



# Lower Silesia

a region of innovations

Spatial mobility, information and communications technology (ICT),  
manufacture of machines and appliances/material processing

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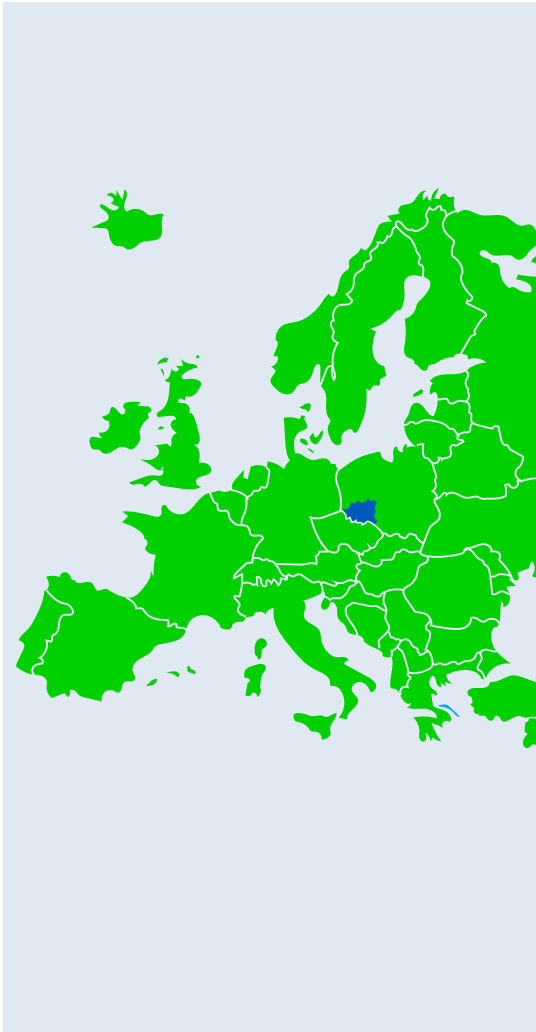
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# Profile of the Province



## Region's capital city:

Wroclaw

## Surface:

19 947 km<sup>2</sup>

## Population:

2.898 million (data for 30 June 2020)

## Economically active population:

1.265 million (data for 30 June 2020)

## Population of students:

117.6 thousand, of which 7% foreigners (data for December 2019)

## Unemployment rate:

5.6% (data for September 2020)

## Gross domestic product per capita:

PLN 175.690 million / PLN 60,562 per capita (data for 2018)

## Region's part in the gross domestic product of Poland:

8.3% (fourth place in Poland in 2018)

## Average gross remuneration in the business enterprise sector:

PLN 5,514.14 (data for September 2020, increase of 6.2% compared to September 2019)

## International airport:

Wroclaw Airport

## Special economic zones:

Economic zones	Website
Kamienna Góra Special Economic Zone for Small Entrepreneurs	<a href="http://www.ssemp.pl">www.ssemp.pl</a>
Legnica Special Economic Zone	<a href="http://www.lsse.eu">www.lsse.eu</a>
Wałbrzych Special Economic Zone	<a href="http://www.invest-park.com.pl">www.invest-park.com.pl</a>

## Industry and technology parks:

Technology Park	Website
Technology Park ChemiPark in Brzeg Dolny	<a href="http://www.chemipark.pl">www.chemipark.pl</a>
Data Techno Park (Wroclaw Medical, Scientific and Technology Park)	<a href="http://www.dtpark.pl">www.dtpark.pl</a>
Lower Silesia Innovation and Science Park	<a href="http://www.dpin.pl">www.dpin.pl</a>
Lower Silesia Technology Park 'T-Park' in Szczawno Zdrój	<a href="http://www.darr.pl/pl/park-technologiczny-t-park">www.darr.pl/pl/park-technologiczny-t-park</a>
KGHM LETIA – Legnica Technology Park in Legnica	<a href="http://www.letia.pl">www.letia.pl</a>
Nowa Ruda Industry Park and Nowa Ruda Technology Incubator at the Agency for the Regional Development 'AGROREG' in Nowa Ruda	<a href="http://www.agroreg.com.pl">www.agroreg.com.pl</a>
Bukowice Industry Park in Brzeg Dolny-Bukowice	<a href="http://www.bukowiceip.com">www.bukowiceip.com</a>
Wroclaw Industry Park	<a href="http://www.wpp.wroc.pl">www.wpp.wroc.pl</a>
Wroclaw Technology Park	<a href="http://www.technologypark.pl">www.technologypark.pl</a>

## Selected foreign investors:



### Household appliances industry:

BSH, Electrolux, Ilpea, Italmetal, LG Electronics, Posco, Whirlpool



### Chemical and pharmaceutical industry:

3M, BASF, Hasco-Lek, Fresenius, Herbapol, USP Zdrowie



### IT & ICT:

Atos, Dolby, Capgemini, GlobalLogic, IBM, Nokia, Opera Software, Tieto, Unit4, Volvo IT



### Automotive industry:

Autoliv, Daimler, Industrias Alegre, Pittsburgh Glass Works, Toyota, Volvo, ZF



### Modern business services:

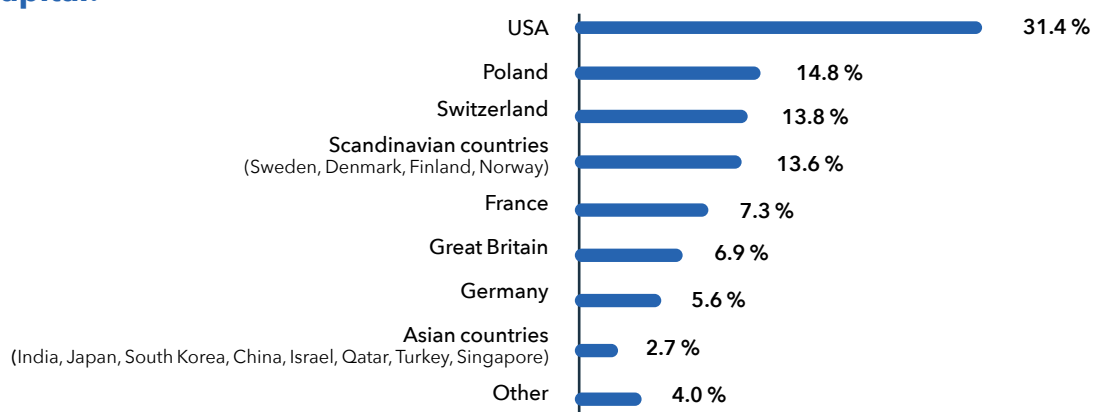
BNY Mellon, Credit Suisse, Google, HPE, McKinsey, Merck, Olympus, Qiagen, Schaeffler, Smith+Nephew, UBS



### Machine industry:

ABB, Balluff, Bombardier, Collins Aerospace, Danfoss Solutions, Fanuc, GE, XEOS

## Employment structure in the modern business services sector by origin of capital:



Sources: *The Modern Business Service Sector in 2020 in Poland. Report by ABSL*

# Assets and strengths

## Location advantages



Favourable location in terms of geography and communication - close to the border with Germany and the Czech Republic

Well-developed transport infrastructure, making the access to the commercial outlets of the European Union and Eastern Europe available

## Investors' support



The economic policy of the authorities of the Province of Lower Silesia aims at developing the region's potential by strengthening the pro-innovative skills and attitudes of the region's residents and entrepreneurs

The activity of the local and regional business environment institutions, supported by the activity of the Polish Investment and Trade Agency

High investment attractiveness of the areas located in the region and intended to serve for economical purposes, supported by the active economic policy of the local and regional authorities

## Potential of the regional economy



Growing economic importance of the Lower Silesia, resulting in increasing value of the gross domestic product, both total and per capita

Transformation of the economy towards knowledge-intensive and high-innovation sectors

Importance of Wrocław as one of the largest business service centres in Poland - in the city there are 188 SSC/BPO centres (data for the first quarter of 2020) which employ 51,900 employees (new investments: Align Technology, ArchiDoc, Gates Corporation, Infosys, JetBridge, Nexio Management, Olympus Business Services, UPM)

## Potential of the knowledge-based industries



Potential of research and development centres of national importance - fields of specialisation: IT, engineering, chemistry and pharmacy, bio- and nanotechnologies

Wrocław as a leading centre of R&D and computer game sector in Poland

Attractive environment for startups, supporting innovators which successfully operate on international markets: Olga Malinkiewicz (Saule Technologies), Miron Tokarski (Genomtec), Patrycja Wizińska-Socha (Nestmedic), Krystian Piećko (DataWalk), Jan Kędzierski (Flash Robotics /EMYS), Jerzy Łątka (Archi-tektura.eu)

The region of Lower Silesia is a place with the largest number of entrepreneurs of technology sector - The region of Lower Silesia is a place with the largest number of entrepreneurs of technology sector - statistically, there is 1 start-up per 4,500 inhabitants of the region

High part (in relation to the average national value) in the exports of technologically advanced products

## Labour market



Increasing percentage of foreigners in the labour market structure

High percentage of people employed in technologically advanced industry and services - high employment level of ICT specialists in enterprises in relation to the average national value (36,000 specialists employed in the ICT sector)

Very good quality of life, resulting in one of the highest percentage of households in Poland with relative highest income

## The Province of Lower Silesia is one of the leading regions in Poland in terms of the economic development

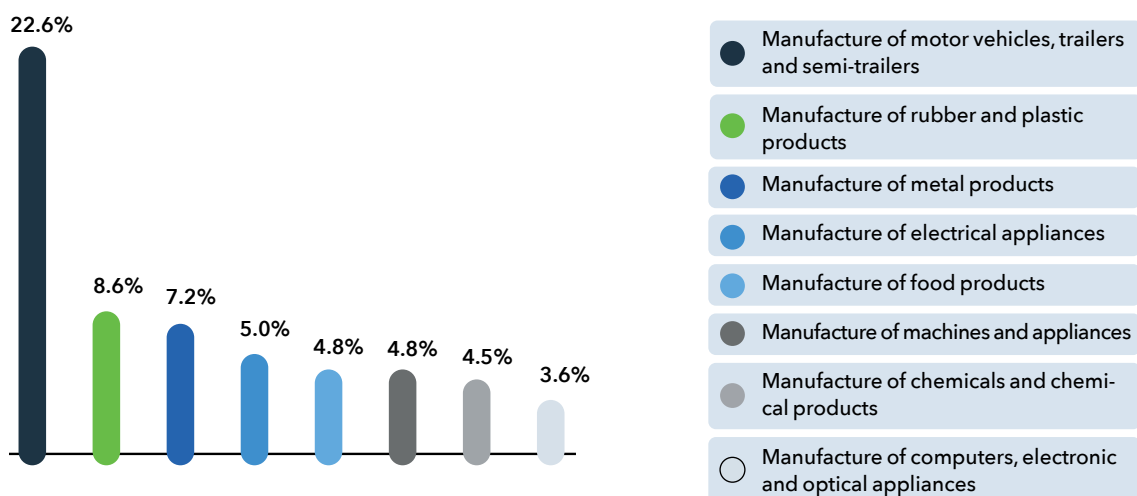


In many aspects, the Province of Lower Silesia is placed among the top-ranked regions in Poland with regard to the economic growth. As it can be clearly seen from the analysis of the localisation indicator, used for demonstrating regions relatively over- and under-represented by enterprises of a given type, **the prevailing types of industry in the region are raw material industry and industrial processing industry. Apart from that, the ICT sector is also of importance, and this is mainly due to the function of Wrocław as a significant national development centre for this sector.**

In 2018, the **sold production of industry** (including the whole activity of business entities, i.e. both industrial and non-industrial type) in the enterprises located in Lower Silesia and employing at least 9 employees reached the high value of 121,176.6 million PLN, placing the region in the fourth place in the country in terms of the sold production of industry.

**The industrial processing** contributed the most to create the sold production of industry (81.7%).

### Structure of creating added value in industrial processing:



Sources: Central Statistical Office, Domestic Database (Regional accounts)



**With its gross domestic product** of 175.7 billion PLN (2018), the Province of Lower Silesia is placed in the fourth place among all the regions in Poland. In 2018 (as in the previous years), the gross domestic product per capita in the region was approximately 10% higher than the average national value.

**The gross value added** for 2018 of the Province of Lower Silesia was 153.5 billion PLN, which was the fourth best value of this indicator in the country.

Pursuant to The Regional Innovation Scoreboard [(4)], **one of the most important virtue of Lower Silesia, crucial in terms of region innovativeness rankings**, is relatively high employment rate in the sectors of middle and high technology and knowledge-based business services in comparison to average values. In addition, noteworthy is the activity in the field of scientific papers, legal protection of inventions and utility designs.



In 2019, Lower Silesia was one of five provinces with **positive net migration rate** (third place in the country). Importantly, in the case of Province of Lower Silesia, the positive value of the rate was mainly due to international migration, what is indicative of a strong international economic position of the region.

According to the development plans for the region laid down in The Development Strategy of the Province of Lower Silesia 2030, the region's potential should be strengthened by investing in the economy's innovativeness, which should in turn be carried out for example by developing smart specialisations or supporting modern reindustrialisation.



# Innovative potential of the Lower Silesian economy

The province of Lower Silesia belongs to the group of the leading Polish regions in terms of the level of innovative development. Almost one fourth of enterprises running their activity in the region have introduced in a given period at least one product or process innovation: a new or significantly improved product (service) or process. Particular attention shall be paid to the relatively wider innovative activity of companies providing services.

***In the years 2016-2018, the level of expenditure on innovative activities in enterprises providing services increased by 24.2% compared to the period 2015-2017. However, the industrial enterprises channel more funds for such type of activity.***

As it can be seen from the diagnoses of smart specialisations of the Province of Lower Silesia, these are manufacturers of machinery and appliances and companies from the chemical and pharmaceutical sectors that are particularly active in this area. More than two-thirds of enterprises from the ICT sector and more than half of manufacturers of machinery and appliances and of chemicals and pharmaceuticals declared that they had introduced some innovation over the last 10 years.

One of the most important factors proving the high extent of scientific research support, technological development and innovation in the region is the level of expenditure on R&D activity. Its value places Lower

***In the years 2009-2018, the level of expenditure of Lower Silesian enterprises on R&D activity increased nine times.***

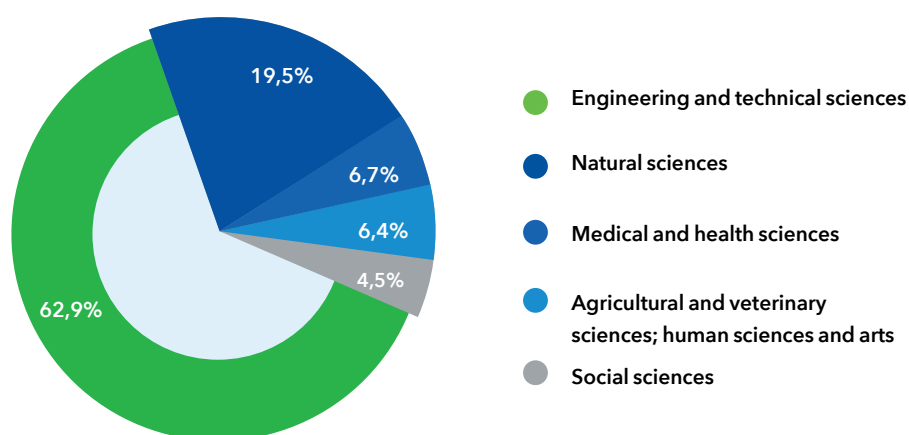
Silesia among the best Polish provinces in this respect. The expenditure incurred by the companies on R&D activity constitute more than half of the total expenditure for these purposes in the region.

The innovative potential of the Province of Lower Silesia can be put down, among others, to a large number of employees involved in R&D activity. Their number is systematically increasing, and now they constitute about 1.5% of all employed persons (second place in Poland). About 50% of employees involved in R&D are employed with enterprises.

**The number of people employed in R&D in the business enterprise sector is growing faster than in the higher education sector. This is an optimistic sign for the future which will allow companies to reach higher level of independence in their development processes.**

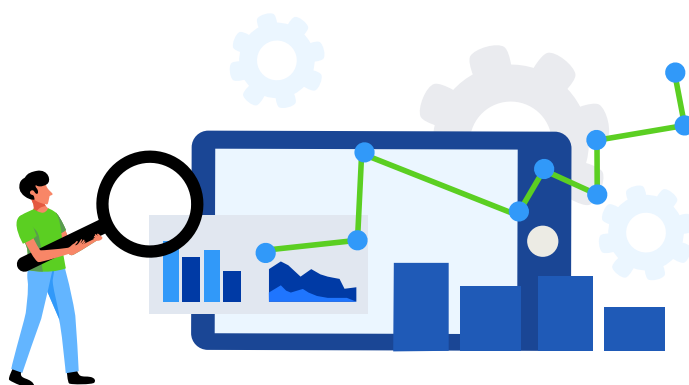
Over the years 2015-2018, the number of entities carrying out R&D activity increased by 43%, reaching in 2018 the value of 437. Importantly, this increase is due primarily to increased number of R&D entities related to industry and services; they constitute over 90% of all such entities.

### Structure of expenditure on R&D activities in 2018 in Lower Silesia by fields of science:



Sources: Central Statistical Office, Domestic Database (Research and Development Activities)

By linking the internal expenditure on R&D activity with the fields of science and technology it can be shown that engineering and technical sciences, on which almost two thirds (62.8%) of all expenditure are spent, are prominently predominant in the Province of Lower Silesia. This could logically be attributed to the aforementioned higher share of the business enterprise sector in the expenditure on R&D activity. In 2018, the highest expenditure was incurred by companies dealing in information and communication (28.7% of enterprises' expenditure on R&D activities), production of motor vehicles, trailers and semi-trailers (23.6%), chemicals (9.5%) and manufacture of machines and appliances (7.0%).



# Spatial mobility

Its important area is the automotive industry. In the last few years, several large enterprises producing subassemblies and parts for the automotive industry have been established in the Province of Lower Silesia. One of them is the Borgers factory which deals in production of parts for large international giants in the automotive industry, such as BMW, Daimler or Volvo.

Components for Scania are produced by the factory located in Złotoryja. Another factory established here is Carcoustics, manufacturing products mainly for companies such as Daimler, Porsche and Volkswagen. The BIW Isolierstoffe GmbH plant has launched the production, too, and their products are used in cars, airplanes and trains. As another example, it is worth mentioning about the expansion of the production activities of the company 3M (in Wrocław from 2003), which in 2011 started to produce elements used for the construction of ceramic catalysts and diesel filters for passenger cars, trucks and buses.

The production of new subassemblies was started in the existing plants, as in the case of Toyota, which began to deal in production of modern gearings for hybrid drives. The production in the plant in Jelcz-Laskowice has also been expanded and involves now new gasoline engines. Another company to develop activity in the field of electromobility is LG Chem Wrocław Energy which produces lithium-ion batteries for powering electric vehicles. These breakthrough technologies made LG Chem a global market leader in the field of supplying global car manufacturers, including Audi, Daimler, Jaguar, Porsche, Renault and Volvo, with batteries for electric vehicles. Due to the fact that the products enjoy great interest, second LG Chem factory in Lower Silesia is planned to be established.

Lower Silesia is a region where the Lower Silesian Automotive Cluster is located that was established to increase the potential, provide common access to modern technologies, educational facilities and support the transfer of knowledge and innovation. Currently, 49 entities from the sector are brought together here, including companies producing various parts and subassemblies of use in the automotive industry.

## **Subareas of specialisation:**

- 1. Appliances and subassemblies for means of transport,**
- 2. Unmanned objects, including autonomous ones,**
- 3. Drive and power sources,**
- 4. Electromobility,**
- 5. Improving transport safety,**
- 6. Systems and components for the space industry,**
- 7. Systems increasing transport efficiency (also in terms of pro-ecology).**

## Chosen enterprises operating within the Lower Silesian Automotive Cluster:

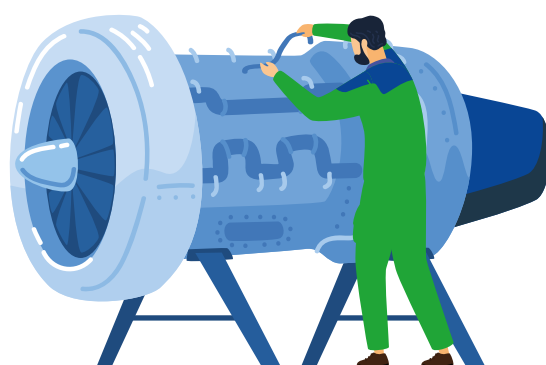
Enterprise	Location	Scope of activity
Aircom Automotive	Pietrzykowice	Manufacture of tyre repair kits
BASF Polska	Środa Śląska	Manufacture of car catalyts
Eldisy Polska	Komorniki (Środa Śląska)	Manufacture of sealing elements
Faurecia Automotive Polska	Legnica, Wałbrzych, Jelcz-Laskowice	Design and manufacture of automotive equipment elements (car seats, exhaust emission control technologies, car interiors, IT solutions)
Gates Polska	Legnica	Manufacture of rubber belts and cords
GOTEC Polska	Komorniki (Środa Śląska)	Surface treatment of car chassis components
Hester	Pieszycy (Dzierżoniów)	Manufacture of technical fabrics
HMT Heldener Metall Technik	Środa Śląska	Plastic treatment of sheet metal
Pittsburgh Glass Works	Komorniki (Środa Śląska)	Manufacture of car glasses
Pneumat System	Wrocław	Manufacture of pneumatic systems
Ritex Logistics	Gniewomierz (Legnica)	Transport Forwarding Logistics
Sanden Manufacturing Poland	Polkowice	Manufacture of compressors for car air conditioning
Schurholz Polska	Komorniki (Środa Śląska)	Manufacture of car bodies, elements of chassis, interiors and parts for electrics and electronics
Sika Automotive Złotoryja	Złotoryja	Manufacture of bituminous mats for companies from the automotive industry
Sitech	Polkowice	Manufacture of metal frames for car seats
Voestalpine Rotec	Komorniki (Środa Śląska)	Manufacture of steel and aluminium elements
Volkswagen Motor Polska	Polkowice	Manufacture of engines
Wezi-tec	Legnica	Manufacture of car modules

Sources: Own study of the Wrocław Agglomeration Development Agency (ARAW)



**In addition, Lower Silesia is an area where the aviation sector (including space sector) develops well,** being one of the most modern branches of the global industry with a high level of product innovation. Poland shows a significant – one of the largest in Europe – growth potential in this field. The aviation industry in Poland, with a thriving scientific and research facilities, has an opportunity to develop both in terms of production and research and development (R&D).

The traditions of the aviation industry in Lower Silesia were begun by the 'Hydral' National Aviation Plant and the Aviation Scientific Plant which operated in Wrocław. Currently, following the takeover of the 'Hydral' plant by the American aviation concern Collins Aerospace, a part of the United Technologies corporation, the company established additionally own engineering centre, where hydraulic and fuel units are developed and tested before their production starts here. What is more, production plants of components, materials and parts for the aviation industry are located in various parts of the voivodeship (e.g. Ostheimer-Akok in Nowa Ruda – doors for Airbus, 3M – coatings for aircraft fuselages, Becker Avionics Polska in Wrocław – electronic aviation appliances, Unison Engine Components in Dzierżoniów – subassemblies for landing gears). As far as unmanned objects are concerned, it is planned to start the production of drones for the Polish army at the Military Communications Plant in Lower Silesia in cooperation with Sky Tronic. These actions shall be considered as a part of the priority programme of the technical modernisation of the Polish army.



Another company operating since 2017 in Lower Silesia is Wrocław Aircraft Maintenance Services (WAMS), the activity of which consists in conducting thorough inspections of Ryanair aircraft. Due to the permanent shortage of specialists with technical experience in the aviation industry in Poland, Ryanair decided to create at the Aviation Secondary Technical School in Wrocław class specialised in educating future aircraft mechanics, where not only mechanics, but also future employees of airport operational services are educated.

## Chosen enterprises of the aviation sector in Lower Silesia:

Name of enterprise	City/Town	Sector
Becker Avionics Polska	Wrocław	Manufacture
Collins Aerospace	Wrocław	Manufacture, R&D
KFB Acoustics	Wrocław	Manufacture, R&D
Mecamen	Dzierżonów	Manufacture
Output 42	Wrocław	IT
Paradigm Precision Poland	Kąty Wrocławskie	Manufacture
Pattonair Poland	Wrocław	Supply chain management
PIT-RADWAR	Wrocław	Manufacture
Radiotechnika Marketing	Kąty Wrocławskie	Manufacture
Ritex Logistics	Gniewomierz	Logistics
Ryanair	Wrocław	IT
Unison Engine Components	Dzierżonów	Manufacture
The 'Jeżów' Glider Works	Jeżów Sudecki	Manufacture
Wrocław Aircraft Maintenance Systems	Wrocław	Service facilities for Ryanair aircraft
XEOS	Święte	Manufacture

Sources: Own study of the Wrocław Agglomeration Development Agency (ARAW)

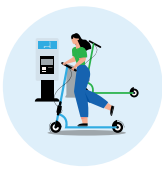
The development of the sector is favoured by the functioning of **the Lower Silesian Aviation Cluster (DKL)**, partnered by the Ministry of Economic Development, Labour and Technology, established to create environment for the development of enterprises of the aviation industry in the south-western Poland. Currently, the Cluster comprises 34 enterprises and institutions. In 2018, the DKL was extended to include XEOS, a joint venture of the global leaders in the aviation sector – Lufthansa Technik and GE Aviation. Aircraft engines are serviced at the plant located within the Legnica Special Economic Zone [LSEZ], and currently the company is constructing a test chamber in which engines will be checked before being fitted in the aircraft. It will be the largest test chamber in Poland and one of the 10 largest in the world. The completion of construction and the first engine test is scheduled for the first quarter of 2021.

***It is worth mentioning that in 2019, two satellites – KRAKsat and Światowid – joined the group of satellites placed by Poland in outer space. They were taken from the USA with an unmanned spacecraft as cargo delivered to the ISS International Space Station. The construction of both satellites was initiated of SatRevolution***

Another company located in Lower Silesia is Thorium Space, one of the most famous companies in the space industry and Polish manufacturer of satellites and antennas installed in outer space. Apart from it, there are in the region, among others, manufacturers of components, companies creating solutions in the field of space technologies and space exploration and developing specialised measurement systems.

## Development trends in electromobility

The electric vehicle market is going to grow. Along with the increasing interest in hybrid or fuel cell (including hydrogen fuel cells) powered vehicles, there will be a significant decline in sales of internal combustion vehicles, or at least its reduction. The growing popularity of electric cars used in individual transport is a clear sign of a wider trend, that is of developing pro-ecological attitudes. Further, this trend can be seen in the renaissance of multi-modal public transport, based to a large part on the usage of vehicles powered by electricity or other 'emission-free' energy sources. The general changes will be accompanied by more specific ones:



**Creating bicycle and scooter rental systems**, in particular an effective multimodal communication system, which will constitute an attractive alternative to cars. This will require the implementation of solutions in the field of ICT and automation on a large scale, for example concerning vehicle positioning, traffic organisation, etc., which are currently being implemented. An example could be Wheelme, a MaaS (Mobility as a Service) app which makes it easy to move throughout the city and plan the route using shared and public transport. The platform is a place where the services of many companies offering pay-per-minute rental vehicles are gathered and where price lists can be compared in order to finally enable the user to find the right means of transport without the need to switch between different applications.



**The efficient use of energy used to power vehicles depends also on such factors as weight of the vehicle driven.** The tendency to reduce the weight of vehicles currently used in public transport and of city cars is clearly visible. In the future, it will result in further search for new materials, which would need to be safe enough, i.e. durable, and at the same time as light as possible. Consequently, it provides an opportunity to use the potential of the specialisation 'Natural and recycled raw materials', especially in the area of advanced materials.



**Continuation of searching for and development of emission-free power sources for vehicles.** Under this category fall hydrogen fuel cells, in case of which water vapour is emitted instead of ordinary exhaust fumes. The launch of the production plant of electric vehicle batteries by LG Chem provides an opportunity for local startups.



**Increased demand for public transport vehicles: buses, trolley buses, trams, railway engines and combinations of traction vehicles.** Lower Silesia has been traditionally developing the production of such type of vehicles, but the trend creates development opportunities for a wide range of sub-suppliers, too.



# Information and communication technology

Wrocław is a special spot on the map of the Polish IT sector. The city is found to be one of the most well-developed and innovative IT ecosystems in the country. Thanks to numerous investments by both foreign and Polish companies, it is a market currently experiencing a growth trend, the attractiveness of which is not decreasing. The history of the IT market of Wrocław (of Lower Silesia) began in 1963 when the first Odra computers started to be produced by the Elwro company. Until the 1990s, Wrocław was the only city in Poland to manufacture computers on a mass scale.

The next stage of the market development was the investment of Siemens, which established in 2000 its own Software Development Centre. From that point on, Wrocław and Lower Silesia have attracted a large number of investors, predominantly with foreign capital.

The most important segments of the Lower Silesian IT market are:



software



IT services



computer hardware

## **Subareas of specialisation:**

- 1. Predictive methods for large heterogeneous data sets: acquisition, analysis and reporting,**
- 2. Use of mechatronics and robotics in the improvement of the quality of life of citizens,**
- 3. Processing, modelling and analysis of image and multimedia data,**
- 4. Digital security systems,**
- 5. Systems of managerial decision support (Business Process Management),**
- 6. Solutions for 'smart homes' (smart buildings),**
- 7. Solutions for 'smart cities'**
- 8. Support systems for people with disabilities, chronic diseases and the elderly (Ambient Assisted Living),**
- 9. Mobile apps,**
- 10. E-services and appliances for the healthcare sector,**
- 11. E-learning systems,**
- 12. Creating software available in the SaaS model,**
- 13. Innovative methods of human-technology interaction,**
- 14. E-commerce systems,**
- 15. Intelligent IT systems for the financial and insurance sector,**
- 16. Development of computer games.**

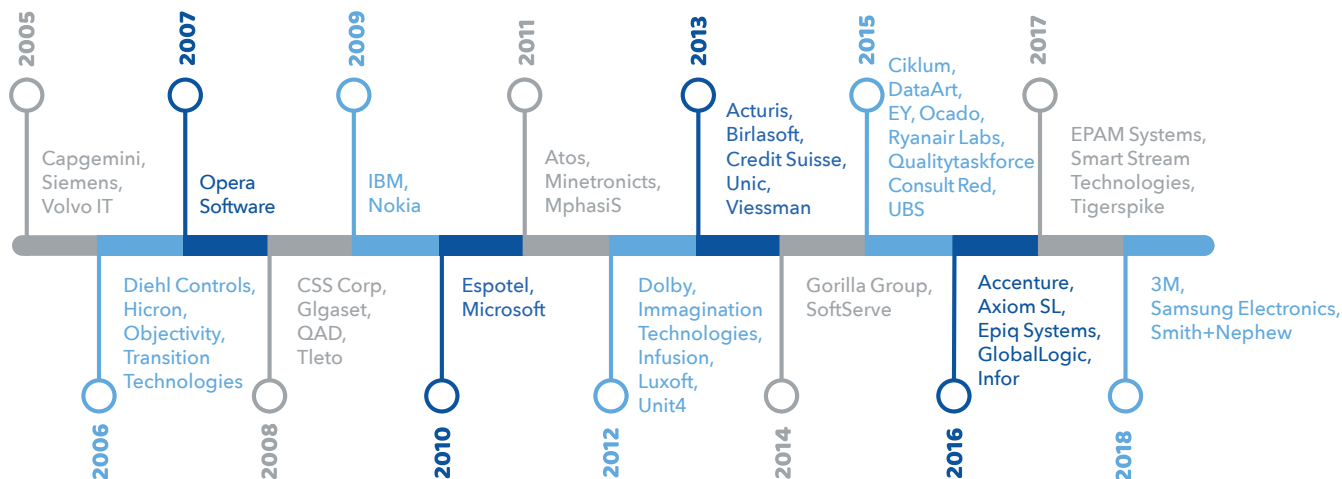
Despite the fact the latter of the abovementioned segments holds the highest share in the sector's revenues, the two remaining ones, having showed regular and high growth over the recent years and more resistance to economic fluctuations, are perceived as future directions of the sector's development. Apart from that, favourable prospects for the development of the industry result from the changes of the economy due to the Covid-19 pandemic. The demand for software and IT tools supporting the companies in their work creates numerous development opportunities for the ICT sector.



The effects of this are noticeable already at the present moment, since the revenues of Lower Silesian enterprises operating in the sector increased in 2020 significantly when compared to those of 2019, even though there is the crisis affecting other sectors on the market. Handling with problems resulting from the Covid-19 pandemic can have a positive impact on the development of automation, computerisation and remote work. Consequently, the number of entities of the ICT sector in Lower Silesia is also increasing uninterruptedly – since 2009, they have more than tripled in Lower Silesia. This increase was mainly in the number of companies involved in the production of software and IT consultancy, amounting in 2009 to 2,096, and in 2013 increasing up to 8,433. More than two-thirds of the companies were based in Wrocław.

The attention should be paid to the fact that over the past decade, well-known international corporations, such as Atos, Google, HP Enterprise, HP Inc., IBM, Nokia, Opera Software and Tieto, have set up their branches and development centres in the city.

## Main foreign investments in the IT sector in Lower Silesia:



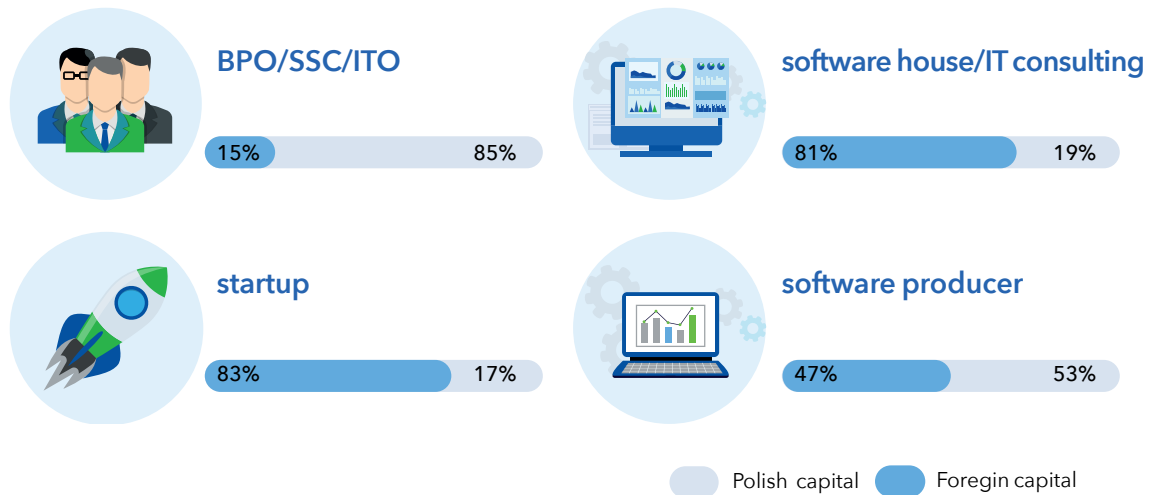
Sources: Wroclaw IT sector. Report 2019

The most common specialisation in the field of ICT in Wroclaw is the production of software, carried out by more than half of the companies in the sector. Less than half of the companies deal in providing services, implementation and IT consulting, whereas one third of them - in software sales. Almost one fourth of the ICT market in Wroclaw consists of companies involved in R&D activity.

The ICT industry is developing very dynamically in Lower Silesia. More than half of the enterprises in the sector are looking for IT specialists with additional competences in order to be able to expand the scope of their activity (for example BPO/SSC/ITO), and more than two thirds of them are willing to hire new staff to increase their production (e.g. software developers).

Large growth potential of the ICT sector can be also seen from the considerable number of newly established startups. Their activity involves such fields as artificial intelligence (AI), business intelligence (BI), Big Data, robotics and electronics, development of CRM/ERP systems or Industry 4.0. More than half of the startups are established in the ICT sector. This trend can be observed not only throughout the whole country, but also in the region of Lower Silesia itself. Brand24, ByteLake, DataWalk, Giant Lazer, Infermedica, LiveChat Software, Revive Machines, Smabblers, Stermedica, Techland – these are examples of the Lower Silesian startups operating in the ICT sector, to name a few.

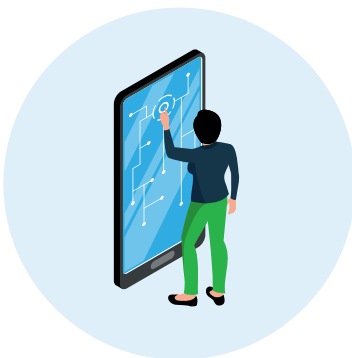
## Scope of activity of companies of the IT sector by the origin of capital in 2018:



Sources: *Wroclaw IT sector. Report 2019*

## Possible development directions of the ICT sector:

### The Fourth Industrial Revolution



There are more and more appliances and whole computer-controlled systems (with so-called 'embedded systems'), connected to the global network (creating the so-called 'Internet of Things'). The economy associates this phenomenon with the idea of the 'Industry 4.0' revolution. Thus the ICT industry is given the opportunity to cooperate with the broadly understood industrial sector, which is also of importance in Lower Silesia.

### Increased involvement of EU in the ICT development



It includes many possible ways of development thanks to funds earmarked to support the digitisation of enterprises (including e-commerce, e-business and network business processes, B2B services), ICT solutions, electronic services, applications for administration, IT services and apps in the scope of digital skills, electronic health care services and apps (including e-care, Internet of Things for the purposes of physical activity and modern technologies for the elderly).

## The Strategy for Responsible Development (SRD)



It indicates those strategic sectors that have a chance to support the development of the Polish economy in the future. The examples of such sectors could be the specialised ICTs, e.g. Fintech, automation of machines and buildings, cybersecurity, computer games, bioinformatics. Furthermore, there are development potentials in other areas based on the use of ICT:

- **professional electronics – smart watt-hour meters, car chargers, sensors,**
- **aviation and space sector – drones, satellite elements,**
- **production sector of means of transport – e-buses,**
- **mining systems sector – smart mine.**

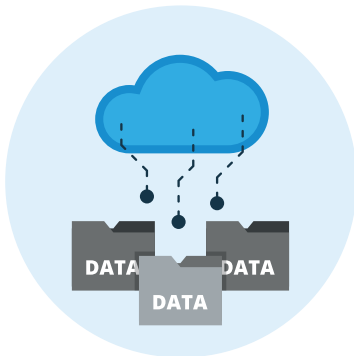
Except for possible areas of development, such an assumption makes the ICT sector horizontal for the regional economy by linking it with other smart specialisations. Most of the sectors indicated in the SRD correspond to the Lower Silesian Smart Specialisations. Therefore, it can be assumed that in the coming years, one will implement some actions at the national level to boost the development of smart specialisations in Lower Silesia. Thus the ICT industry will have a wide range of possibilities to carry out its activities.

## Growing interest in IT solutions for business



The growing interest in IT solutions for business results from the changes that have occurred following the Covid-19 pandemic and reflects at the same time a long-term trend. It will be accompanied by further development of e-commerce systems, internet banking and social media. New business models, including those in such areas as financial services, presuppose the necessity of continuous progress in the scope of offered solutions. This phenomenon is particularly visible in the case of apps.

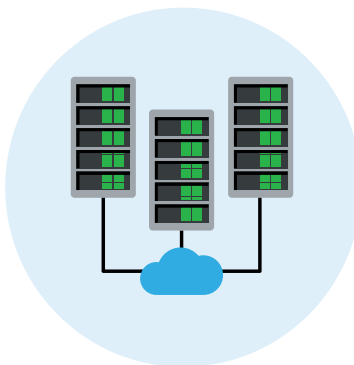
## 'Data science', or the management of large, disordered data sets (so-called 'big data') that change over time



Transferring many business and social activities to the network has led to the creation of data sets, which, when properly analysed, enable the detection and resolution of important business questions.

- This phenomenon creates an opportunity for the development of technologies of acquisition that use a wide range of data, usually available in the public domain or shared consciously or unconsciously by users, for analysis and reporting (usually for business-related purposes).
- In this phenomenon, the developing technologies of processing, modelling and analysis of image and multimedia data, such as face analysis to identify persons when confirming payment, are going to play an important role. Appropriate solutions in this field are already offered by PayEye; the company is implementing a system for iris scanning used in payment processes.

## 'Cloud computing'



Offering an increasing quantity of services and activities in distributed computing model, using cloud solutions.

- Vast possibilities of using 'cloud' computing support the creation of mobile apps that do not burden the client's computing power, although the computing capabilities of mobile devices are growing fast and are basically at the same level as office or home stationary devices. This is especially important when it comes to on-line games, where graphics processing requires high computing power.
- Another example of application of 'cloud' computing are apps supporting decision-making processes in business (the so-called 'Business Process Management' systems), in case of which 'cloud' computing is carried out for the same reasons as above due to using a wide range of data, that is calculations based on 'big data', already mentioned above,
- The so-called cloud gaming, i.e. playing games hosted on external servers by users, can be indicated as an example of a new application of cloud activities.

# Manufacture of machines and appliances / material processing

This area is highly represented in the Lower Silesian economy. The vast majority of entities specialise in the production of machines and appliances. Among them, there are large entities with foreign capital: DeLaval – systems for food industry, General Electric – electrical appliances, LG Chem – batteries for electric vehicles, Sanden – compressors for air conditioning, Vestel Ticaret – electronics, and Polish companies: KGHM ZANAM and Kopex-Famago – mining machines, Zetkama – industrial fixture and castings.

However, the domestic SME sector is the one with the highest number of entities. This group comprises dynamically developing innovative companies, such as BEST Systemy Grzewcze, Dolnośląska Fabryka Maszyn Elektrycznych, Plazmatronika NT.

The development of the specialisation 'Manufacture of Machines and Appliances, Material Processing' implies a more extensive use of the potential of the Lower Silesian smart specialisation ICTs, especially as far as the development of Industry 4.0 and the conception of Internet of Things are concerned. Nowadays, the technological progress in the machinery industry relies mainly on the integration and digitisation of production processes (which leads to increased efficiency and reduced production costs) and on materials engineering. Further, the potential of the sector lies in the possibility to establish cooperation with entities of other smart specialisations of Lower Silesia.

**Subareas of specialisation in the field of design and development of new technologies and manufacture of machines and appliances of various type (including their subassemblies and elements):**

- 1. For general and special purposes,**
- 2. For energetics-related purposes,**
- 3. For electronic purposes,**
- 4. For optoelectronics-related and i photonic purposes,**
- 5. For manufacture and treatment of materials.**

**To address the abovementioned challenges, the sector will take up the following measures:**



Efforts to produce and sell machines and appliances equipped with modern software with focus on remote control, communication and easy re-configuration.



Production of control and other digitisation-related elements (data processing and transport).





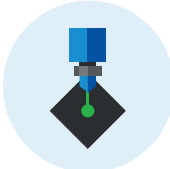
Construction of machines and appliances for local enterprises. The cooperation with the extractive sector, with its enormous potential and needs, may turn out to be the driving force for the development of the machinery and appliances production sector. Development will also be boosted by the use of the potential of large companies (such as PGE or KGHM) as 'catalysts' for the cooperation within smart specialisation.



Use of trends in the development of alternative energy sources (production of wind turbines, photovoltaic cells and other products with a large share of automation).



Design and production of visual control systems for mechanical engineering.



Lasers for cutting, welding and fine processing of modern materials.



Biophotonics – used in pharmaceutical research, clinical diagnostics, medical treatment and in semi-automatic diagnostic systems.

The trends in the development of surface and incremental technologies, such as 3D printing based on both plastics and metals, are used to a significant extent, too. When it comes to the incremental technologies, the Polish companies Zortrax and Dragon 3D, dealing in manufacture of 3D printers, manage to operate successfully on the international market as part of the Industry 4.0 trend. Another example could be the company Materialise, based in Wroclaw and founded by young university graduates. Originally, the company offered its services in the field of 3D printing in the Wroclaw Technology Park; although, it caught the attention of a foreign investor, which resulted in establishing a large and modernly equipped production plant. There is every prospect in this field for Polish producers to gain a competitive advantage on the international market.

Great potential is often demonstrated by young organisations and startups. In this field, potential areas for the development of the sector could be:

- Manufacture of lasers for applying functional coatings (as new technologies for manufacture and modification of functional surfaces and coatings),
- Development and improvement, carried out with other sectors dealing in such materials as composites, functional coatings and powder materials for 3D printing.

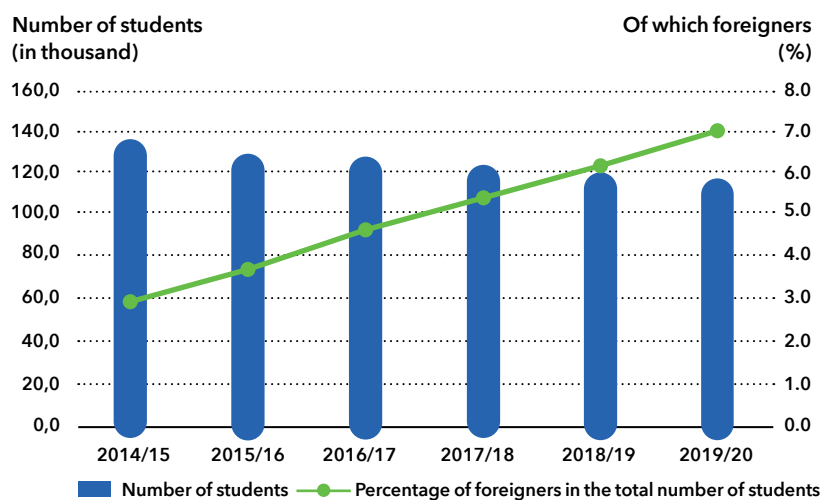
## Education, including higher education

In the academic year 2019/20, there were 33 universities in the Province of Lower Silesia, of which 13 were public schools. As for 31 December 2019, 117.6 thousand students were educated at universities in Lower Silesia, which makes the region one of the largest academic centres in Poland. In 2019, 31.2 thousand students, i.e. by 2.8% more than in 2018, graduated from universities. The number of foreign students was still increasing.

In the case of Province of Lower Silesia, higher education institutions represented 9.5% of all Polish higher education institutions, and the number of students – 9.8% of the total number of students in Poland, what places Lower Silesia in the fourth place in the country.

The main academic centre in the province is Wrocław, where the largest universities in the region in terms of the number of students are located: Wrocław University of Science and Technology (24.7 thousand students) and the University of Wrocław (23.5 thousand students). In the academic year 2019/20, the number of students in Wrocław was 108.5 thousand, which constituted 92.4% of the total number of students in the province.

### Number of students at the universities of Lower Silesia:



Sources: Statistical Office in Wrocław, Higher education in the Lower Silesia Province in 2019

The most numerous group of foreigners at universities in Lower Silesia were students coming from European countries, mainly from Ukraine – 4.1 thousand (50.4% of foreign students) and then from Belarus and Germany – 8.9% and 5.5% of foreign students, respectively.

In the academic year 2018/19, 31.2 thousand students graduated in the Province of Lower Silesia, which represented 9.9% of the total number of graduates in the whole country. Similarly, the number of graduates from abroad has dynamically increased in recent years. In the academic year 2018/19, the number of foreign graduates was 1.5 times higher than in the previous year. University diplomas were awarded primarily to students from Ukraine – 54.0% of all graduates from abroad, and then from the Czech Republic and Belarus – representing 9.1% and 5.7%, respectively.

***In the years 2014-2019, the number of foreigners studying at universities in Lower Silesia increased (by 120.2%), as well as their share in the total number of Lower Silesian students (by 150% in turn).***



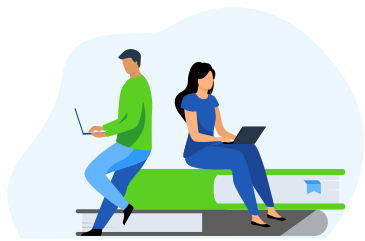
In the academic year 2019/20, the fields of study most often chosen by people in the Province of Lower Silesia were still business, administration and law – 26.5% of the total number of students, and technology, industry, construction – 18.9% of the total number of students, then human sciences and arts – 8.8%, social sciences – 8.1%, natural sciences – 6.3% and ICT – 5.8%.

There are numerous R&D centres operating in the Province of Lower Silesia, which conduct works related principally to the ICT sector. They include mainly **the Wrocław University of Science and Technology, the University of Wrocław** and **the Wrocław University of Economics**.

As far as the development of smart specialisations is concerned, the region can especially boast about the activity of the Wrocław University of Science and Technology, one of the best technical universities in the country (third place in the 'Perspektywy' Ranking of Universities 2020). Construction (programme held at the Faculty of Civil Engineering) was considered in the same ranking as the best one in Poland. Nowadays, the Wrocław University of Science and Technology offers several dozen fields of study, such as mechanics and mechanical engineering, electronics, automata and robotics and mechatronics.

At the Wrocław University of Science and Technology, an important role is played by the Faculties of Computer Science and Management, of Technology and Computer Science, and of Electronics, in which such scientific units as Department of Telecommunications and ICT and Department of Technical Computer Science are going to be included. Among all the higher education institutions located in Lower Silesia, it is the Wrocław University of Science and Technology that runs distinctly the largest number of separated R&D units carrying out their activity in the field of ICT.

The entity responsible for the technology transfer at the university is **the Wrocław Centre for Technology Transfer**. The main objective of its activity is to commercialise the results of scientific research obtained at the Wrocław University of Science and Technology, animate the cooperation of research and technology and support the enterprises' activity in the field of innovativeness. Thanks to its cutting-edge research activity, the Wrocław University of Science and Technology has been since many years a leader in innovativeness and is named as an outstanding institution in this respect in the reports of the Patent Office of the Republic of Poland. On average, over 100 new inventions and utility models are reported by the Wrocław University of Science and Technology annually.



At the University of Wrocław, R&D works in the field of ICT are carried out principally at the Institute of Computer Science at the Faculty of Mathematics and Computer Science; the unit responsible for technology transfer is **the Centre for Innovation and Knowledge Transfer of the University of Wrocław**.

At the Wrocław University of Economics, the unit specialised in works in the field of ICT is in turn the Institute of Business Informatics at the Faculty of Management.

There are numerous R&D units in the Province of Lower Silesia conducting activity in the field of, among others, the sector of spatial mobility. They include primarily the above-mentioned Wrocław University of Science and Technology, in particular its Faculties of Mechanics and of Electrical Engineering. The development potential in the activity of **the Polish Centre for Technology Development** (formerly: the EIT+ Wrocław Research Centre), is also material in this respect. The Centre offers research services for industry, including analytical and R&D services for automotive sector, such as physicochemical, mechanical, surface, thermal, flammability, rheological and aging tests.

There are as many as 175 research laboratories at the Wrocław University of Science and Technology that are able to support enterprises operating in sectors related to spatial mobility. The Faculty of Mechanics runs 9 laboratories, of which 2 are accredited (one at the Department of Machine Construction and Testing and the Reverse Engineering Laboratory); at the Faculty of Electronics there are 17 laboratories, of which 4 are accredited; 1 laboratory operates at the Department of Electronics of Microsystems and Photonics, 5 at the Faculty of Mechanics and Energy

Technology, and 1 at the Faculty of Technology and Engineering. In addition, **the University has the Scientific and Research Laboratory Complex of the Centre for Knowledge and Scientific and Technical Information (CWINT)**. The Complex conducts researches and offers services in the field of ICT and multimedia technologies and consists currently of 14 laboratories. The activity of each of them is in line with the priority directions of business and science development in Poland and Europe.



Lower Silesia is a place where companies dealing in space technologies have the opportunity to develop on a grand scale. They can benefit here not only from adequate scientific and technical facilities, but have also access to well-educated young staff, which is extremely important in this type of activity. Researches are conducted at the Wrocław University of Science and Technology in the field of ESA technology domains financed

with the funds channelled for statutory activities for example at the Faculties of Civil Engineering and Photonics. This type of activity is also carried out at the Wrocław University of Environmental and Life Sciences and the University of Wrocław at the Faculties of Chemistry, Physics and Astronomy, and Mathematics and Computer Science.

**Potential of chosen R&D units that are able to support enterprises operating within the following smart specialisations: ‘ICT’, ‘Spatial mobility’ and ‘Manufacture of machines and appliances’:**

ICT	
<p>Faculty of Computer Science and Management of the Wrocław University of Science and Technology</p>	<ul style="list-style-type: none"> <li>• modelling, analysis and design of software systems,</li> <li>• databases and data warehouses,</li> <li>• analysis and design of distributed, mobile and web computer systems,</li> <li>• security of IT systems,</li> <li>• basic issues of expert systems with knowledge representation and artificial intelligence algorithms,</li> <li>• basic issues of designing ICT systems and local and wide area computer networks.</li> </ul>
<p>Faculty of Electronics of the Wrocław University of Science and Technology</p>	<p><b>Department of Telecommunications and ICT:</b></p> <ul style="list-style-type: none"> <li>• methods of computer modelling in the scope of electromagnetic compatibility of appliances,</li> <li>• impact of EMC wave on living organisms,</li> <li>• development of modelling methods of electromagnetic wave propagation in different environments,</li> <li>• sensor networks for pollution monitoring, environmental protection and military applications.</li> </ul>

	<p><b>Department of Technical Computer Science:</b></p> <ul style="list-style-type: none"> <li>• computer architecture and operating systems,</li> <li>• ICT and computer networks,</li> <li>• database systems,</li> <li>• design of microcomputer systems and automata theory,</li> <li>• data protection and cryptography,</li> <li>• reliability and security of computer systems,</li> <li>• computer graphics, image processing, multimedia techniques,</li> <li>• artificial intelligence,</li> <li>• neural networks.</li> </ul>
<p><b>Wroclaw Centre for Networking and Supercomputing of the Wroclaw University of Science and Technology</b></p>	<ul style="list-style-type: none"> <li>• development of computer networks, data storage systems, grid and HPC (High Performance Computing) infrastructures, with aspects of their security,</li> <li>• research in the field of new technologies and optimisation of scientific applications.</li> </ul>
<p><b>Faculty of Mathematics and Computer Science of the University of Wroclaw</b></p>	<ul style="list-style-type: none"> <li>• programming languages,</li> <li>• software engineering,</li> <li>• automata theory,</li> <li>• application of logic in certain areas of computer science,</li> <li>• database theory,</li> <li>• image processing and computational photography,</li> <li>• 3D scanning, photogrammetry, 3D shooting, motion capture,</li> <li>• neural networks,</li> <li>• text processing and analysis.</li> </ul>

**Spatial mobility, manufacture of machines and appliances**

<p><b>Institute of Machine Technology and Automation of the Wroclaw University of Science and Technology</b></p>	<p>The scientific research carried out at the Institute concerns the technologies of founding, welding, plastic working of metals and polymers and of treatment by removing excessive material, which are four basic technologies; further, it concerns also the construction of machines and production systems used in the abovementioned technologies. The research works at the Institute are conducted in 8 research departments and 6 laboratories. They are described on the Institute's website.</p>
<p><b>Centre for Advanced Production Systems of the Wroclaw University of Science and Technology</b></p>	<p>The research areas correspond to the latest development trends in technologies, manufacturing systems and IT systems, known not only in Poland.</p>
<p><b>Institute of Machine Construction and Exploitation of the Wroclaw University of Science and Technology</b></p>	<p>Biomechanics, mechatronics, basic issues of machine construction, computer aided design and engineering calculations, logistics and transport systems. The basic and applied research concerns certain classes of objects: working machines and industrial vehicles, hydraulic and pneumatic drive systems, internal combustion engines and motor vehicles, inland waterways vessels, robots, bionic manipulators.</p>
<p><b>Institute of Automatics and Energy Systems (IASE)</b></p>	<p>The Laboratory for Research and Calibration of the Institute offers carrying out environmental tests of electrical/electronic appliances or systems in the field of electromagnetic (EMC), climatic and mechanical interactions, and electrical safety.</p>
<p><b>KGHM CUPRUM Research and Development Centre</b></p>	<p>It runs activity in a number of areas, from geology, hydrogeology and geophysics, through mining, geoengineering, geodesy, ventilation, automation, electrification and mechanisation of mines, ore enrichment, storage of post-flotation waste to protection of environment and mining heritage objects.</p>

# Labour market in Lower Silesia

According to the Central Statistical Office (GUS), the registered unemployment rate in the Province of Lower Silesia was 5.5% in October and fell by 0.1 percentage point compared to the previous month. Since June 2020, the unemployment rate for the whole country is 6.1%. It is a sign of the good condition of the Lower Silesian economy, which manages to counter the negative phenomena occurring in the economy as a result of the state of epidemiological threat announced in March 2020 due to the spread of the COVID-19 infectious disease.

***The Province of Lower Silesia is one of the leading regions in Poland in terms of the percentage of people employed in the business enterprise sector.***

Lower Silesia is ranked second in terms of the amount of remunerations, right after the Mazovia Province. In the first half of 2020, the average salary economy of the region was PLN 5,582, and increased by 3.6% compared to 2019.

## Challenges for the labour market in Lower Silesia

Lower Silesia with its main economic centre Wrocław belongs to the group of the fastest growing labour markets. The business-like approach of local organisations and local government, favourable infrastructure, availability of qualified employees and high academic potential make it an attractive place for Polish companies and foreign investors. The most developed sectors are those related to industry and production, modern service centres and IT. Over the past few years, dynamic growth of the R&D sector has also been observed.

The most demanding challenge for the local labour market is to attract employees with competences and financial expectations corresponding to the needs of employers. Enterprises are already striving to create positive experiences for job candidates and employees and pay attention to salaries, benefits, career paths and professional recruitment process.

The academic environment in Lower Silesia is highly developed and is a source of qualified specialists for both international corporations and local enterprises. The amount of remuneration depends largely on the competences, experience and skills of employees. From the point of view of employers' needs, not only education in relevant field of science, but also soft skills, such as ability to think abstractly or to work in team, are of importance. It is due to the progressing trends of modern industrialisation and Industry 4.0, where companies increasingly rely on automation and optimisation of production, and thus emphasise the importance of those features that machines or artificial intelligence cannot learn.



## Salary range for chosen job positions in production and engineering:

Job position	Gross salary in PLN for a given (full-time) job position per month		
	MIN	OPT*	MAX
Operations Director	23 000	30 000	33 000
R&D Manager	13 000	17 500	22 000
Production Manager	10 000	15 500	23 000
Project Manager	10 000	13 500	20 000
Maintenance Manager	10 000	13 000	18 000
EHS Manager	9 000	12 000	18 000
Tooling Engineer	7 000	9 000	14 000
R&D Engineer	6 000	9 000	12 000
Project Engineer	6 000	9 000	12 000
Automation Engineer	6 000	9 000	12 000
EHS Specialist	6 500	8 500	10 000
Production/Process Engineer	6 000	8 500	10 000
Utilities Specialist	7 500	8 500	11 000
Lean Manufacturing Engineer	6 000	8 000	10 000
Maintenance Engineer	6 000	8 000	10 000
Electrical Engineer	6 000	8 000	10 000
Packaging Engineer	6 500	8 000	10 000
Quality Control Specialist	5 000	7 500	8 500
Production Planner	4 000	6 000	9 000

\* OPT - amount that reflects in the best way the current market level.

Sources: Payroll report 2020. Labour market trends. HAYS

## Salary range for chosen job positions in automotive sector:

Job position	Gross salary in PLN for a given (full-time) job position per month		
	MIN	OPT*	MAX
Sales Director	18 000	25 000	35 000
Fleet Sales Manager	15 000	18 000	22 000
Used Car Sales Manager	14 000	17 000	20 000
Regional Sales Manager	10 000	14 000	16 000
Fleet Sales Specialist	7 000	9 000	12 000
Spare Parts Sales Specialist	7 000	8 000	10 000

\* OPT - amount that reflects in the best way the current market level.

Sources: Payroll report 2020. Labour market trends. HAYS

## Salary range for chosen job positions in ICT sector:

Job position	Gross salary in PLN for a given (full-time) job position per month		
	MIN	OPT*	MAX
IT Director	20 000	30 000	45 000
Security Manager	20 000	26 000	35 000
Systems Development Director/Manager	18 000	25 000	35 000
SAP Consultant	15 000	18 000	23 000
IT Project Manager	12 000	17 000	20 000
Infrastructure Manager	15 000	17 000	20 000
Security Consultant	13 000	17 000	23 000
Business/System Analyst	13 000	16 000	19 000
SAP Business Analyst	14 000	16 000	18 000
Infrastructure Security Specialist	14 000	16 000	18 000
Java Developer	11 000	15 000	19 000
Big Data Developer	13 000	15 000	18 000
Mobile Developer	11 000	14 000	17 000
Database Developer (Oracle, PL/SQL)	12 000	14 000	16 000
Database Developer (Microsoft, T-SQL)	12 000	13 500	15 000
.NET/C# Developer	10 000	13 000	16 000
Network Administrator	11 000	13 000	16 000
Microsoft Windows Server Admin	11 000	13 000	15 000
Database Administrator (Oracle, Microsoft SQL)	10 000	13 000	16 000
JavaScript Developer	10 000	12 000	14 000

\* OPT - amount that reflects in the best way the current market level.

Sources: Payroll report 2020. Labour market trends. HAYS



## Business environment institutions

There are several dozen business environment institutions and companies in the Province of Lower Silesia which provide support to entrepreneurs in setting up, running and developing business, in training, consulting and implementation of projects based on modern technologies, in R&D services, etc. The business environment institutions include technology parks, science parks, science and technology parks, technology transfer centres, technology incubators, business incubators, chambers of commerce, entrepreneur councils, training and advisory centres, loan and guaranty funds, to name a few.

***The business environment institutions are located principally in about a dozen centres of at least sub-regional importance, such as Wrocław, Legnica, Jelenia Góra, Wałbrzych, Świdnica, Głogów, Lubin or Polkowice. Dzierżoniów, Kłodzko and Złotoryja are examples of smaller towns with business environment institutions to support entrepreneurs.***

The activity of the majority of the Lower Silesian business environment institutions (BEIs) is focused on supporting business initiatives and attitudes, technology transfer and local development. The most developed activity in this regard is without doubt the training, consulting and information activity in the field of running business. The pro-innovative institutions have a wide range of professional specialisations. In certain cases, BEIs could have many specialisations, depending on the customers' preferences and structure.

Currently, potential investors might find in Lower Silesia over 100 offers of investment real estate, most of all investment areas, located in different parts of the region. The fact that almost all those areas are located within the Special Economic Zone gives additional opportunities to entrepreneurs who want to start a business there. Thanks to the Polish Investment Zone, an instrument created in 2018 to support new investments in Poland, it is possible for the entrepreneurs who plan a new investment to be granted public aid from several sources:



**Financial support within EU programmes**



**Real property tax exemption**



**Governmental grants**



**Income tax exemption  
(in any location chosen by the entrepreneur)**

Lower Silesia is the region where 3 out of 14 state institutions issuing investment decisions are located in. They process applications and issue decisions on supporting new investments in the form of tax relief:

Economic zones	Website
Kamienna Góra Special Economic Zone for Small Entrepreneurs	<a href="http://www.ssemp.pl">www.ssemp.pl</a>
Legnica Special Economic Zone	<a href="http://www.lsse.eu">www.lsse.eu</a>
Wałbrzych Special Economic Zone 'INVEST-PARK'	<a href="http://www.invest-park.com.pl">www.invest-park.com.pl</a>

In regard to supporting enterprises, the knowledge and technology transfer from universities and R&D units to business plays an important role. There are a number of entities of such type in Lower Silesia, which offer enterprises and potential investors the access to up-to-date knowledge and research results. Besides, they support innovation implementation processes:

Technology transfer centres	Website
Wroclaw Centre for Technology Transfer at the Wroclaw University of Science and Technology	<a href="http://www.wctt.pwr.edu.pl">www.wctt.pwr.edu.pl</a>
Centre for Innovation and Technology Transfer of the Medical University of Wroclaw	<a href="http://www.citt.umed.wroc.pl">www.citt.umed.wroc.pl</a>
Wroclaw Technology Park	<a href="http://www.technologpark.pl">www.technologpark.pl</a>
University of Wroclaw	<a href="http://www.uni.wroc.pl">www.uni.wroc.pl</a>

**Level 4.0**, a consortium set up in Wroclaw associating companies, specialists and scientists, is another institution providing services for enterprises interested in implementing innovations. Level 4.0. is composed of 5 expert organisations, specialising in various technologies within Industry 4.0. The members of the Level 4.0 consortium will share their expert know-how with enterprises. The aim is to support the regional economy in digital transformation by raising awareness in the field of new technologies in industry and business, and by assisting enterprises and organisations in implementation of the latest solutions. Companies interested in it can use Level 4.0 services free of charge.

The Polish Investment and Trade Agency (PAIH) is an institution largely contributing to the investor support. Its activity is supported by the nationwide network of regional Investor Service Centres (COIs), partners of partners of PAIH. COIs were established in close cooperation with the voivodeship marshals, statutorily responsible for the promotion of their provinces, and provide investors with comprehensive services at the level of province. In the case of Lower Silesia, COI is run by The Lower Silesian Agency for Economic Cooperation. The main objective of the activity of the Centres is to provide investors with comprehensive services at the level of province. The Centres cooperate with PAIH in handling investment projects and independently offer their services to investors who contact them directly. The Centres also have databases of contacts with local self-governments and business-related institutions, the activity of which is aimed at developing the voivodeship.

Furthermore, there are the Regional Investor Service Offices, operating under the patronage of PAIH in Lower Silesia. The purpose of their activity is to enhance the cooperation in the field of promotion of the economy and to attract foreign investments to municipalities. One of the Offices is run by the Wroclaw Agglomeration Development Agency (ARAW).

ARAW is a company aiming at attracting foreign investors in order to create thereby new workplaces and support the economic growth of the region. Established in 2005 as the first institution of this type in the country, it is owned by the Municipality of Wroclaw and 29 municipal self-governments of the agglomeration. In addition, the company conducts vast informative and promotion activities directed at residents, and implements projects supporting development and cooperation in the agglomeration.

***ARAW has supported over 200 direct foreign investments, creating thus over 100,000 workplaces.***

The company's activity focuses on numerous areas of operation of Wroclaw and its surrounding municipalities, and contributes to the intensified cooperation and to creating a strong economic position and image of the Wroclaw agglomeration:

- Creating new workplaces by attracting foreign investors from the production and service sectors; cooperation with the agglomeration's businesses as part of aftercare; providing conditions for the development of startups;
- Supporting the cooperation between self-governments by implementing various types of projects: educational, promotional or infrastructural ones, using external financial support;
- Carrying out informative activities directed at residents and all those who work, study, live or spend their free time in Wroclaw and the surrounding area;
- Branding and development of many recognisable brands, such as **Invest in Wroclaw, Study in Wroclaw**.

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