II.24. The distribution of foreign affiliates of the largest ten electronics TNCs, ^a by function, 1999

R&D and other professional services



Finance and insurance



Source: UNCTAD, FDI/TNC database, based on *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

^a On the basis of 1,557 majority-owned foreign affiliates identified for ten large electronics TNCs (Hitachi, Intel, Matsushita, Mitsubishi, Motorola, NEC, Philips, Siemens, Sony and Toshiba).

Note: The SIC codes used for the different functions are the following:
 Production of equipment and parts: 3519-3592, 3824, 3999, 2221-3499, 3613-3699 and 3714.
 Distribution, communication and wholesale/retail: 4013-4789, 4813-484, 5012-5013, 5511-5599 and 7513-7515.
 Research and development (R&D) and professional services: 8731-8734, 8711-8721 and 8741-8742.
 Finance and insurance: 6011-6411.

organizational role in a particular geographic area, and are regarded by host countries as a valuable function to attract. Regional headquarters need a strategic location from a communications point of view, in order to keep in close contact with other affiliates, access to high quality services and a ready supply of advanced skills, especially in information processing. Their need to collect information requires interaction with other regional organizations, leading to strong agglomeration tendencies.

The development of the European Single Market and the rapid growth of South-East Asian economies have stimulated TNCs to establish regional headquarters in these areas. United States TNCs have been establishing European headquarters for some time. A number of Japanese TNCs are following this trend, setting up regional European headquarters. More than 400 of some 23,000 Japanese foreign affiliates in the world acted as regional headquarters by 1997; the United States, Singapore, the United Kingdom and Hong Kong, China, in that order, hosted two-thirds of the total (Toyo Keizai, 1998). In the Americas, more than 70 per cent of Japanese manufacturing plants are engaged in some regional management functions (table II.7).

Two of the most successful economies to attract regional headquarters in Asia are Hong Kong, China and Singapore: Hong Kong, China was, in 2000, the regional headquarters for some 855 firms. Among them were 212 United States TNCs, followed by Japanese, United Kingdom and Chinese TNCs (table II.8). Even firms from Singapore established regional headquarters there, with their number doubling during the past five years. Reflecting the economy's characteristics, more than 40 per cent of the foreign affiliates with regional headquarters status were engaged in trade, followed by business services and financial services (table II.8). Singapore began to attract regional headquarters actively when it introduced, in 1996, various incentives under an International Business Hub Programme.¹³ By end-2000, some 200 foreign affiliates there had regional headquarters status; in 2000 alone, 20 TNCs were awarded that status. They include major TNCs such as 3M, ABB, BMW, Caltex, Compaq, General Motors, Hilton, IBM, Johnson Controls, Matsushita, Motorola, Nokia, Philips, Reuters and UPS.¹⁴ A regional headquarters strategy is attractive for a country in that it gives it a strategic position in the corporate systems of TNCs and wins favourable recognition in the international investment community (Dicken and Kirkpatrick, 1991).

Table II.7. Corporate networks of Japanese affiliates in the Americas, 1999^a
(Number)

Economy	Regional headquarters and managerial offices	Sales offices	Final production sites	Parts and materials production	R&D and design centres
United States	897	877	887	446	580
Canada	39	223	157	48	4
Mexico	57	138	136	62	26
Brazil	53	94	77	10	40
Puerto Rico	-	1	-	-	-
Dominican Republic	-	-	1	-	-
El Salvador	-	2	2	-	-
Honduras	-	2	2	-	-
Costa Rica	-	3	3	2	-
Panama	-	5	-	-	-
Argentina	18	33	29	1	-
Colombia	1	6	-	-	-
Chile	1	8	1	-	-
Venezuela	16	19	16	-	-
Peru	1	3	1	-	-
Barbados	-	-	1	-	-
Unspecified	-	5	-	1	-

Source: UNCTAD, based on JETRO, 2000.

^a On the basis of 1,223 plants, each of which may be engaged in more than one activity.

R&D. While R&D is subject to the same factors that are driving the globalization of other TNC activities, there is a widespread impression that there is greater "stickiness" in relocating innovation activity abroad than in other functions. Not only are there large transaction, communication and coordination costs in reproducing R&D activities abroad, there are strong synergies between corporate R&D and the science and production system around it. These external economies add to

the inertia in setting up innovation functions abroad (Porter, 1990).

However, that impression appears to be largely based on evidence from the United States. It does not necessarily apply to other home countries. In fact, smaller home countries in Europe internationalized their R&D many decades ago. Taking patents registered by TNCs in the United States by their head offices and affiliates abroad as an indicator of the international spread of innovative activity, the data show that many TNCs perform significant proportions of R&D abroad (table II.9).¹⁵ There was extensive overseas patenting by TNCs even in the inter-war period (Cantwell, 1995). But national tendencies differed. French, Swiss and German TNCs had relatively low shares

(3-6 per cent) of patents taken out by affiliates. At the other end, Belgian TNCs had 95 per cent of patents arising abroad. United Kingdom, Italian and Swedish TNCs ranked in the middle (with 28-31 per cent) and United States TNCs had moderately low shares (7 per cent). In the period 1940-1968, affiliate patenting rose for most of Europe (from 12 to 27 per cent), but not for the United States (it fell to 4 per cent). After 1970, foreign patent shares of United States TNCs rose steadily, exceeding those in the inter-war period by 1991. TNCs from European countries continued to have generally higher ratios; the average declined till 1978 but has risen consistently since. In contrast, Japanese TNCs have continued to keep most innovation activity at home (table II.9).

Table II.8. Regional headquarters of foreign firms in Hong Kong (China), by home economy and by industry, 1996-2000^a
(Number)

Home economy/industry ^b	1996	1997	1998	1999	2000
Number of regional headquarters	816	903	819	840	855
<i>By home economy</i>					
United States	188	219	194	205	212
Japan	122	121	109	114	127
United Kingdom	90	86	95	82	81
China	85	117	70	69	69
Germany	40	53	59	55	50
Netherlands	30	27	27	32	31
Switzerland	27	30	28	32	29
France	26	35	38	36	28
Virgin Islands	16	21	9	17	22
Canada	12	17	13	19	21
Singapore	10	18	17	20	21
Taiwan Province of China	25	28	26	28	21
Others	158	163	144	139	149
Total ^c	829	935	829	848	861
<i>By industry</i>					
Wholesale/retail, import/export	408	435	412	444	422
Business services	151	167	162	166	187
Finance and banking	113	103	93	107	108
Manufacturing	110	119	84	75	86
Transport and related services	73	88	55	57	55
Construction, architectural and civil engineering	45	41	50	32	33
Real estate	26	34	25	23	20
Telecommunication services	15	12	10	10	16
Insurance	16	13	15	16	14
Restaurants and hotels	9	9	4	6	5
Diversified	3	12	8	10	11
Others	9	11	15	3	19
Total ^d	978	1 044	933	949	976

Source: Data provided by Census and Statistics Department, Government of Hong Kong, China.

^a As at 1 June.

^b Ranked in an ascending order.

^c The totals are higher than the actual numbers due to the inclusion of joint ventures undertaken by two or more foreign investors.

^d The totals are higher than the actual numbers due to the fact that some companies are engaged in more than one line of business.

There is a general tendency for TNCs to set up R&D facilities overseas according to the technological strengths of host countries, initially to adapt technologies to local conditions and later to tap into its innovation capabilities and the use of skilled scientists (Cantwell and Santangelo, 1998). One manifestation of this trend is to set up affiliates abroad primarily to undertake R&D: such affiliates now exist in more than 45 host countries (figures II.25-27), compared to 26 in 1985 (annex figures II.A.9-11).

While there is a growing tendency to locate R&D abroad, most such facilities are concentrated in a few countries, mostly highly industrialized. Thus, while Japanese TNCs have established R&D centres in four countries in the Americas, most of them are in the United States (table II.7). Data on overseas R&D by United States TNCs in 1994 show that 77 per cent of the R&D conducted in developing countries was concentrated in just four economies: Brazil, Mexico, Singapore and Taiwan Province of China (*WIR99*). The reasons are clear. Innovation concentrates where there is a high density of specialized resources for innovation: a large supply of highly trained

scientists, engineers and technicians, proximity to universities and other research institutions. More important, perhaps, there has to be a presence of other innovative enterprises that create cluster benefits.

There is also a growing tendency for R&D in some industries, such as automobiles, to work jointly with first-tier suppliers. This increases the tendency to concentrate in established locations. Mapping foreign affiliates engaged in R&D and universities shows that the two tend to cluster close to each other (figures II.25-27).¹⁶

Foreign R&D at the sub-national level is more concentrated geographically than most other functions. In the United States, for instance, two-thirds of the Japanese R&D facilities (157 out of 251 R&D facilities) were located in four states (California, Michigan, New Jersey and Massachusetts) in 1998, while only one-quarter of employees of Japanese manufacturing affiliates (98,300 of 422,400 employees) were located there.¹⁷ In the United Kingdom, R&D is disproportionately concentrated in South-East England (Dicken, 1998; Cantwell and Iammarino, 2000). In the developing world, there are almost no clusters of foreign R&D facilities, except for Hong Kong, China, Singapore and recently Zhong Guancum, a suburb of Beijing (figure II.27).¹⁸ There are, however, many individual R&D facilities, mainly serving production units (Reddy, 2000).

Production. Foreign production affiliates are among the earliest – after sales – to be established in most countries. They are also more dispersed geographically than other functions (again, apart from sales). As noted, traditional location patterns, serving protected markets and accessing natural resources or low-cost unskilled labour, are changing. The need now

Table II.9. Share of United States patents of world's largest firms attributable to research in foreign locations, 1969-1995
(Percentage)

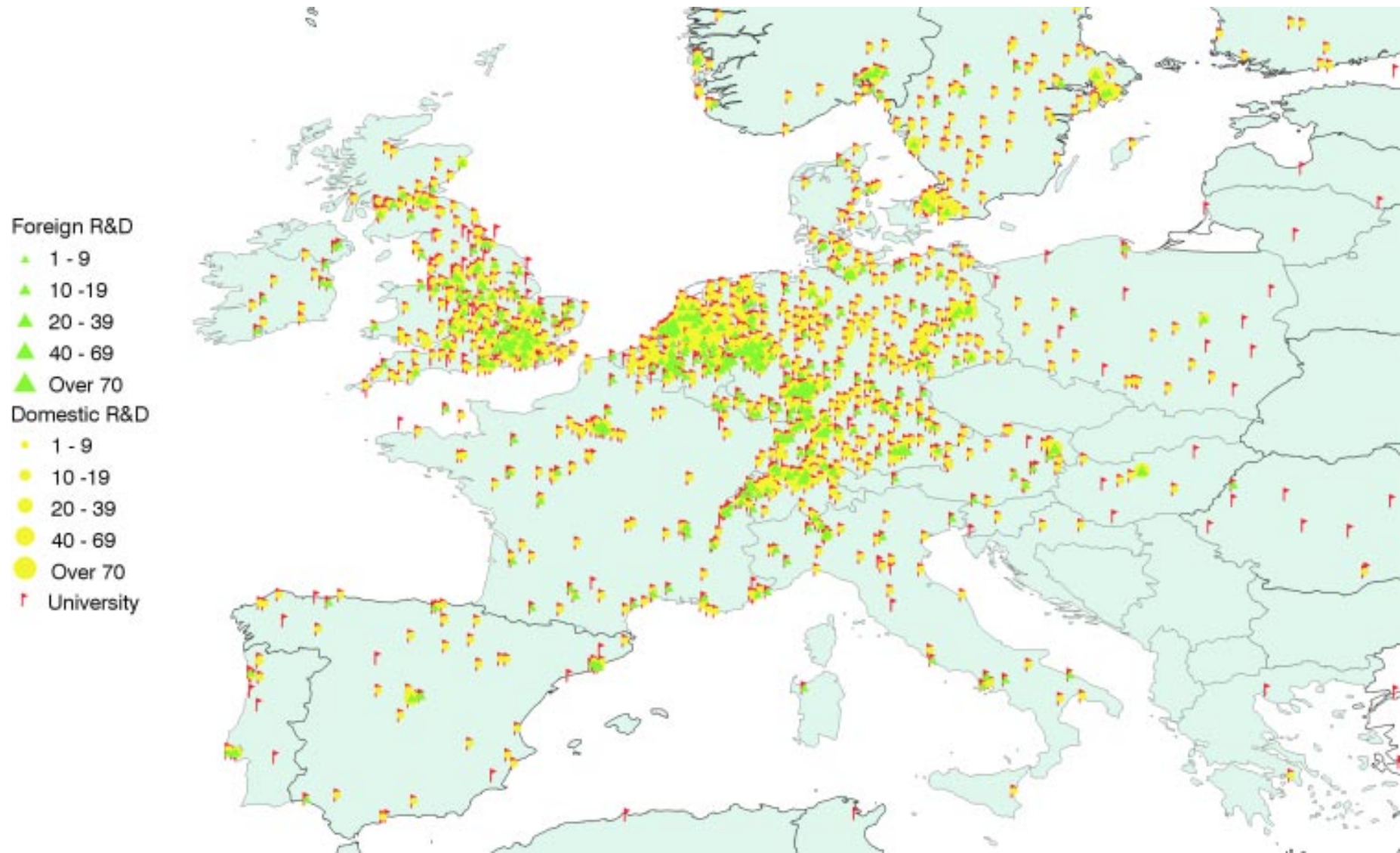
Nationality of parent firm	1969-1972	1973-1977	1978-1982	1983-1986	1987-1990	1991-1995
United States	4.96	5.89	6.40	7.53	7.91	8.62
Germany	12.77	11.05	12.07	14.47	17.05	20.72
United Kingdom	43.08	41.24	40.47	47.09	50.42	55.79
Italy	13.39	16.03	13.85	12.59	11.14	16.47
France	8.16	7.74	7.17	9.19	18.17	33.17
Japan	2.63	1.88	1.22	1.26	0.92	1.08
Netherlands	50.40	47.37	47.65	53.99	53.96	55.69
Belgium-Luxembourg	50.36	51.11	49.28	58.15	47.53	53.25
Switzerland	44.36	43.63	43.78	41.59	42.99	52.47
Sweden	17.82	19.90	26.20	28.94	30.60	42.42
Austria ^a	5.06	16.76	19.84	11.82	8.00	-
Norway ^a	20.00	1.67	12.31	32.50	37.14	20.22
Finland ^a	18.87	27.11	26.89	18.67	27.94	39.49
Canada	41.19	39.30	39.49	35.82	40.12	43.96
Others	28.21	22.22	26.37	30.34	7.54	3.94
Total	10.04	10.53	10.50	10.95	11.28	11.27
Total excluding Japan	10.52	11.59	12.25	13.87	15.76	16.53
Total European countries ^b	28.01	25.19	24.52	26.95	29.99	34.78

Source: Cantwell and Janne, 1997.

^a Patents less than 50 for several periods.

^b Germany, United Kingdom, Italy, France, Netherlands, Belgium-Luxembourg, Switzerland, Sweden, Denmark, Ireland, Spain, Portugal, Greece, Austria, Norway and Finland.

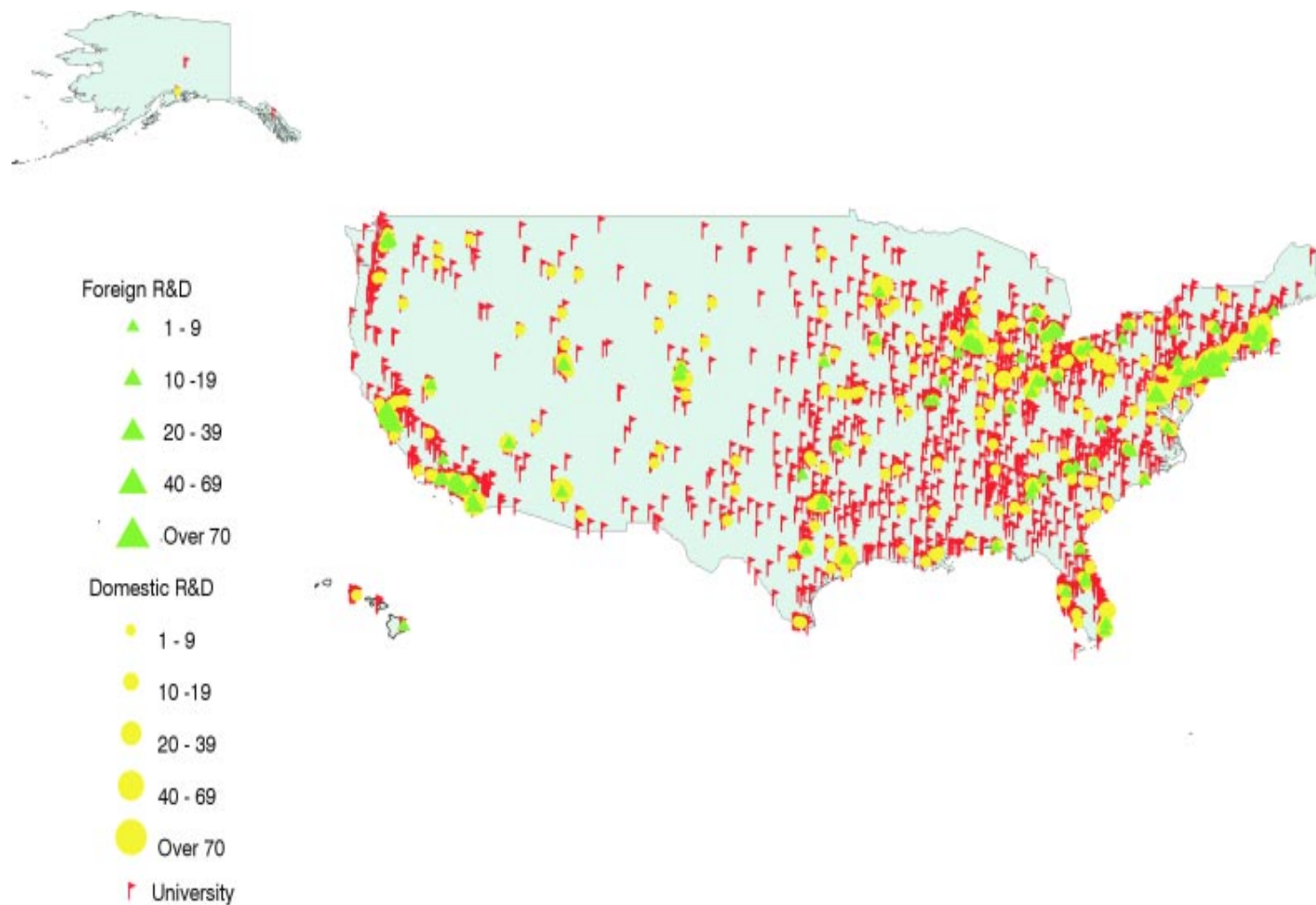
Figure II.25. The distribution of R&D facilities and location of major universities in Europe, 1999



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

Note: On the basis of 744 majority-owned foreign R&D facilities and 3,436 domestic R&D facilities identified.

Figure II.26. The distribution of R&D facilities and location of major universities in the United States, 1999



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

Note: On the basis of 357 majority-owned foreign R&D facilities and 1,476 domestic R&D facilities identified.

is for competitiveness, efficiency and flexibility. As a result, skills, advanced infrastructure, state-of-the-art logistics, supply networks and support institutions are becoming key determinants of location.

These determinants vary according to industry, and also according to where affiliates are in the value chain. In integrated production systems, where affiliates are part of a complex global production strategy, the functions entrusted to specific units vary greatly. Those in less industrialized locations are assigned simpler tasks like assembly and packaging. Those in advanced locations are assigned more skill and technology intensive tasks. Where production involves close supply linkages and the operation of just-in-time delivery, affiliates have to be located in dense networks of efficient suppliers and infrastructure providers. The automobile industry provides a prominent example of an integrated production system. In Thailand, automobile part makers (both domestic and foreign) are closely linked to automobile assemblers. Similarly in Brazil, all automobile makers have invited their core suppliers to be in close proximity to their plants.

Integrated production systems have grown in regions that have reduced trade barriers between member countries and have strong industrial capabilities. The essence of this organizational form is geographical specialization by different parts of a TNC production system (e.g. components, sub-assemblies, semi-finished products). In the EU, for instance, TNCs in the automobile industry have built closely knit supply chains across several countries. A similar system is emerging in NAFTA, and increasingly in ASEAN (figure II.28).

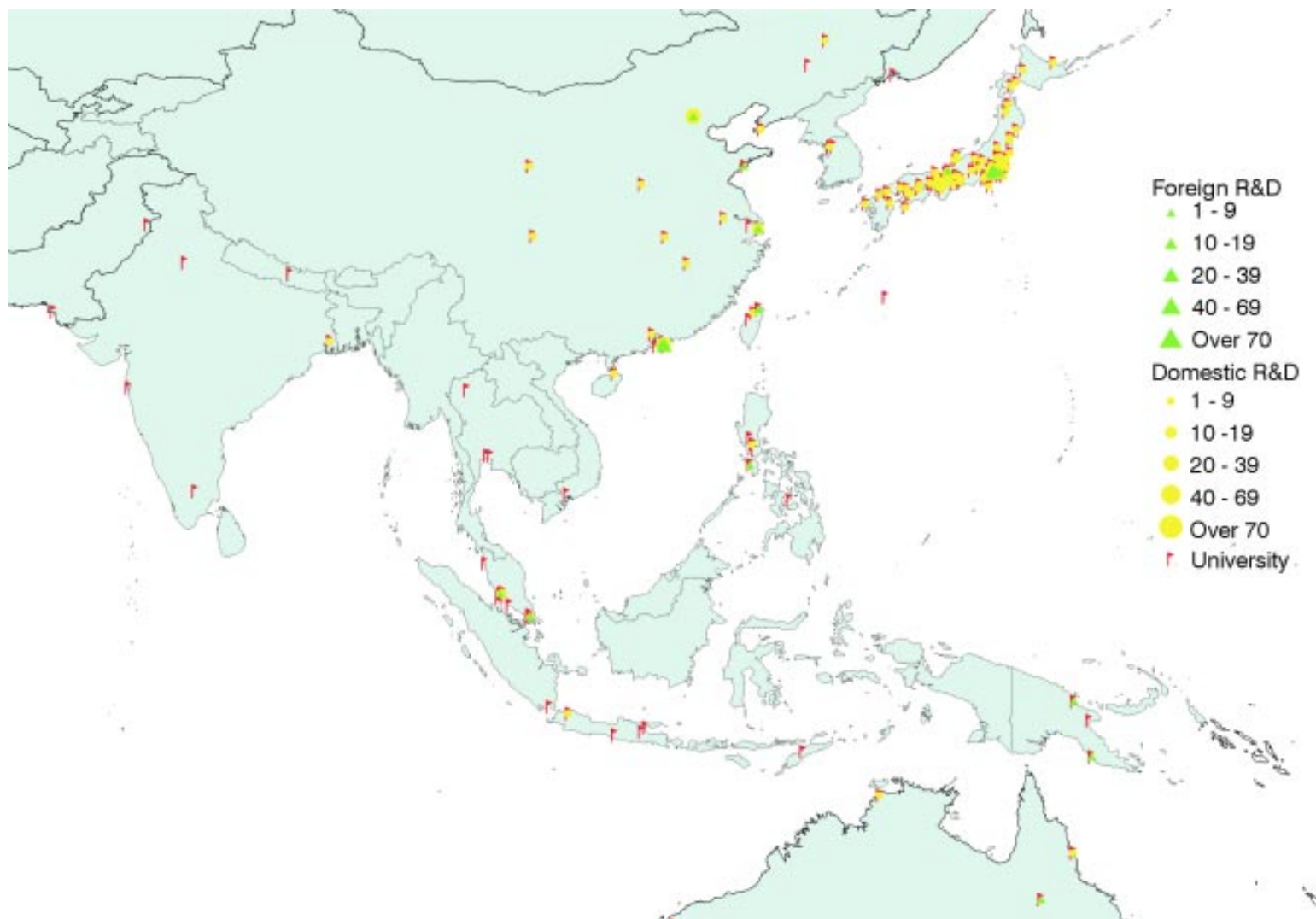
There is a different form of integrated system that is more global than regional. The semiconductor industry, for instance, operates an integrated chain from North America and Europe to Israel and South-East Asia. Such systems make economic sense where the product has a very high value-to-weight ratio and can be produced in enormous volumes. For “heavier” products, or those less amenable

to scale economies, global systems are not economical.

Marketing and sales. Marketing and sales operations have to be located close to (actual and potential) customers, and are the most geographically dispersed of all TNC functions. There is little need to be near other firms or clusters, though, of course all firms serving a national market tend to locate near major consumer centres. Large TNCs have sales units in virtually every country (see table II.7 for Japanese manufacturing affiliates in the Americas and figure II.23 for the automobile industry). Still, there are marketing and sales functions of firms selling to other businesses, rather than final consumers. Such sales operations may also tend to cluster in areas hosting regional or global purchasing operations of major firms.

The growing role of international production in the world economy is enlarging the geographical spread of TNCs’ international production systems. The changing strategies of TNCs, including an increasing trend towards organizing trade and production in integrated international production systems, especially in certain major industries, is changing the patterns of FDI. The mapping of FDI patterns – in the aggregate, by industry and by functional activity – in this chapter throws light on the location of FDI and its industrial and functional distribution across countries. International production continues to be concentrated geographically – at the regional, national as well as the sub-national levels. Cross-border M&As as corporate strategies of TNCs and clusters as locational advantages play an increasing role in determining the location of international production and, hence, FDI patterns. Understanding the patterns of FDI and the driving forces of production location in different industries, and within international production systems, is important for formulating effective strategies and policies with respect to FDI.

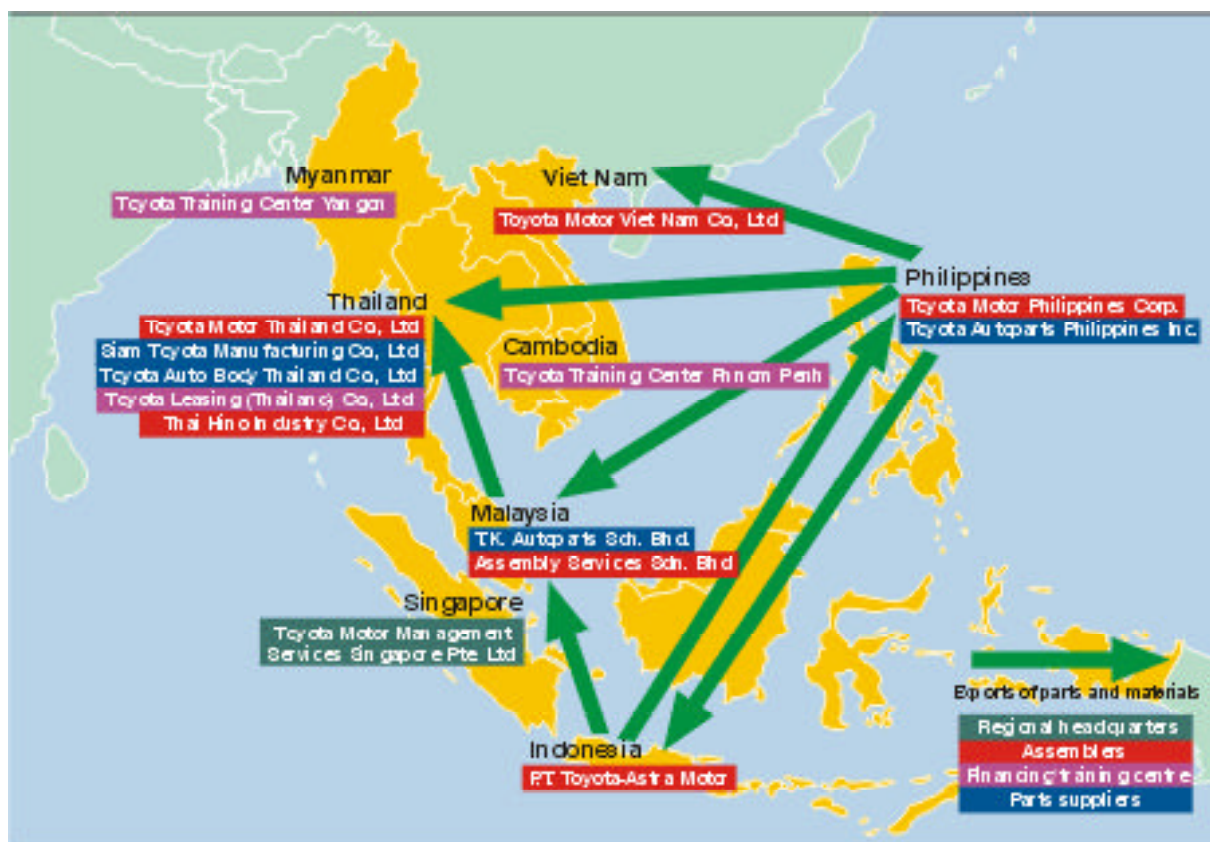
Figure II.27. The distribution of R&D facilities and location of major universities in Asia, 1999



Source: UNCTAD, FDI/TNC database, on the basis of *Who Owns Whom CD-Rom 2000* (Dun and Bradstreet).

Note: On the basis of 155 majority-owned foreign R&D facilities and 432 domestic R&D facilities identified.

Figure II.28. Functional integration of foreign affiliates of Toyota Motor Corporation in ASEAN, 2000



Source: UNCTAD, based on information from www.global.toyota.com.

Notes

- 1 Stocks are normally expressed in book value. During 1985 and 1999 the import price index (the deflator commonly used to revalue international transactions) increased by only 8 percentage points. If world FDI stock is deflated by this amount to approximate FDI stock in real prices, the figures would not change very much.
- 2 In the absence of appropriate stock variables measuring size of economies, GDP – a flow variable – is used to compare with FDI stock.
- 3 UNCTAD's data on cross-border M&As include deals resulting in the acquisition of more than 10 per cent equity share only. The value is on a completion basis, rather than on an announcement basis. However, the data suffer from other problems that make it impossible to compare the value of M&As directly with FDI on a balance-of-payments basis. These problems include: the transaction value of M&As is not necessarily paid out in the year a deal is completed; the financing of M&As is not necessarily cross-border (funds can be raised in domestic as well as international financial markets); and values are not on a net basis, i.e. not as differences between gross acquisitions and divestment abroad. For details, see *WIR00*, chapter IV.
- 4 The differences in the nature of investment between foreign and domestic investment should also be noted in this comparison. The bulk of the former investment in developed countries now takes place through cross-border M&As, which have different impacts from domestic – real – investment.
- 5 This is measured by the ratio of the share of partner region b in total trade (exports and imports) of region a to the share of the region b in world trade.
- 6 FDI intensity is measured by the ratio of the share of partner b in FDI stock of region a to the share of the region b in world FDI stock.
- 7 This may also happen in developed countries. For example, in the automobile and electronics industries in the United Kingdom, local firms (for various reasons) were unable to take advantage of the location advantages of the country. Exports today are dominated by foreign firms (notably Japanese), which were able to use their ownership advantages to exploit the location advantages of the United Kingdom.
- 8 See, for instance, the case studies in UNCTAD, 2000b.
- 9 The literature is quite extensive. See, e.g. Bell and Albu, 1999; Markusen, 1996; Nadvi, 2001; OECD, 1994; Porter, 1998; Pyke and Sengenberger, 1992; Pyke, Becattini and Sengenberger, 1990; Rabellotti, 1997; Saxenian, 1994; Schmitz, 1995, 1999.
- 10 Biotechnology industry here includes in vitro/in vivo diagnostic substances industry (SIC code 2835) and biological products industry (SIC code 2836).
- 11 On the basis of 272 majority-owned foreign affiliates identified in the semiconductor industry and 2,245 in food and beverages.
- 12 Examples of such shifts include the cutlery industry of Sheffield (United Kingdom), which was displaced by a similar cluster in Solingen (Germany). Producers of low- and medium-priced watches in the Jura area in Switzerland also came under great pressure, first from Japanese companies and then from a cluster of Hong Kong companies (Enright, 2000).
- 13 Under this Programme foreign affiliates awarded regional headquarters status are taxed at a concessional rate of 10 per cent on the income arising from the provision of approved services for up to 10 years; an extension is possible. Other income from their overseas affiliates may also be eligible for effective tax relief.
- 14 Information obtained from Singapore Economic Development Board (www.sedb.com.sg).
- 15 Patents as a measure of technological activity have advantages over R&D expenditures. Patents data are available for longer periods, in more detail and for more countries. In any case, both give very similar geographical distributions (Patel and Pavitt, 1991).
- 16 R&D affiliates are defined here as those engaged in commercial physical and biological research (SIC 8731), commercial non-physical research (SIC 8732), non-commercial research organizations (SIC 8733) and testing laboratories (SIC 8734).
- 17 Data provided by United States Department of Commerce, Bureau of Economic Analysis.
- 18 Altogether foreign R&D facilities in developing countries were located in just 18 countries in 1999.