

**UNECE**United Nations Economic Commission for Europe

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There is still steam in the German locomotive: its industry is consolidating its position as the world's second largest user and producer of industrial robots

Growth projected to be at least 4% per year in 2003-2006

After a slight drop in 2002, demand in 2003 is up sharply ...

In 2002, almost 12,000 new industrial robots were installed in Germany, compared with 10,000 in the United States, making an important contribution to the competitiveness of German industry. The stock of robots in operation amounted to about 105,000 units at the end of 2002, against 104,000 in the United States (see figure 1a).

While the robot market in 2002 was down by 16% in the European Union, it only fell by just below 7% in Germany, in terms of units, and by 5% in terms of value. As a comparison, the value of the German market for machine tools fell by as much as 20%. Robot investments seem to be less sensitive to recession than other types of investment goods.

Both the German figures and the EU figures should, however, be seen in the light of unprecedented growth since 1994, with the exception of 1997 (see figure 1b).

For the period 2003-2006, the market in Germany is projected to grow by a yearly average of 4%, reaching 13,900 units in 2006, which would result in a robot stock of over 136,000 units. As order intake of industrial robots placed by European customers increased by as much as 25% in the first half of 2003, compared with the same period in 2002, reaching the highest level ever recorded, this forecast might very well be far too conservative.

Germany has the world's highest robot density

For every 10,000 persons employed in the German manufacturing industry at the end of 2002, there were 135 industrial robots, which puts Germany at the top, disregarding Japan which includes all types of robots and not just general purpose robots in the statistics (see figure 2). In the motor vehicle industry there are as many as 1,000 robots per 10,000 production workers (see figure 3).

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Robot prices are down, labour costs are up...

Between 1990 and 2002, prices of industrial robots fell from index 100 to 48, without taking into account that robots installed in 2002 had a much higher performance than those installed in 1990 (see figure 4). If quality changes had been taken into account, it was estimated that the index would have fallen to 24. In other words, an average robot sold in 2002 would have cost about a fourth of what a robot with the same performance would have cost in 1990 if it had been possible to produce such a robot in that year. In the last few years, however, the price decline has levelled out.

At the same time, the index of labour compensation in the German business sector increased from 100 to 142. This implies that the relative prices of robots fell from 100 in 1990 to 34 in 2002 without quality adjustment, and to 17 when taking quality improvements into account.

It is interesting to note that the unit value of robots fell from over €80,000 in 1991 to about €51,000 in 1998, since which time it has been stable. This sharp fall in unit value is probably explained mainly by economies of scale and increased productivity.

Welding is the dominant application area

With almost 33,000 units or 31% of the estimated total stock of operational robots at the end of 2002, welding was the largest application area. In view of the size of the German automobile industry, this result is not surprising.

Material handling, which accounted for almost 15,300 robots at the end of 2002, was the second largest application area with just under 15% of the total stock of operational robots.

The motor vehicle industry is the largest user of robots

With about 56,200 robots, representing 53% of the 2002 total stock of operational robots, the motor vehicle industry was by far the largest robot-using branch. The chemical industry made up 10% of the total stock while the fabricated metal products industry, the machinery industry and the electrical machinery industry each had a share of about 6%.

<p>For the global development of industrial robots and service robots, see a parallel press release (ECE/STAT/03/P01) issued on the same day as the present one.</p>
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Figure 1a. Estimated operational stock of robots at year-end and shipments during the year

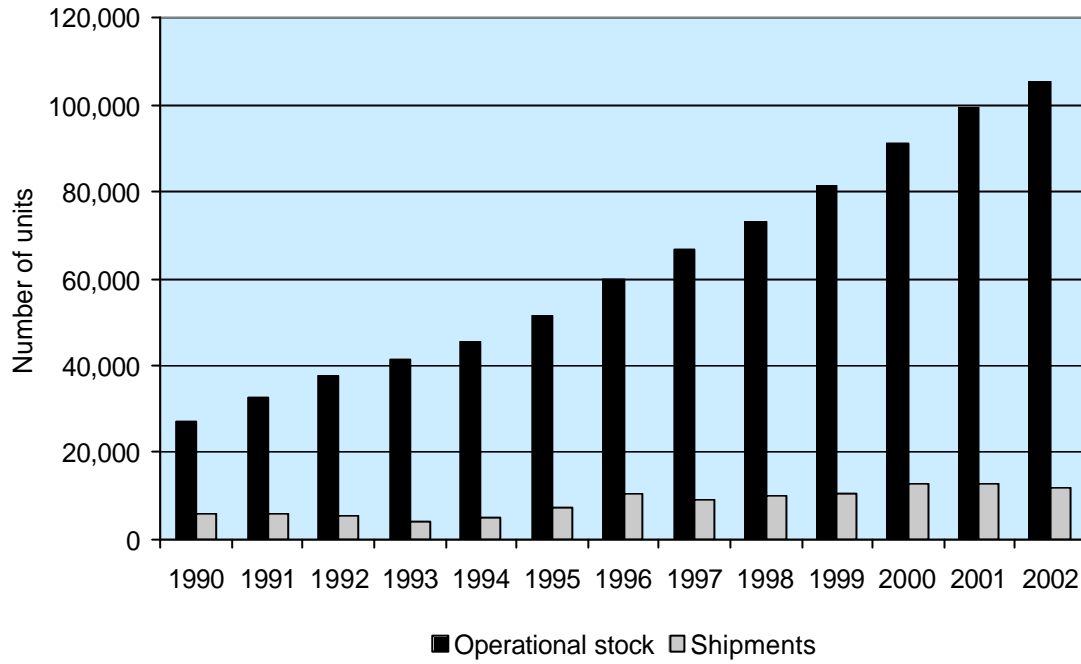
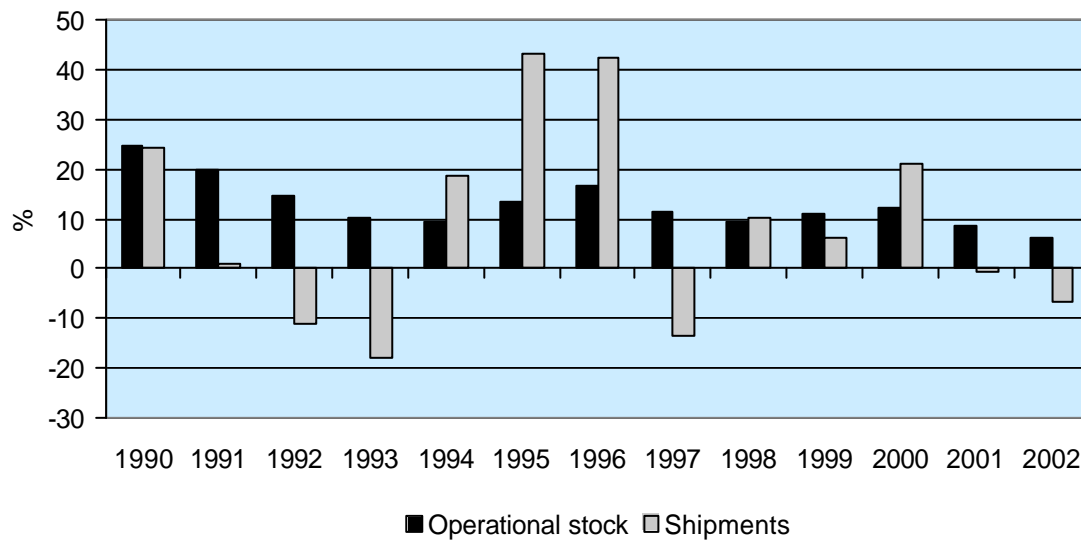


Figure 1b. Yearly percentage change in estimated operational stock and in shipments



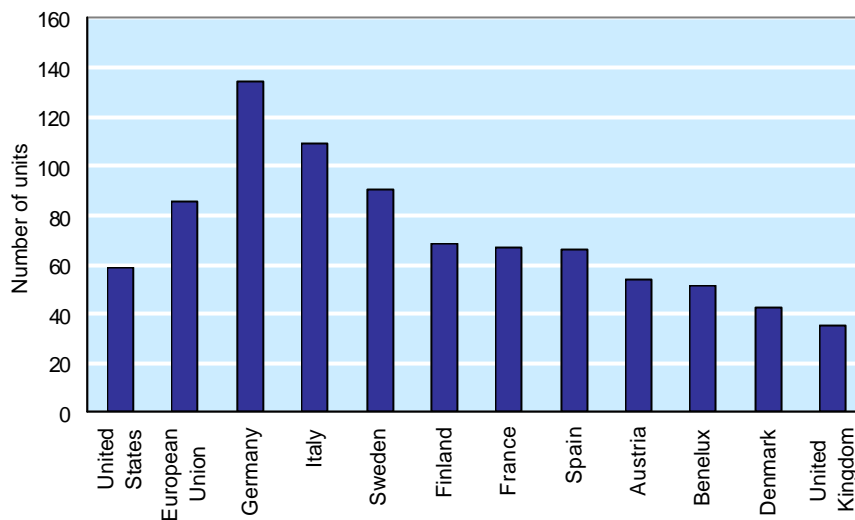
	2002
Japan a/	308
Rep. of Korea b/	128
United States	58
European Union	86
Germany	135
Italy	109
Sweden	91
Finland	68
France	67
Spain	66
Austria	54
Benelux	51
Denmark	43
United Kingdom	36
Australia	33
Norway	21
Portugal	9
Czech Rep.	8

Sources: UNECE and IFR.

a/ Up to and including 2000, data for Japan include all types of robots. As from 2001, data exclude dedicated robots, except for dedicated machining robots. As from 2001, Japanese statistics are therefore much more comparable with those of other countries.

b/ All types of industrial robots.

Figure 2. Number of robots per 10,000 persons employed in the manufacturing industry in 2002



	2001	2002
France	540	630
Germany	890	1,000
Italy	1,010	1,130
Japan	1,600	1,700
Spain	670	760
Sweden	540	570
United Kingdom	520	550
United States	690	770

Sources: UNECE and IFR.

Figure 3. Number of robots per 10,000 production workers in the motor vehicle industry, 2001 and 2002

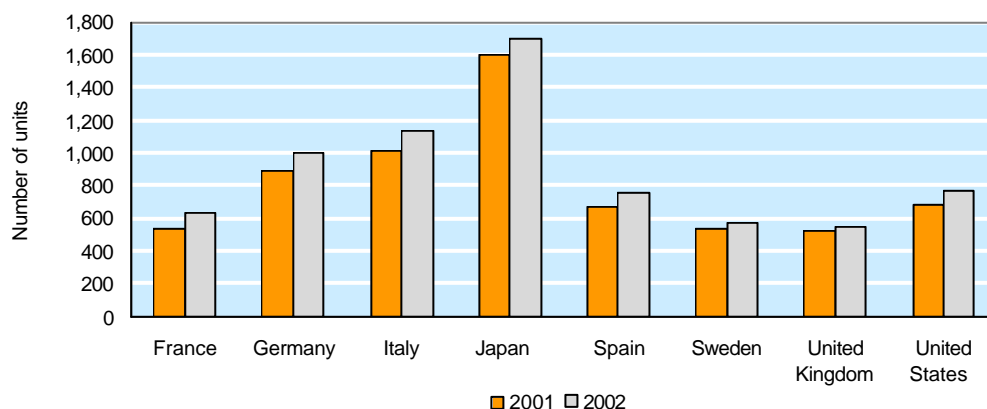
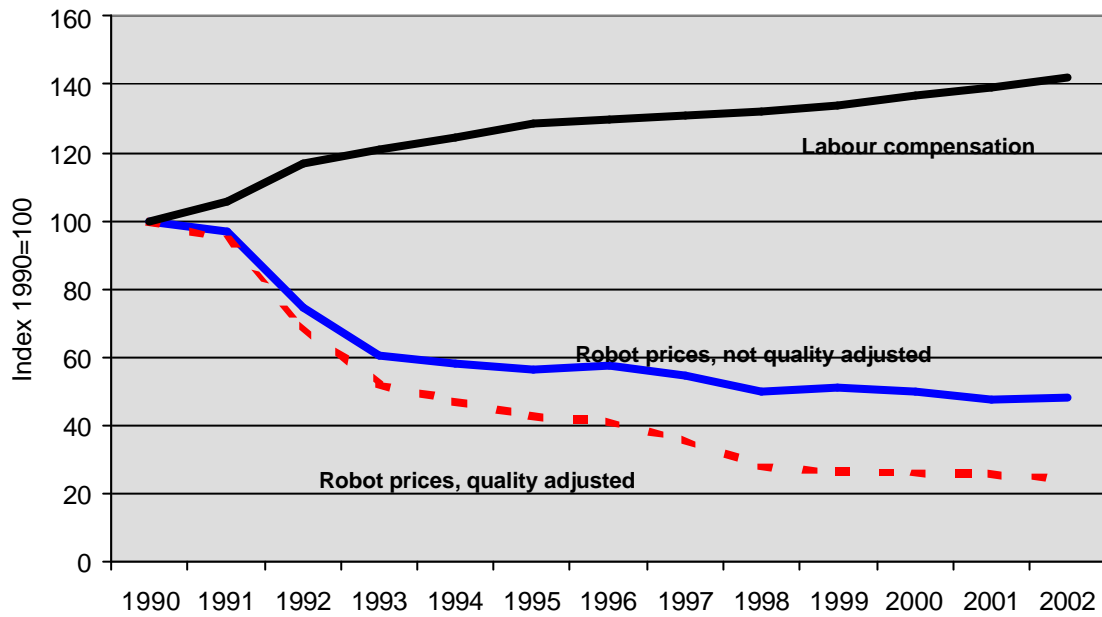


Figure 4
Price index of industrial robots in Germany, with and without quality adjustment.
Index of labour compensation in the German business sector



The publication **World Robotics 2003 – Statistics, Market Analysis, Forecasts, Case Studies and Profitability of Robot Investment** is available, quoting Sales No. GV.E.03.0.16 or ISBN No. 92-1-101059-4, through the usual United Nations sales agents in various countries or from the United Nations Office at Geneva (see address below), priced at US\$ 130:



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