17. Manufacture of radio, television, and communication equipment and apparatus – NACE 32

17.1. Characteristics of the branch

The assortment of electronic parts and equipment, which were manufactured in individual countries of the Central and Eastern Europe, did not achieve the lot production, which would allow for the utilisation of progressive technologies. Enterprises in the Czech Republic fell behind technologically advanced countries in 1980s because of their isolation from world markets. Investment demands of development programmes were the limiting factors of the development in this area.

The manufacturing base for the manufacture of electronic parts and equipment has diversified during the transformation of the Czech economy in different ways. The domestic production, which was not competitive in the market, has been closed down.

Creation of advantageous conditions for the entry of foreign direct investments by multinational companies, which were interested in relocation of a part of their production to the country with an accessible workforce and with advantageous territorial position, and already developed infrastructure, became an objective possibility for the development in the industry of electronic parts and equipment in the Czech Republic.

The production assortment and relating services are parts of the following groups in the division 32 of the Czech Branch Classification of Economic Activities (NACE):

- **32.1 – Manufacture of electronic valves and tubes and other electronic components.** NACE 32.1 includes the manufacture of hot and cold cathodes, photo cathode electronic tubes and screens, transistors, light-sensitive semiconductors, installed piezoelectric crystals, installed electronic circuits and micro sets (e.g. monolithic and hybrid integrated circuits, and micro modules), the manufacture of printed circuits, electrical condensers, resistors, and potentiometers.

- **32.2 – Manufacture of radio and television transmitters and apparatus for line telephony and line telegraphy.** NACE 32.2 covers the manufacture of television broadcasting equipment, retranslation television equipment, transmitters with receivers, radio broadcasting equipment, transmitting equipment for radio telephones and radio telegraphic systems, stabile transmitters, transmitters with receivers, and television cameras.

- **32.3 – Manufacture of radio and television receivers, sound or video recording or reproducing apparatus, and associated radio equipment.** NACE 32.3 includes the manufacture of radio and television receivers, video monitors, and video projectors, video equipment, video cameras, DVD recording and playing equipment, tape recorders, telephone answering machines, cassette recorders, audio equipment, and associated radio equipment.

Note: Data in current prices
Source: Czech Statistical Office, MIT estimate

Figure 17.1 Shares of the groups in receipts from sales of own products and services in 2004
recorders, microphones, speakers, headphones, amplifiers, antenna dishes, television decoders, the manufacture of exchanges, communication terminals, and the installation of telecommunication systems.

The share of electronic parts and equipment in receipts from sales of own products and services in 2004 is presented in Figure 17.1.

The share of the manufacture of electronic parts (NACE 32.1) in receipts of the division 32 from sales of own products and services made up 29% in 2004. The share of deliveries of telecommunication systems and telecommunication networks (NACE 32.2) in receipts of the division 32 reached 47% in 2004. The share of the manufacture of consumer electronics (NACE 32.3) in receipts of the division 32 reached 24% in 2004.

17.2. Position of the branch within manufacturing

There were new manufacturing centres producing electronic parts and equipment built, in the form of investment green site projects, in the Czech Republic in the period 2000 – 2004. They utilised foreign direct investments.

Electronic parts

The company AVX Czech Republic produces tantalic condensers in Lanškroun in 1993. The owner is AVX Corporation (USA), whose majority shareholder is Kyocera Corporation (Japan). The company AVX Czech Republic also qualified for the system of government investment incentives and in 1999 invested into the construction of a new production hall for the manufacturing of tantalic anodes. The transfer of the manufacture of tantalic anodes from Great Britain to the Czech Republic created more than 1 000 new workplaces. AVX Czech Republic in Lanškroun (http://www.avxcorp.com) is one of the biggest plant manufacturing tantalic condensers in the world. The company exports 100% of its production through its AVX distribution centre in Great Britain and covers more than 20% of the world consumption.

The company ON Semiconductor CHC in Rožnov pod Radhoštěm is the majority owner of the joint stock company ON Semiconductor Czech Republic. ON Semiconductor Czech Republic is the successor of TESLA SEZAM and the amalgamated joint stock company TEROSIL. These companies were founded in 1990 by the division of the former state owned company TESLA Rožnov. Both companies had developed their commercial relations with Motorola and this was finalised by the privatisation of these companies in 1997.


Activities of ON Semiconductor in the Czech Republic are focused on the design of new semiconductor parts, the production of integrated bipolar circuits on 4" boards, the manufacture of mono crystalline silicon, and Si boards of the diameters 4.5" and 6" including epitax layer.

The world semiconductor market crisis in 2001 speeded up the structure optimising project in the concern ON Semiconductor. The increase of manufacturing capacities in Rožnov was a part of this project as well as the implementation of new manufacturing processes and the transfer of a number of manufacturing activities. There was the manufacturing from the closed down production lines in Toulouse (France) and East Greenwich (USA) transferred to Rožnov. There were 350 new kinds of IO, with different technological processes, introduced to Rožnov during five years.

The company ASICentrum in Praha (http://www.asicentrum.cz) extended its original orientation on design, testing, and the manufacture of integrated circuits with the development of integrated circuit applications, sales of Mentor Graphics Software, and sales of a selected assortment of electronic parts. ASICentrum had become a part of the international SWATCH GROUP in 2001.

The result of co-operation of the Royal Philips Electronics from the Netherlands with LG Electronics from South Korea was the founding of a joint venture in the Czech Republic. By the implementation of this investment business plan, a plant for the manufacture of large colour TV screens of the LG Philips
Displays Technology Centre in Hranice na Moravě was constructed. Operations consisting of two manufacturing lines commenced in the manufacturing plant LG Philips Displays Technology Centre in Hranice na Moravě (http://www.lgphilipsdisplays.com) in September 2001. There had been a third manufacture line installed in April 2002. More than 95% of the production is determined for exports to developed EU countries. The most important customers of the company LG Philips Displays are the companies Philips Consumer Electronics and LG Electronics.

The company Vishay Electronic Přeštice (http://www.vishay.com) was founded in 1991. The company Vishay has got currently, in the Czech Republic, five manufacturing plants in Přeštice, Blatná, Prachatice, Volary, and Dolní Rychnov u Sokolova. Vishay Intertechnology had transferred to the Czech Republic the production of electric resistors and condensers, mainly from Germany and France. Exports of the company production has reached 100%. It is completed through the distribution centre, which the company Vishay Intertechnology built in Plzeň in 2001.

The company TCT in Rožnov pod Radhoštěm (http://www.tctas.cz) produces flat television screens. The production depends on a foreign licence holder and it has found its way to relevant markets.

There are many other important manufacturers of electronic parts in the Czech Republic as follows:


**Telecommunication technology**

The company Panasonic Mobile & Automotive Systems Czech in Pardubice (http://www.mccz.panasonic.cz) manufactures car radios and supplies mobile telephones. The telecommunication division Matsushita Communication Industrial of the Japanese concern Matsushita Electric Industrial invested into building a new plant in the industrial zone in Pardubice. The production is exported to demanding markets in the EU Members–States.

The company Celestica Kladno (http://www.celestica.com) assembles mobile telephones on order and produces printed circuit boards. The plant for the assembly of mobile telephones was built in the industrial zone Kladno in 2000, in the division of terminals and telecommunications of the Sagem Group. There were more than 1 000 new jobs created. This investment was taken over by Celestica in July 2001.

STROM Telecom, s.r.o. (http://www.strom.cz) is a Czech telecommunication company. It has been active in the telecommunication technology market since 1993. The manufacturing programme of the company is represented by two basic groups of products. They are the digital systems determined for working in telecommunication networks of different topologies and integrated information–technological system for the automated collection, saving, and processing of information for the management and support of the decision–making process of telecommunication operators.

The company 2N Telekomunikace (http://www.2n.cz) manufactures and supplies communication servers, digital and hybrid branch exchanges, GSM gates with interfaces or analogue lines, and door
Manufacture of radio, television, and communication equipment and apparatus

Communicators. The company exports to 30 countries. GSM and alternative operators are among key customers.

TTC Marconi (http://www.ttc.cz) is a joint venture of TTC Telekomunikace Praha and MARCONI COMMUNICATIONS. Its position on the telecommunication market proves the necessity of interconnection of domestic manufacturers with a strong partner, which helps in complex approach to customer requirements and in penetration of markets abroad. TTC Marconi supplies technologies and network integration in the area of transmission of telephones, data, and radio signals.

The important suppliers of telecommunications equipment in the Czech Republic are as follows: TESLA Praha (http://www.tesla.cz), the company ROHDE & SCHWARZ in Vimperk (http://www.rohde-schwarz.cz), and TSE in České Budějovice (http://www.tse.cz).

Consumer electronics

The company Panasonic AVC Networks Czech, s.r.o. (http://www.matsushita.cz) was founded in March 1996 in the industrial zone Borská Pole in Plzeň. It is a subsidiary of Matsushita Electric, products of which are known under commercial brands Panasonic, National, Technics, and Quasar. Matsushita Electric Industrial realized the transfer of the production of colour television receivers from Great Britain to the Czech Republic. The plant construction started in 1996. The lot production of televisions sets started in April 1997. It was one of the biggest foreign investments in the Czech Republic. The production is exported to demanding markets in EU countries.

The company ALPS Electric Czech built a plant for the manufacture of digital TV tuners, for set-top-boxes and digital television receivers, in Boskovice. ALPS Electric Czech (http://www.alps.cz) commenced the production in Boskovice in August 2000 and created more than 400 new work places. The production is determined for exports.

There are also other manufacturers of consumer electronics in the Czech Republic: TVM Valašské Meziříčí (http://www.tvm-valmez.cz) – the manufacturer of speakers, and SEV Litovel (http://www.sev-litove1.cz) – the manufacturer of turntables. The turntables of the Pro-ject series have been co-designed and distributed by Audio Tuning from Vienna.

The exports of electronic parts and equipment reached CZK 107922 million in 2004. The share of exports of electronic goods in exports of the manufacturing industry reached 6.3% in 2004. The commissioning of the new production capacities continued in the NACE 32. Foreign direct investments within the branch DL, at implementation of more than 60 projects, reached CZK 67 151.2 million. The share of the NACE 32 in receipts from sales of own products and services of the entire manufacturing industry, in the amount of CZK 96 720.8 million in 2004, attained the level of 3.9%. The inter-annual growth of receipts within electronic parts and equipment industry represented 41%.

The companies of TOP 10 largest exporters of goods production of the Czech Republic in 2004 were exporting by 76% more production than in 2003. The 8th place was taken by the company Panasonic AVC Networks Czech from Plzeň with exports of colour television receivers amounting to CZK 20 697 million (the inter-annual growth by 71.2%). The enhancement of exports is connected with the implementation of the production of colour television receivers with LCD and plasma screens.

The most important investors, who decided to invest in the Czech Republic in 2004, took over the award of “INVESTOR OF THE YEAR 2004”. The company TYCO Integrated Systems Brno gained accordingly the 2nd place in the category of the investment with the biggest innovating potential for its project of centre of development of electronic equipment for wireless communication.

The Czech Republic has already had a strong position in the area of foreign direct investments. In calculation per capita, the CR along with Estonia and Hungary is one of the most successful countries of the Central and Eastern Europe. Confidence of investors, positive experience and references are important pre-condition to get the projects in the field of strategic services and technological centres, the number of which has been all the time increasing. The above-mentioned awarded company proves that.

In the course of 1st quarter 2005 the NACE 32 reported another implementation of the new capacities into operation along with the enlargement of the productions. The products have been largely oriented on export, which manifested the growth of receipts from direct export of the production of the NACE 32 by 20.9%. The newly concluded orders have significantly increased in total, out of which from abroad by 42.7%.
17.3. Structure of the branch, according to the size of enterprises

The organizations with more than 250 employees reached a high growth of receipts (in current prices) in the size groups of industrial enterprises. In the size groups of enterprises with 250 to 999 employees and in that one with 1 000 and more employees there are mainly companies under foreign control with good export possibilities, which is witnessed in a high growth of receipts from direct export.

Receipts from sales of own products and services, value added per employee and the number of employees, according to size groups of enterprises in 2003 (NACE 32) are presented in Table 17.1.

Table 17.1 Main production indicators in 2003, according to size of enterprises – NACE 32

<table>
<thead>
<tr>
<th>(Mil. CZK, Employees)</th>
<th>0 – 9</th>
<th>10 – 49</th>
<th>50 – 249</th>
<th>250 – 999</th>
<th>more than 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receipts from sales of own P and S in cur. p.</td>
<td>3 678.1</td>
<td>2 505.2</td>
<td>8 853.0</td>
<td>31 501.4</td>
<td>26 088.9</td>
</tr>
<tr>
<td>Value added in cur. p.</td>
<td>1 301.7</td>
<td>962.5</td>
<td>2 690.6</td>
<td>3 818.0</td>
<td>5 991.2</td>
</tr>
<tr>
<td>Number of employees</td>
<td>5 824.0</td>
<td>2 815.0</td>
<td>5 543.0</td>
<td>7 489.0</td>
<td>11 129.0</td>
</tr>
</tbody>
</table>

Source: Czech Statistical Office, MIT estimate

After completion of the investment projects, the share of the size groups of enterprises in the main production indicators will be still more significantly concentrated in the category with 1 000 and more employees.

The share of size groups of enterprises in the production indicators in 2003 is specified in Figure 17.2.

![Figure 17.2 Shares of the size groups of organisations in main production indicators 2003](image)

Note: Data in current prices
Source: Czech Statistical Office, MIT estimate

17.4. Regional structure of the branch

The shares of individual regions in main production indicators of the NACE 32 in 2003 are presented in Figure 17.3.
Manufacture of radio, television, and communication equipment and apparatus

17.5. Main economic indicators

17.5.1. Development in price indices

Development in price indices of the production in the NACE 32 – manufacture of electronic parts and equipment (CPA 32) in the period 2000 – 2004 is described in Table 17.2.

Table 17.2 Development in price indices of products in 2000–2004

<table>
<thead>
<tr>
<th>(%)</th>
<th>Year–on–year index</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/00</td>
<td>02/01</td>
</tr>
<tr>
<td>CPA 32.1</td>
<td>100.3</td>
</tr>
<tr>
<td>CPA 32.2</td>
<td>100.1</td>
</tr>
<tr>
<td>CPA 32.3</td>
<td>104.0</td>
</tr>
<tr>
<td>CPA 32</td>
<td>100.7</td>
</tr>
</tbody>
</table>

Source: Czech Statistical Office, MIT estimate

From the above–presented table it follows that the price index of the manufacture of electronic parts and equipment in the period 2000 – 2004 fluctuated below the level of inflation. Thus it differs from energy intensive groups of the manufacturing industry.

17.5.2. Main production indicators

Development in sales of own products and services within the branch of electronic parts and equipment (NACE 32) in the period from 2000 – 2004 is presented in Table 17.3.
Table 17.3 Receipts from sales of own products and services, in current and constant prices, in 2000–2004

<table>
<thead>
<tr>
<th>NACE 32.1</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NACE 32.2</td>
<td>14 773.7</td>
<td>17 589.5</td>
<td>17 713.3</td>
<td>23 329.6</td>
<td>28 470.8</td>
</tr>
<tr>
<td>NACE 32.3</td>
<td>14 766.5</td>
<td>20 147.1</td>
<td>25 090.7</td>
<td>33 976.6</td>
<td>44 606.2</td>
</tr>
<tr>
<td>NACE 32</td>
<td>15 259.6</td>
<td>16 798.3</td>
<td>23 320.4</td>
<td>15 320.3</td>
<td>23 643.8</td>
</tr>
</tbody>
</table>

| NACE 32 | 44 799.8 | 54 534.9 | 66 124.4 | 72 626.5 | 96 720.8 |

Year–on–year index (cur. p.)
Cumulative index (cur. p.)
100.0
121.7
121.3
109.8
133.2
215.9

Table 17.4 Value added, in current and constant prices, in 2000–2004

<table>
<thead>
<tr>
<th>NACE 32.1</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NACE 32.2</td>
<td>14 773.7</td>
<td>17 036.9</td>
<td>18 655.4</td>
<td>25 945.7</td>
<td>33 659.5</td>
</tr>
<tr>
<td>NACE 32.3</td>
<td>14 766.5</td>
<td>20 051.4</td>
<td>24 592.3</td>
<td>33 072.6</td>
<td>43 595.8</td>
</tr>
<tr>
<td>NACE 32</td>
<td>15 259.6</td>
<td>16 265.2</td>
<td>24 627.2</td>
<td>16 944.1</td>
<td>27 148.2</td>
</tr>
</tbody>
</table>

| NACE 32 | 44 799.8 | 53 353.5 | 67 874.9 | 75 962.4 | 104 403.5 |

Year–on–year index (con. p.)
Cumulative index (con. p.)
100.0
119.1
151.5
169.6
233.0

Performance of the NACE 32 in the period 2000 – 2004 was influenced by the commissioning of the new production capacities in the companies under foreign control. Competitiveness was enhanced by the inflow of the foreign capital. The index 2004/2003 documents the inter–annual growth of receipts from sales of own products and services of the division of electronic parts and equipment by 33.2% in current prices. The cumulative index 2004/2000 proves the growth of production by 115.9%.

Development in value added per employee within the division of electronic parts and equipment (NA-CE 32) in the period 2000 – 2004 is presented in Table 17.4.

Table 17.4 Value added, in current and constant prices, in 2000–2004

<table>
<thead>
<tr>
<th>NACE 32.1</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NACE 32.2</td>
<td>3 288.2</td>
<td>3 781.9</td>
<td>5 486.4</td>
<td>5 149.5</td>
<td>6 477.7</td>
</tr>
<tr>
<td>NACE 32.3</td>
<td>1 645.9</td>
<td>2 423.3</td>
<td>3 051.1</td>
<td>1 991.2</td>
<td>2 132.7</td>
</tr>
<tr>
<td>NACE 32</td>
<td>10 817.0</td>
<td>13 252.3</td>
<td>15 058.6</td>
<td>14 764.1</td>
<td>17 240.5</td>
</tr>
</tbody>
</table>

Year–on–year index (con. p.)
Cumulative index (con. p.)
100.0
111.4
136.9
133.6
185.7

Development in costs in the division of electronic parts and equipment (NACE 32) in the period 2000 – 2004 is described in Table 17.5.

Development in the main production indicators within the division of electronic parts and equipment (NACE 32) in comparison with the same indicators in the manufacturing industry (NACE D) in the period 2000 – 2004 is illustrated in Figure 17.4.

Development in the number of employees in the division of electronic parts and equipment (NACE 32) in the period 2000 – 2004 is described in Table 17.5.
Table 17.5 Number of employees in 2000–2004

<table>
<thead>
<tr>
<th>(Employees)</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NACE 32.1</td>
<td>19 134</td>
<td>19 042</td>
<td>17 618</td>
<td>18 354</td>
<td>20 260</td>
</tr>
<tr>
<td>NACE 32.2</td>
<td>7 967</td>
<td>9 144</td>
<td>9 163</td>
<td>9 304</td>
<td>10 137</td>
</tr>
<tr>
<td>NACE 32.3</td>
<td>5 246</td>
<td>7 370</td>
<td>6 354</td>
<td>5 142</td>
<td>5 662</td>
</tr>
<tr>
<td>NACE 32</td>
<td>32 347</td>
<td>35 556</td>
<td>33 135</td>
<td>32 800</td>
<td>36 059</td>
</tr>
<tr>
<td>Year–on–year index</td>
<td>x</td>
<td>109.9</td>
<td>93.2</td>
<td>99.0</td>
<td>109.9</td>
</tr>
<tr>
<td>Cumulative index</td>
<td>100.0</td>
<td>109.9</td>
<td>102.4</td>
<td>101.4</td>
<td>111.5</td>
</tr>
</tbody>
</table>

* Preliminary value
Source: Czech Statistical Office, MIT estimate

Figure 17.4 Development in main production indicators in 2000–2004

Table 17.6 Total costs, in current prices, in 2000–2004

<table>
<thead>
<tr>
<th>(Mill. CZK) cur. p.</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NACE 32.1</td>
<td>16 371.9</td>
<td>20 455.0</td>
<td>20 175.1</td>
<td>25 759.6</td>
<td>30 407.6</td>
</tr>
<tr>
<td>NACE 32.2</td>
<td>25 484.9</td>
<td>25 734.6</td>
<td>33 287.9</td>
<td>49 193.2</td>
<td>61 318.9</td>
</tr>
<tr>
<td>NACE 32.3</td>
<td>17 301.6</td>
<td>17 808.7</td>
<td>24 136.0</td>
<td>15 713.5</td>
<td>23 891.1</td>
</tr>
<tr>
<td>NACE 32</td>
<td>59 158.4</td>
<td>63 998.3</td>
<td>77 599.0</td>
<td>90 666.3</td>
<td>115 617.6</td>
</tr>
<tr>
<td>Year–on–year index (cur. p.)</td>
<td>x</td>
<td>108.2</td>
<td>121.3</td>
<td>116.8</td>
<td>127.5</td>
</tr>
<tr>
<td>Cumulative index (cur. p.)</td>
<td>100.0</td>
<td>108.2</td>
<td>131.2</td>
<td>153.3</td>
<td>195.4</td>
</tr>
</tbody>
</table>

* Preliminary value
Source: Czech Statistical Office, MIT estimate
The share of labour costs in the division of electronic parts and equipment (NACE 32) in the period 2000 – 2004 (in current prices) is documented in Table 17.7.

Table 17.7 Labour costs, in current prices, in 2000–2004

<table>
<thead>
<tr>
<th>NACE</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.1</td>
<td>3 405.7</td>
<td>3 589.7</td>
<td>3 516.7</td>
<td>3 900.4</td>
<td>4 770.4</td>
</tr>
<tr>
<td>32.2</td>
<td>1 943.3</td>
<td>2 191.2</td>
<td>2 630.1</td>
<td>2 797.1</td>
<td>3 527.5</td>
</tr>
<tr>
<td>32.3</td>
<td>865.9</td>
<td>1 311.2</td>
<td>1 305.5</td>
<td>1 082.3</td>
<td>1 265.0</td>
</tr>
<tr>
<td>32</td>
<td>6 214.9</td>
<td>7 092.1</td>
<td>7 452.3</td>
<td>7 779.8</td>
<td>9 562.9</td>
</tr>
</tbody>
</table>

Year–on–year index (cur. p.)
x 114.1 105.1 104.4 122.9
Cumulative index (cur. p.)
100.0 114.1 119.9 125.2 153.9

* Preliminary value
Source: Czech Statistical Office, MIT estimate

17.5.3. Labour productivity and labour costs

Development in the labour productivity from value added per employee in the division of electronic parts and equipment (NACE 32) in the period 2000 – 2004 is presented in Table 17.8.

Table 17.8 Labour productivity from value added, in current and constant prices, in 2000–2004

<table>
<thead>
<tr>
<th>NACE</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.1</td>
<td>307.5</td>
<td>370.1</td>
<td>370.1</td>
<td>415.4</td>
<td>426.0</td>
</tr>
<tr>
<td>32.2</td>
<td>412.7</td>
<td>413.6</td>
<td>598.8</td>
<td>553.5</td>
<td>639.0</td>
</tr>
<tr>
<td>32.3</td>
<td>313.7</td>
<td>328.8</td>
<td>480.2</td>
<td>387.2</td>
<td>376.7</td>
</tr>
<tr>
<td>32</td>
<td>334.4</td>
<td>372.7</td>
<td>454.5</td>
<td>450.1</td>
<td>478.1</td>
</tr>
</tbody>
</table>

Year–on–year index (cur. p.)
x 111.5 121.9 99.0 106.2
Cumulative index (cur. p.)
100.0 111.5 135.9 134.6 143.0

(Thous. CZK/Empl.) con. p.

<table>
<thead>
<tr>
<th>NACE</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.1</td>
<td>307.5</td>
<td>336.7</td>
<td>368.1</td>
<td>438.6</td>
<td>488.1</td>
</tr>
<tr>
<td>32.2</td>
<td>412.7</td>
<td>413.9</td>
<td>508.7</td>
<td>367.6</td>
<td>393.7</td>
</tr>
<tr>
<td>32.3</td>
<td>313.7</td>
<td>251.1</td>
<td>575.8</td>
<td>579.3</td>
<td>715.0</td>
</tr>
<tr>
<td>32</td>
<td>334.4</td>
<td>338.8</td>
<td>446.8</td>
<td>440.5</td>
<td>497.2</td>
</tr>
</tbody>
</table>

Year–on–year index (con. p.)
x 101.3 131.9 98.6 112.9
Cumulative index (con. p.)
100.0 101.3 133.6 131.7 148.7

* Preliminary value, constant prices in 2000
Source: Czech Statistical Office, MIT estimate

The share of labour costs in value added in the division of electronic parts and equipment (NACE 32) in the period 2000 – 2004 is shown in Table 17.9.

Table 17.9: Share of labour costs in value added, in current prices, in 2000–2004

<table>
<thead>
<tr>
<th>NACE</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.1</td>
<td>0.579</td>
<td>0.509</td>
<td>0.539</td>
<td>0.512</td>
<td>0.553</td>
</tr>
<tr>
<td>32.2</td>
<td>0.591</td>
<td>0.579</td>
<td>0.479</td>
<td>0.543</td>
<td>0.545</td>
</tr>
<tr>
<td>32.3</td>
<td>0.526</td>
<td>0.541</td>
<td>0.428</td>
<td>0.544</td>
<td>0.593</td>
</tr>
<tr>
<td>32</td>
<td>0.575</td>
<td>0.535</td>
<td>0.495</td>
<td>0.527</td>
<td>0.555</td>
</tr>
</tbody>
</table>

* Preliminary value
Source: Czech Statistical Office, MIT estimate

Development in labour productivity from value added in the division of electronic parts and equipment (NACE 32) in comparison with the development in the manufacturing industry (NACE D), and the share
of labour costs in value added in the NACE 32, when compared with the development in the manufacturing in the period 2000 – 2004, is illustrated in Figure 17.5.

![Graph showing the development in share and ratio indicators in 2000-2004](image_url)

*Note: Labour productivity from value added in constant prices of 2000; share of labour costs in value added in current prices
* Preliminary value
Source: Czech Statistical Office, MIT estimate

**Figure 17.5 Development in share and ratio indicators in 2000-2004**

### 17.6. Foreign trade

Exports of electronic and electrotechnical products achieved the value of CZK 391 927 million in 2004. It makes up 23.6% of the export of the entire manufacturing industry.

#### 17.6.1. Development in foreign trade

Exports of electronic parts and equipment (CPA 32) achieved the value of CZK 107 920.8 million in 2004. The newly concluded orders in the production significantly increased, out of which from abroad by 42.7%. The share of the exports of electronic parts and equipment in the export of goods production of the manufacturing industry achieved 6.3%. The index 2004/2003 documents the growth of exports of electronic parts and equipment by 56.5%.

The biggest share in exports of electronic parts and equipment in 2004 consisted of the exports of goods, according to the following sub–chapters of HS (data in million CZK):

- 8528 Television receivers and combined sets: 24 553.4
- 8525 Transmission equipment for television and the radio broadcasting, and television cameras: 20 470.6
- 8529 Parts of broadcasting, receiving, television, and radio sets: 13 305.8
- 8540 Electronic tubes, tubes with a cathode, or photo cathode: 11 969.4
- 8532 Electric fixed, rotary, and tuning condensers: 11 705.1
- 8542 Integrated electronic circuits and micro sets: 7 158.0
- 8527 Receivers for radio telegraphy, radio telephony, and radio: 5 587.9
- 8517 Electric equipment for telephony and wire telegraphy: 4 720.1
- 8534 Printed circuits: 2 113.2
- 8533 Electric resistors, including rheostats, etc.: 1 852.1
- 8519 Turntables, chassiss, and other players and reproduction sets: 1 359.2
- 8541 Diodes, transistors and semiconductor and photo sensitive sets: 1 059.7
- 8521 Video recording and playing sets: 1 067.8

Development in foreign trade (NACE 32) in the period 2000 – 2004 (in current prices) is presented in Table 17.10.
### Table 17.10 Development in foreign trade in products, in current prices, in 2000–2004

<table>
<thead>
<tr>
<th>CPA</th>
<th>Total exports (Mill. CZK)</th>
<th>Total imports (Mill. CZK)</th>
<th>Balance (Mill. CZK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPA 32.1</td>
<td>33 569.6</td>
<td>28 778.6</td>
<td>29 821.1</td>
</tr>
<tr>
<td>CPA 32.2</td>
<td>6 035.5</td>
<td>17 280.9</td>
<td>16 655.0</td>
</tr>
<tr>
<td>CPA 32.3</td>
<td>15 050.3</td>
<td>27 060.0</td>
<td>21 663.1</td>
</tr>
<tr>
<td>CPA 32</td>
<td>54 655.4</td>
<td>73 119.5</td>
<td>68 139.2</td>
</tr>
</tbody>
</table>

Source: Czech Statistical Office

Imports of electronic parts and equipment reached CZK 132 397.5 million in 2004. The biggest share in the imports of the production of the branch of electronic parts and equipment consisted of imported goods, according to the following sub-chapters of HS (data in million CZK):

- 8542 Integrated electronic circuits and micro sets: 40 809.7
- 8525 Broadcasting equipment for television and the radio: 25 987.9
- 8529 Parts of broadcasting and receiving television and radio sets: 11 197.7
- 8540 Electronic tubes, tubes with a cathode, or a photo cathode: 8 674.9
- 8534 Printed circuits: 7 714.2
- 8528 Television and combined receivers: 7 467.4
- 8532 Electric fixed, rotary, and tuning condensers: 6 882.5
- 8517 Electric sets for telephony and wire telegraphy: 5 077.9
- 8541 Diodes, transistors and similar semiconductor sets, including photosensitive and other units: 4 467.1
- 8533 Electric resistors, including rheostats: 3 031.6
- 8527 Radio telegraphy, radio telephony, and radio receivers: 3 214.1
- 9009 Photocopy and thermocopy apparatus: 1 900.3
- 8519 Turntables, chassis, players and similar sets: 1 349.6

### 17.6.2. Territorial structure of foreign trade

The territorial distribution of foreign trade in products of the division of electronic parts and equipment (CPA 32) in 2004 is shown in Figure 17.6.

Exports of electronic parts and equipment (CPA 32) went, in 2004, mostly to Germany, Great Britain, Netherlands, Poland, Italy, Hungary, France and Spain. Imports came mostly from Germany, China, Japan and Malaysia.
17.6.3. Domestic consumption

A decisive part of the domestic consumption of electronic parts and equipment has been covered by imports of progressive technologies from technologically advanced countries.

Supplying, distributing, and selling organisations (NACE 51 and 52), which specialise on supplies of electronic parts and equipment, decisively organised deliveries to the domestic market. The production manufactured in the Czech Republic (NACE 32) was mostly determined for exports.

17.6.3.1. Domestic consumption of products

Development in the domestic consumption of electronic parts and equipment (CPA 32) in the period 2000 – 2004 (in current prices) is presented in Table 17.11.

Table 17.11 Domestic consumption, in current prices, of CPA 32 products in 2000–2004

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPA 32.1</td>
<td>64 778.7</td>
<td>90 121.6</td>
<td>66 346.6</td>
<td>68 321.1</td>
<td>69 624.2</td>
</tr>
<tr>
<td>CPA 32.2</td>
<td>36 503.6</td>
<td>47 187.9</td>
<td>37 852.2</td>
<td>25 045.2</td>
<td>35 177.1</td>
</tr>
<tr>
<td>CPA 32.3</td>
<td>19 890.7</td>
<td>27 034.5</td>
<td>18 947.2</td>
<td>23 949.6</td>
<td>18 970.7</td>
</tr>
<tr>
<td>CPA 32</td>
<td>121 173.0</td>
<td>164 344.1</td>
<td>123 146.0</td>
<td>117 315.9</td>
<td>123 772.0</td>
</tr>
<tr>
<td>Year–on–year index (cur. p.)</td>
<td>x</td>
<td>135.6</td>
<td>74.9</td>
<td>95.3</td>
<td>105.5</td>
</tr>
<tr>
<td>Cumulative index (cur. p.)</td>
<td>100.0</td>
<td>135.6</td>
<td>101.6</td>
<td>96.8</td>
<td>102.1</td>
</tr>
</tbody>
</table>

Note: change of calculation method
Source: Czech Statistical Office, MIT own estimate
The build up of the domestic consumption, which has been taking place since 2000, has been determined by implementation of the telecommunication technologies in all parts of the national economy similarly like other EU countries.

17.7. Investments

Foreign direct investments in the branch of the manufacture of computers, electronics and electrotechnics, at implementation of more than 60 projects, reached CZK 67 151.2 million.

17.7.1. Foreign direct investments

Development in foreign direct investments (FDI) in the division of electronic parts and equipment (NACE 32) in the period 2000 – 2003 is presented in Table 17.12.

Table 17.12 Foreign direct investments – NACE 32

<table>
<thead>
<tr>
<th>Mill. CZK</th>
<th>as on 31.12. 00</th>
<th>as on 31.12. 01</th>
<th>as on 31.12. 02</th>
<th>as on 31.12. 03</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI in ČR</td>
<td>6 761.9</td>
<td>17 464.3</td>
<td>23 435.0</td>
<td>26 652.0</td>
</tr>
<tr>
<td>Domestic investments abroad</td>
<td>3.1</td>
<td>2.7</td>
<td>4.3</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Source: Czech National Bank

There were new manufacturing centres for electronic parts and equipment built with the utilisation of foreign direct investments in the period from 2000 – 2004. They were especially the facilities of Panasonic Mobile & Automotive Systems Czech in Pardubice, Panasonic AVC Networks Czech in Plzeň, LG Philips Displays Technology Centre in Hranice na Moravě, AVX Czech Republic in Lanškroun, ON Semiconductor CHC in Rožnov pod Radhoštěm, and Celestica in Kladno.

Currently there is being implemented another project for enlargement of the company AVC Networks Czech in Plzeň. The plan will create another 550 new jobs. In Plzeň a completely new manufacture of colour television receivers with plasma (PDP) and liquid crystalline (LCD) screens is being introduced.

Andrew Corporation built up new production plant in the industrial zone in Modřice u Brna. There were 300 new jobs created. The company Andrew Telecommunications manufactures coaxial cable systems SureFlex, waveguides Flex–Twist, and microwave antennas for the base stations in mobile telecommunication networks, which are determined mainly for European markets. The Andrew Company only in the plant in the Czech Republic manufactures the antennas ValueLine. The production is determined for exports.

The Danish company Bang & Olafson, the manufacturer of luxury electronics, is building a centre for the manufacture of brand television sets, speakers, and other audio and video equipment in the industrial zone in Kopřivnice. The investment will create 200 new job opportunities. The production is determined for export.

The Irish company Realtime Technologies manufactures printed circuit boards in Pardubice. The company has got its plants in Dublin and Sunnyvale (USA). There are multinational electronic companies among its customers.

The company VDO Czech Republic in Brandýs nad Labem constructs new production capacities. They relate to the transfer of production of display units, electronic control units for the air conditioning control in cars of German and French origin. The audio equipment includes also combinations of car radios with a navigation system, or with other vehicle control systems. The production is determined for exports.

The company EPCOS Ferity is the second biggest ferrite manufacturer in the world, and the biggest one in Europe. EPCOS Ferity transferred to Šumperk its production of ferrite cores from Germany and partly also from France with the utilisation of an investment incentive. The investment incentive for the construction of a new plant was granted in 2000 and the company invested about EUR 35 million. At this stage the production from Munich was transferred to Šumperk. EPCOS received another incentive to
extend its production in 2002. The production from Bordeaux was transferred to Šumperk. The company created 600 new jobs in the Czech Republic. Its production is determined for exports.

Development of foreign direct investments in the division of electronic parts and equipment (NACE 32) in the period 2000 – 2002 is presented in Figure 17.7.

![Graph](image)

Source: Czech National Bank

**Figure 17.7 Indigenous and foreign investments**

### 17.8. International comparison and competitiveness

Because of the globalisation process in the economy, the dynamic development in economies of technologically advanced countries required the corresponding level of labour productivity, intensive involvement of developed countries in the international work cooperation, and efficient specialisation related to economic and natural conditions existing in these countries.

Next stage in development is a creation of prerequisites for development of technological centres. The “Framework Programme Supporting Creation of the Strategic Services and Technological Centres” was approved by the Resolution of the Government No. 1238/2003.

The plan for the extension of research and development centre of Panasonic AVC Networks Czech in Plzeň has become one of the first projects in the area of technological high-tech centres in the Czech Republic. The project creates conditions for creation of new workplaces with high demands on qualifications. The goal of the VVC project is the extension of the existing technological centre for the development of colour television receivers. The project will require the investment of CZK 148 million.

In 2002, a small development centre, focused on the optimising and transfer of production processes, was established within the framework of ON Semiconductor CHC in Rožnov pod Radhoštěm. The investment goal of the company is the extension of the existing development activities in Rožnov pod Radhoštěm, which are focused on development and innovation of technological processes related to the manufacture of semiconductor parts and elements. The company is going to invest CZK 336 million within the next three years and it wishes to create 40 new jobs.

The main activity programme of the technological centre, in the period 2004 – 2006, is the development of a new technological process of IO chips’ production, which represents the current technological top design in the area of bipolar technologies. The process contains technological blocks, which are compatible with advanced technologies of the kind Bipolar–CMOS. Physical laboratories, which are going to verify the feasibility, process design results and its practical availability for the mass production, make a part of the centre.

Another investment plan of ON Semiconductor CHC in Rožnov pod Radhoštěm is the construction of a Centre of shared financial and accounting services and IT, including the development of special software applications for human resource policies and education, for environmental and safety policies, the quality control systems, and logistics. The objective is the consolidation of these activities of ON Semiconductor in the Czech Republic, Slovakia, France, Germany, and Great Britain into one Centre in Rožnov pod Radhoštěm. The completion of this plan will require CZK 95 million. There will be 52 new jobs created. About 80% of services will be exported.
ALPS Electric Czech has been operating in Boskovice since 1995. It produces keyboards for notebooks, compact moduls of thermoprinters, analogue TV tuners and modulators, digital tuners, antenna convectors of satellite signal. The production of ALPS Czech is determined for export. The plan of ALPS Electric Group is to transfer development activities, which have been currently carried out for European plants in Great Britain, to the Czech Republic. The centre will be focused especially on development and innovation of TV tuners and satellite convectors.

The Czech Branch of the company AMI Semiconductor in Brno is one of the development centres of the multinational group with focus on design, development and testing of order integrated circuits and standard IO. The results of the development activity have been delivered to the mother company in Belgium, which applies them subsequently in the production. Export of high–tech services attains 100%.

Technological centre Tyco Integrated Systems in Brno will focus on development of sensing elements and detectors, control equipment, sensors, and monitors of breath. Technological centre of the company Merten Zlín will focus on development of electronic control systems, which are determined for automation and control of the operation of the plant and residential objects.

Development in exports of electronic production (CPA 32) to the EU countries and the share of the Czech Republic in deliveries of CEFTA countries to the EU in the period 2000 – 2003 is specified in Table 17.13.

| Table 17.13 Development in exports to EU countries, in CPA 32 commodities, in 2000–2003 |
|---------------------------------|-------|-------|-------|-------|
| (Thousand EUR, %)              | 2000  | 2001  | 2002  | 2003  |
| From CEFTA                      | 5 033 525 | 7 442 963 | 7 525 259 | 8 751 553 |
| Year–on–year index               | x     | 147.9  | 101.1  | 116.3  |
| Included from ČR                 | 909 880 | 1 411 595 | 1 401 704 | 1 659 568 |
| Year–on–year index               | x     | 155.1  | 99.3   | 118.4  |

Source: EUROSTAT

The competitiveness of the branch (CPA 32) production in the period 2000 – 2003 might be quantified by comparing the positions of countries with transforming economies (CEFTA) in the EU markets. Eurostat data imply that exports of the division 32 production from the Czech Republic to EU countries made up 18.9% of the exports belonging to CEFTA countries in 2003. Index 2003/2002 documents the inter–annual growth of export by 18.4%.

The company Panasonic Mobile & Automotive Systems Czech in Pardubice with exports of the production at the level of CZK 21 063 million and the company Panasonic AVC Networks Czech in Plzeň with exports of the production at the level of CZK 20 697 million rank among the biggest exporters in the Czech Republic in 2004.

17.9. Summary and perspectives of the branch

Investment demands make a common feature of technological processes utilised within the manufacturing of electronic parts and equipment, where production technologies are getting obsolete faster than in traditional fields within the manufacturing industry.

The Investment Incentives Act has created prerequisites for a trustworthy environment for foreign investors in the Czech Republic. Thanks to the system of investment incentives, the business environment in the Czech Republic has significantly improved. The inflow of foreign direct investments consequently influenced, in a positive way, development in the industry of electronic parts and equipment.

As said above, the “Framework programme” has been launched with the aim to support development of technological centres and centres of strategic services. Besides there is another programme – the “Programme of creation of new working places”. The aim of this programme is to support a creation of new working places in the regions of the Czech Republic, which are mostly touched by unemployment through the support of the projects, which are directed to the branches of the manufacturing industry and strategic services. The programme was approved by the Resolution of the Government No.566/2004 in June 2004.
The small and medium-size enterprises in the Czech Republic can be involved in the “Project of support of the Czech suppliers”, which is being introduced by CzechInvest. The project is determined for the companies, whose type of business is the manufacture of computing and electronic components, electro-technical parts, plastic parts and parts for outfit of automobiles.

The production base of electronics has already successfully lined up to the international collaboration with competitive production. Export of electronic parts and equipment makes up more than 20% of the export of high-tech production from the Czech Republic.