

## 2.2. Knowledge-based industries and services

- The importance of technology-based activities has often been approximated by the share of high-technology industries in manufacturing. However, this approach focuses only on the main *producers* of high-technology goods.
- It is desirable to include other activities that are intensive *users* of high technology and/or have the relatively highly skilled workforce that is required to benefit fully from technological innovations. Therefore, in addition to the commonly identified manufacturing industries, service activities such as finance, insurance and communications are included here.
- This broadly defined group (see box) accounted for more than 50% of OECD business value added in the mid-1990s, rising from around 45% in the mid-1980s. Finance, insurance and business services account for the biggest share in all countries.
- Knowledge-based manufacturing industries and services are more predominant in the larger OECD economies.
- In the United States and Japan, growth in high- and medium-high technology manufacturing has outpaced that in services in recent years. In Europe, services have performed significantly better.
- In general, growth in knowledge-based services has been consistent throughout the decade. Growth in high- and medium-high-technology manufacturing tends to be more cyclical in nature. In the United States, little growth occurred in this group of industries between 1988 and 1993; since then, growth has been strong and sustained.

### Measuring knowledge-based industries

All industries are to some extent dependent on knowledge inputs. However, some industries rely more on knowledge than others. The term "knowledge-based industries" usually refers to those industries which are relatively intensive in their inputs of technology and/or human capital.

While there are established methods for classifying manufacturing industries according to technology intensity (see Box 7.2), capturing the right service sectors to help measure the impact of knowledge has proved more challenging. Limited data availability and international comparability are the main reasons:

- For many years, a majority of OECD countries have provided data on service sectors only at fairly aggregate levels, concentrating instead on more detailed manufacturing data.
- Even when considering broad service sectors, limited information in areas such as R&D expenditure and skill levels makes it difficult to group them formally according to "knowledge intensity".
- As interest in services has increased, the situation has improved, but difficulties remain when applying a common classification (in this case ISIC Rev. 2) to improve comparability. For example, although imperfect, ISIC Rev. 2 Division 8 is used to capture financial and other business services. However, for some countries, including Germany and Japan, many business services are reported under ISIC Rev. 2 Division 9 and the distinction may thus be blurred.

In view of the above, in addition to the commonly identified manufacturing industries, the following ISIC Rev. 2 service activities are included:

- Division 72: Communications
- Division 8: Finance, insurance, real estate and business services
- Division 9: Community, social and personal services

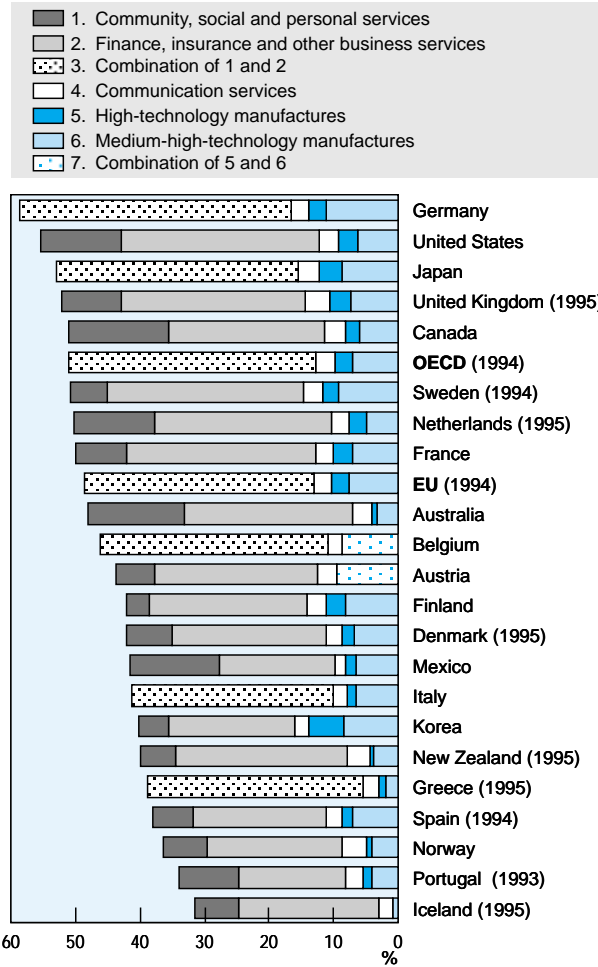
While including health and education services, Division 9 includes many services that may not be considered knowledge-intensive (though health and education are predominant). It is included here for optimal comparability across countries. It should be noted, however, that although many countries report only market services in ISIC Rev. 2 division 9, some include certain non-market services. Nevertheless, the general picture is unchanged when this is taken into account.

"Total business sector" refers to ISIC Rev. 2 Divisions 1 to 9.

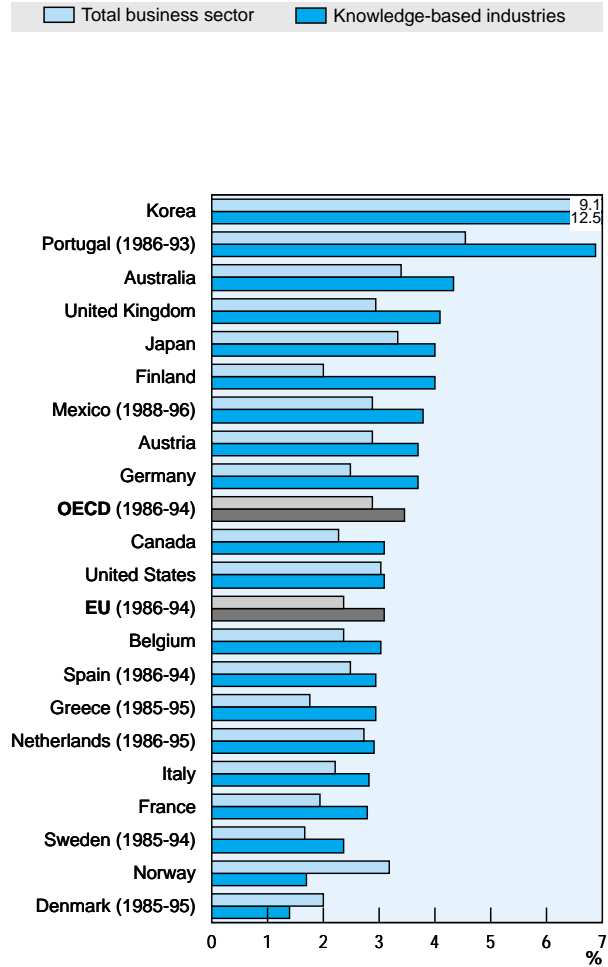
*For more details, see Annex, Table 2.2.1.*

## 2.2. Knowledge-based industries and services

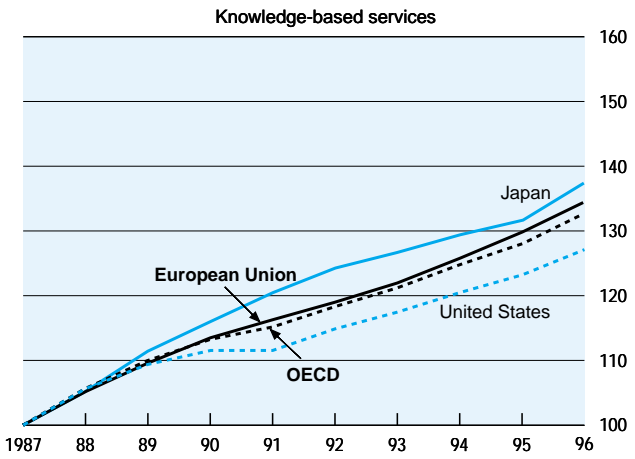
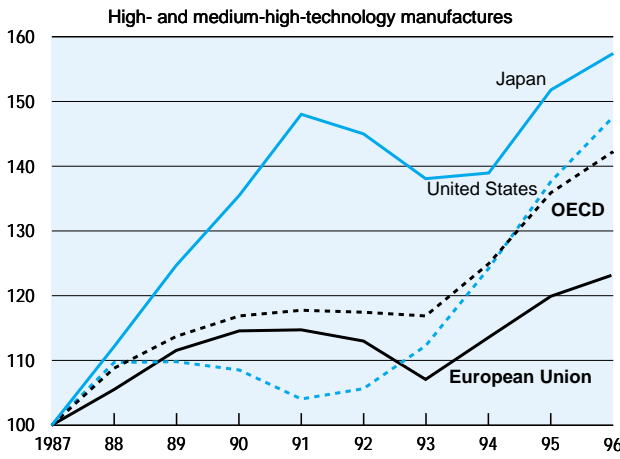
Share of value added in the business sector  
1996



Real value-added growth  
Average annual growth rate 1985-96



Real value added (1987 = 100)



Source: OECD, STAN database and Main Industrial Indicators, 1999.

Table 2.2.1. Value added of knowledge-based industries

Percentages

		Share in business sector value added, current prices						Real value added growth		
		Total knowledge-based industries	High-technology industries	Medium-high-technology industries	Communications services	Finance, insurance and other business services	Community, social and personal services	Average annual growth rate		
								Knowledge-based industries	Business sector	
Canada	1996	51.0	2.2	6.1	3.3 <sup>1</sup>	24.1 <sup>1</sup>	15.4 <sup>1</sup>	1985-96	3.2	2.3
Mexico	1996	41.6	1.8	6.4	1.6	17.8	14.0	1988-96	3.8	2.9
United States	1996	55.3	3.0	6.1	2.9	30.8	12.4	1985-96	3.1	3.0
Australia	1996	48.0	0.9	3.2	2.9	26.1	14.9	1985-96	4.3	3.4
Japan	1996	53.0	3.7	8.6	3.0 <sup>1</sup>	37.7 <sup>2</sup>	→	1985-96	4.0 <sup>1</sup>	3.3
Korea	1996	40.3	5.4	8.4	2.4 <sup>1</sup>	19.5	4.7	1985-96	12.5 <sup>1</sup>	9.1
New Zealand	1995	39.9	0.5	3.9	3.6	26.4	5.5	-	..	..
Austria	1996	43.8	9.6 <sup>3</sup>	→	2.9	25.2	6.0	1985-96	3.7	2.9
Belgium	1996	46.3	8.7 <sup>3,4</sup>	→	2.2	35.4 <sup>2</sup>	→	1985-96	3.0	2.4
Denmark	1995	42.1	1.8	6.9	2.5	23.9	7.0	1985-95	1.4	2.0
Finland	1996	42.1	3.0	8.2	3.0	24.5	3.4	1985-96	4.0	2.0
France	1996	50.0	3.0	7.0	2.9	29.1	8.0	1985-96	2.8	2.0
Germany <sup>5</sup>	1996	58.6	2.9	11.1	2.6	42.1 <sup>2</sup>	→	1985-96	3.7	2.5
Greece	1995	38.9	0.9	2.0	2.4 <sup>1</sup>	33.6 <sup>2</sup>	→	1985-95	2.9 <sup>1</sup>	1.8
Iceland	1995	31.4	0.0	0.7	2.3	21.8	6.6	-	..	..
Italy	1996	41.3	1.4	6.4	2.1	31.4 <sup>2</sup>	→	1985-96	2.8	2.2
Netherlands	1995	50.2	2.7	5.0	2.5	27.5	12.5	1986-95	2.9	2.7
Norway	1996	35.3	0.9	4.1	2.5	21.1	6.6	1985-96	1.7	3.2
Portugal	1993	33.9	1.4	4.0	2.8	16.4	9.3	1986-93	6.9	4.6
Spain	1994	37.9	1.6	7.2	2.5	20.4	6.3	1986-94	2.9	2.5
Sweden	1994	50.7	2.6	9.1	3.0	30.3	5.7	1986-94	2.4	1.7
United Kingdom	1995	51.5	3.3	7.2	3.3 <sup>1</sup>	28.3	9.4	1985-96	4.1	2.9
European Union <sup>6</sup>	1994	48.4	2.5	7.7	2.7	35.5 <sup>2</sup>	→	1986-94	3.1	2.4
Total OECD <sup>7</sup>	1994	50.9	2.9	6.9	2.8	38.2 <sup>2</sup>	→	1986-94	3.5	2.9

1. Secretariat estimate.

2. Includes Community, social and personal services.

3. Includes medium-high-technology industries.

4. Includes Shipbuilding.

5. Germany refers to western Germany.

6. Calculated with above EU countries, excluding Austria, Belgium and Portugal for shares; excluding Portugal for growth.

7. Calculated with above countries, excluding Austria, Belgium and Portugal for shares; excluding Mexico, New Zealand, Iceland and Portugal for growth.

Source: OECD, STAN database and Main Industrial Indicators, 1999.