

# Hungary's One-Stop Shop for Business

ITD Hungary, the government's investment and trade development agency was established in 1993 to promote inward investment and bilateral trade. With representative offices in eight regional centres of Hungary and a foreign network operating under Hungary's diplomatic services and by special assignments in more than fifty countries, ITD Hungary is a single point of contact to support decision-makers looking for new business opportunities in Hungary.

The Agency provides foreign investors with high-quality support and a wealth of supplementary services.

## In the decision-making process:

- Tailor made, comprehensive information packages on the economy, politics, financial incentives, business environment, tax system and individual sectors
- Site selection assistance, organizing site visits
- Liaising with local, regional and governmental authorities

## During implementation

- Accelerated permitting procedures
- Assistance in incentives applications
- Advising on project partners and project financing

## In the operation phase

- Special follow-up services / After Care
- Advice and assistance to companies seeking to expand
- Advocacy to improve the business climate

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## Electronics industry in Hungary

## Pixel perfect landscape for your investment





# Facts and figures

Located in the heart of Europe, Hungary is the perfect place for investors seeking to expand their operations in Central and Eastern Europe. In Hungary, your company will find a highly skilled, creative, motivated, flexible and hard-working workforce with one of the highest productivity rates in the region. Long-term political and economic stability reflects the country's successful transition to a modern market economy and, thanks to EU accession, investors settling in Hungary have access to a market of 493 million people. Scores of multinational companies have based their manufacturing and service operations and, in some cases, European headquarters and R&D centres in Hungary, bringing some EUR 70 billion in foreign direct investment over the years.

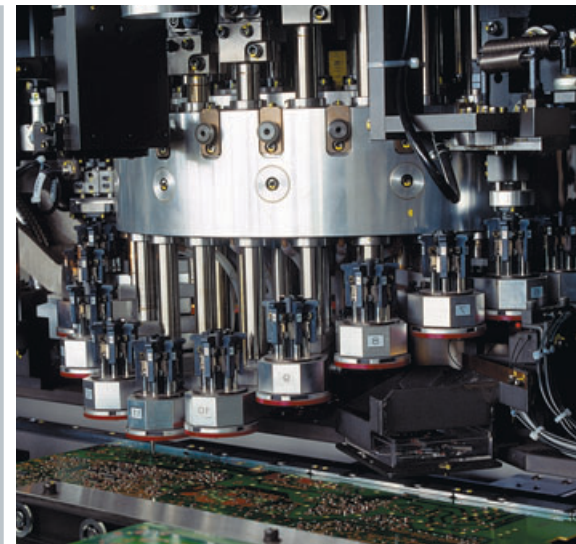
## FDI

- Steady growth in the FDI stock since the 1990s
- Significant per capita FDI in the Central European region
- Balanced FDI stock among sectors
- 50% of FDI is generated by reinvestments of companies

## Superior infrastructure and logistics

Hungary's role in transportation and logistics in the CEE-region is based on several advantageous features:

- Favourable location: within one day you can reach 19 countries (in 1000 km radius)
- 4 international transport corridors passing through Hungary
- Direct railroad connection to Asia
- One of the lowest freight costs in the CEE region
- Extensive road and railway transportation network
- 5 international airports countrywide
- Closest sea port can be reached in 6 hours through highway connection



## Facts and figures

- Area: 93,030 km<sup>2</sup>
- Population: 10.1 million
- Annual GDP: USD 188.6 billion
- GDP per capita: USD 18,810 at PPP
- Unemployment rate: 10.5%
- Average wage: USD 1044
- Corporate tax rate: 19%



## World-class quality of life

- Large number of international schools (British, American, German, French, Chinese, Japanese, Austrian etc.)
- Multicultural language environment
- Rich cultural heritage and entertainment facilities
- Thermal baths, wellness & recreation centres, golf courses



## Did you know that...?

- The electronics industry is the largest industrial sector in Hungary accounting for 25% of total manufacturing production.
- Hungary is the largest electronics producer in the CEE region providing 34% of the regional output.
- After Korea, Japan and Finland, Hungary's electronic sector has the highest contribution to the country's manufacturing value added.
- Production growth between 2000-2008 amounted to 80% in the electronics industry.
- Hungary has probably the most developed motorway network among the new EU member states.
- Hungary has the highest number of patent applications per capita in the region.



# The electronics sector at a glance

## Well trained, creative and flexible human capital at competitive costs

- Two-thirds of the workforce has completed secondary, technical or vocational education (or higher)
- Wages are significantly lower than in Western Europe combined with relatively high productivity rate in the region

## Competitive education system

- Universities/colleges in all regions of the country offer electronics-related education in Hungary
- Courses offered and financed by the regional education centres tailored to companies' needs

## Fresh graduates' strengths:

- Foreign-language knowledge
- Open-minded approach
- Enthusiasm, willingness to learn
- Solid academic background
- 20% with foreign experience
- 61% with professional experience



## Top business locations

- Well-developed, international-standard industrial parks established all over Hungary
- Easy transportation access to the West and South of Europe
- Easy access to public utilities



# Attractive environment for R&D

The World Economic Forum ranked Hungary 23 among 131 countries in terms of the quality of scientific research institutions in 2009. Information and communications technology, as well as electronics are among the main drivers of innovation and economic growth in Hungary. In the past 15 years, the country has grown into a major centre of mobile technology, information security and related hardware research. Outstanding research areas include:

## Mobile communication technology

- Key players: **Nokia** (mobile communications technology and software development); **Ericsson** (research and development in telephone exchanges, telecommunications software); **Siemens** (largest Hungarian software house employing 600 people)

## Medical device

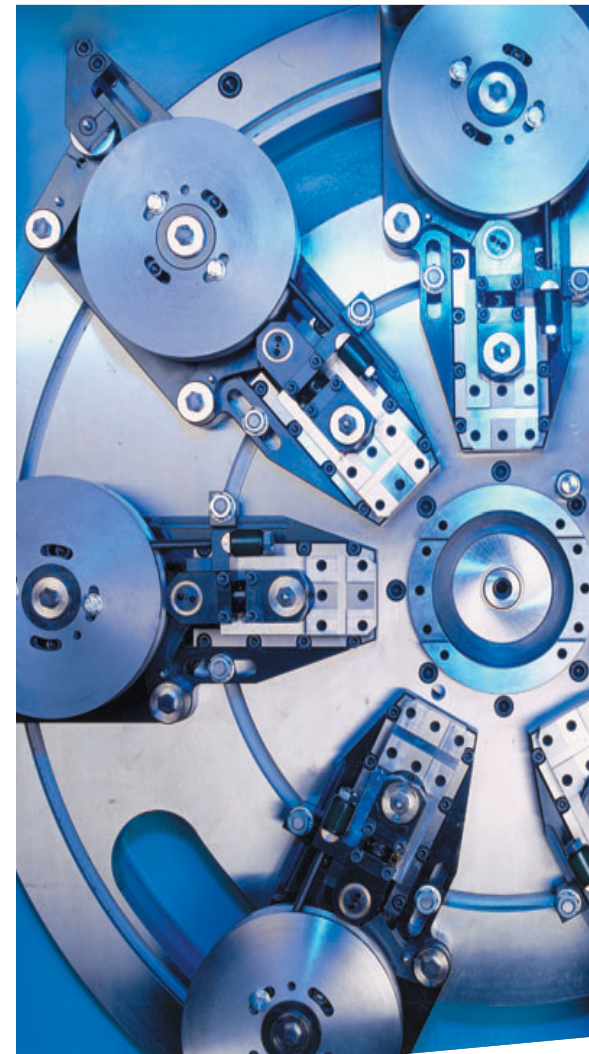
- Key players: **Institute of Experimental Medicine, Hungarian Academy of Sciences**, Budapest: (the world's first 3D microscope based on a two-photon laser microscope); **GE Healthcare** (visual imaging technologies, software and embedded systems for mammographies and vascular surgery equipment); **Mediso** (medical imaging equipment for SPECT, PET and CT tests); **3D Histech** (digital slide scanner systems)

## Automotive electronics

- Key players: **Continental** (brake sensor development, catalytic converter development); **Denso** (Diesel injection pump development); **Visteon** (cluster, A/C compressor, fuel pump, Distributorless Ignition System (DIS), Fuel Delivery Modules (FDM), fuel tanks); **Thyssen Krupp** (electronic steering wheel development); **ZF Hungária** (research and development centre); **Bosch** (car multimedia instrumentation systems, electronic transmission control, diagnostic communication of vehicles); **WET** (car seat climate, complete sample seat with heating, air conditioning systems); **Dräxlmeier** (car interiors - dashboard, instruments); **GE** (car lamp development)

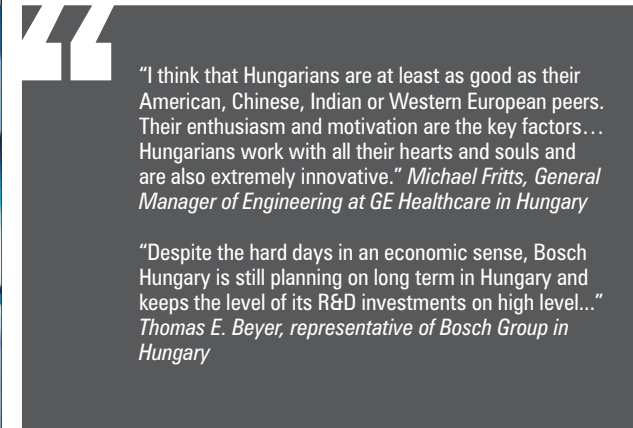
## Nanoelectronics

**Department of Electron Devices, Budapest University of Technology and Economics** (research and education in all the fields of the theory, design, manufacturing and testing of semiconductor devices, micro- and nanoelectronics, VLSI electronics, semiconductor sensors, energy transfer systems, microelectronic mechanical systems (MEMS) and systems in a package (SiP)).



## European Institute of Innovation & Technology

In summer 2008, EU ministers chose Budapest to host the headquarters of the European Institute of Innovation and Technology. The organisation is the first European initiative to integrate the three sides of the "Knowledge Triangle" (higher education, research and business innovation) and will seek to stand out as a world-class innovation-orientated reference model. The institute concentrates on the fields of energy, climate change and information technology with the possibility of further broadening its areas of study.



## Latest investments in the electronics sector

- **Samsung SDI** installed new production lines for PDP modules and expanded its PDP TV production
- **Sony** has started assembling Blu-ray Disc players to keep pace with growing global demand.
- **Infineon** invested 17 million EUR to increase its capacities in semiconductor production.
- **Schaffner Holding** opened its new factory in Kecskemét to produce noise filter units and transformers creating more than 200 workplaces.
- **Ericsson Hungary** has increased headcount by 200 to 800 at its R+D unit, and projects to create a further 200 R+D jobs over the next two years.
- **Datasensor** established a joint venture by USD 20 million worth of investment with Fonyton to produce photoelectric devices employing 165 people.

## Exploit co-operation opportunities with academia

- **Mentor Graphics & Budapest University of Technology and Economics:** operation of the second pilot microelectronics laboratory in the world
- **Bosch and IBM:** mutual research projects with the Budapest University of Technology and Economics
- **Intel:** foundation of Virtualisation and Platform Management Laboratory within the Budapest University of Technology and Economics
- **National Instruments & University of Debrecen:** mutual research projects
- **Ericsson, Nokia, Siemens, T-Mobile, Sun Microsystems & Budapest University of Technology and Economics:** research in high speed mobile and wireless communications technologies, including B3G (beyond 3rd generation) and 3G/4G
- **Knorr Bremse, Thyssen Krupp, TÜV Nord & Budapest University of Technology and Economics:** establishment of a Vehicle Control Knowledge Centre
- **Cadence Design System, Talents Group, the Association of Information Technology Companies & Technical College of Budapest:** education and research laboratory focusing on integrated circuit design; new masters programme planned in the field of electronic design





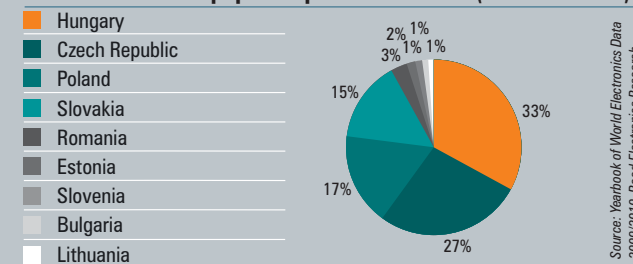
# Contract manufacturing

In the past two years, Hungary has accounted for nearly half of total electronic manufacturing service revenues in the CEE region. Thanks to its proximity to Western European markets and relatively low labour costs, the country continues to represent an attractive proposition for OEMs. In addition to the country's strong position in the computer, communications and consumer electronics sectors, medical, control and instrumentation and industrial production are also expected to migrate to Hungary in the coming years.

## Facts and figures

- 80% of the total revenues of the top 10 European EMS are generated from production in the CEE
- Of the top 100 European EMS companies, 43 have manufacturing facilities in the CEE
- Hungary is the largest electronics equipment producer within the CEE region

### CEE electronics equipment production 2008 (EUR 31 billion)

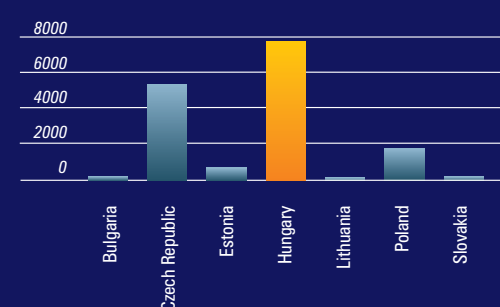


### Hungary generates largest EMS revenues in CEE and Europe

- Global Tier 1 suppliers in Hungary: **Foxconn, Jabil Circuit, Flextronics, Elcoteq, Sanmina-SCI, Zollner, and Videoton.**
- Ranking ninth in Europe, Videoton is Hungary's most successful EMS company.
- Other leading EMS companies: **Becom** (Austria), **CMS Electronics** (Austria), **Orion Electronics** (Singapore), **RAFI** (Germany), **Sanshin** (Japan), **Scanfil** (Finland), **Seidel** (Austria), **Selco** (Austria), and **Solid Semecs** (Holland).
- Hungarian-owned **Albacomp** operates the region's largest PC and notebook assembly plant and manufactures LCD TV sets. It is also involved in systems integration projects and provides after-sales services.



### EMS revenues in the CEE 2008 (EUR Million)



"Hungary provides the right mix of technical qualification of its labor force, infrastructural support network and competitive low-to-medium cost pricing. Furthermore, access to the entire EMEA, CIS and Russian markets is relatively easy from Hungary's central geographical location. All of this makes Hungary an ideal location for technology related investments." *Mark Hetenyi, Regional Finance Director Flextronics*

"Investors in electronic manufacturing services (EMS) are no longer confining themselves to Asia, as Eastern Europe - with its impressive gross domestic product (GDP) growth and low rates of inflation and population expansion - is emerging as an investor-friendly destination. The reduced working capital, immediate availability of trained staff, and the ability to offer after-sales and 'product after-care' services have further endeared Eastern Europe to potential investors." *Frost & Sullivan*

## Why invest in Hungary?

- Favourable location in the heart of Europe – direct access to the EU market of nearly 500 million consumers
- Well-trained, creative and flexible human capital
- Sustainable economic growth
- Long-term stability – EU and NATO membership
- EU conform investment incentives
- Highly developed logistical, transport and communications infrastructure
- Strong presence of multinational companies
- World-class quality of life
- Complimentary one-stop shop support by ITD Hungary

"The performance of the Infineon factory has convinced the corporate group that locating the plant in Hungary was a correct strategic decision regarding future development. Modernity, quality level, reliability of the products, adherence of delivery periods, low wages – these are the factors that take the Hungarian companies to the frontline worldwide. The Hungarian plant is also competitive compared to the Far-Eastern factories if we take into consideration the geographical proximity of the main markets." *József Bodor, Managing Director, Infineon Technologies Cegléd Ltd.*



# Hungarians who have changed electronic engineering

Electric and electronic engineering enjoys a remarkable tradition in Hungary – many Hungarian scientists and engineers have left an indelible mark on information technology and computer science.

- Tivadar Puskás** (1844-1893) invented the forerunner of the radio, the telephone broadcaster<sup>(1)</sup> („wireless“). He first spoke in the telephone broadcast on February 15, 1893, greeting his 60 subscribers, saying "We greet the inhabitants of Budapest. We greet them in an unusual way from which telephone broadcasting all over the world will start its victorious journey."
- Dénes Mihály**<sup>(2)</sup> (1894-1953) developed his television system and patented it in 1917 under the name of TELEHOR, which was capable of transmitting still pictures over a distance of many kilometres. He submitted his patent application for sound-film under the name of PROJECTOPHON in 1918. His method provided good quality sound tracks with 35 mm film stock using optical sound recording, and he can thus be regarded as the inventor of the sound film.
- Kálmán Tihanyi** (1897-1947), a pioneer of electronic television, he made significant contributions to the development of Cathode Ray Tubes (CRTs). Tihanyi's system involved the maintenance of photoemission from the light-sensitive layer of the detector tube between scans. By this means, accumulation of charges would take place and a "latent electric picture" would be stored. In 1936, Tihanyi described the principle of "plasma television" and conceived the first flat-panel television system.
- Dénes Gábor**<sup>(3)</sup> (1900-1979) became known as the "Father of Holography." At the start of his career, he analyzed the properties of high voltage electric transmission lines by using cathode-beam oscillographs, which led to his interest in electron optics. The invention in 1960 of the laser, the first coherent light source, was followed by the first hologram, in 1964. Following the rapid development of lasers and a wide variety of holographic applications Gabor achieved acknowledged success and worldwide attention during his lifetime. He received the Nobel Prize in Physics in 1971.
- Péter C. Goldmark** (1906-1977), a Hungarian-born engineer developed a technology for colour television while working at CBS Laboratories. The system used a rapidly rotating colour wheel that alternated transmission in red, green and blue. CBS started regular daily broadcasts in colour in June 1941 but Goldmark's system was soon replaced by another system compatible with existing B/W TVs. Goldmark had several other important inventions including the long-playing records (LPs), a micro TV camera for medical examinations and the electronic video recorder.
- The original concept of the 3.5" hard case floppy disk was invented and developed in the Radio Technology Factory in Budapest by **Marcell Janosi**<sup>(4)</sup> (1931-). In terms of technology, that 3" cartridge-type disk barely differed from the ubiquitous 3.5" disk that emerged later.

