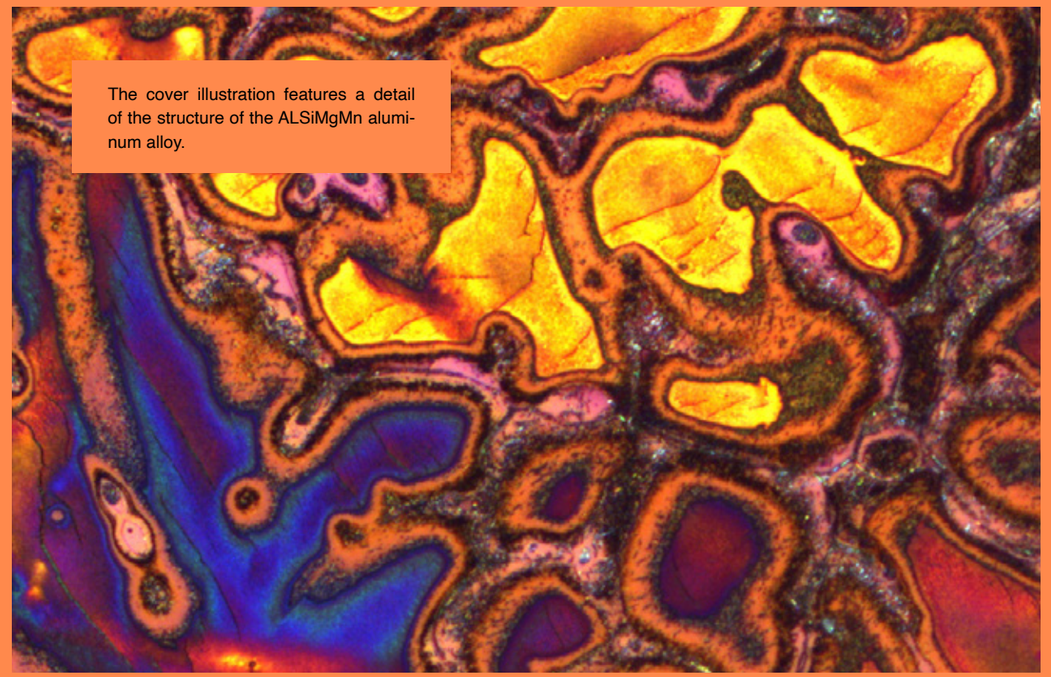
GetSmart #2

research, development, and innovation in the Pilsen Region

Published in November 2021 as part of the project Smart Accelerator for the Pilsen Region II



The cover illustration features a detail of the structure of the ALSiMgMn aluminum alloy.

PLZEŇSKÝ KRAJ
NEJLEPŠÍ MÍSTO PRO INOVACE

GetSmart
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Dear citizens of the Pilsen Region, Investors, Researchers, Students, and Friends,

I am aware that development is inevitable. That is why we in the Pilsen Region support the ideas, innovations, aspirations and dreams of all those who are concerned about the state of society and the industry. We have taken up implementing the Smart Accelerator project, which helps us foster the cooperation of researchers, entrepreneurs, startups and public administration representatives. This is what makes the Pilsen region an ideal place for study, enterprise, a professional career, and life in general.

Our priority is to offer excellent conditions for study and research in the region, attracting both undergraduate and graduate students and researchers, not only from other regions but also from abroad. We also focus on pursuing technological trends and support the development of innovative companies that build their business on an industrial basis and utilize modern technologies to develop and improve.

We are proud of the universities and research centers based in the Pilsen region. We strive to create a flexible, adaptive system that will help students, startups and established companies to collaborate with each other. It is the cooperation and helpfulness of people and institutions specializing in research and innovation that is so essential for progress in our region. That is why we are considering the establishment of the Pilsen Innovation Orchestrator, the purpose of which will be to provide patronage, support and the promotion of the key activities of individual participants; cooperate with partners to open new, future-oriented study majors; and build a system of active cross-border partnerships in science, research and innovation.

Dear supporters of innovation, research and development, thank you for all your interest, ideas and your desire to push yourself, your companies or your universities forward, constantly improving life in the Pilsen Region.

I wish you success in all your endeavors and the best of luck.

Yours sincerely,

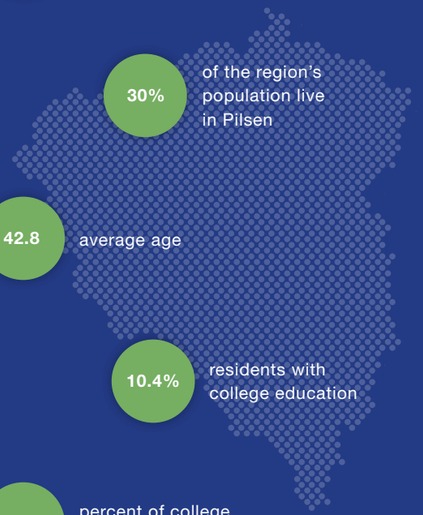
MK

Marcela Krejsová,
Councilor of the Pilsen Region for Tourism, Partner Regions, Public Relations and Business Support

DATA REGARDING RESEARCH AND DEVELOPMENT IN THE PILSEN REGION

BASIC INFO ABOUT THE REGION

591,545 population as of 30/06/2021



30% of the region's population live in Pilsen

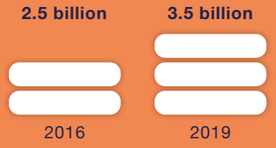
42.8 average age

10.4% residents with college education

8.8 percent of college students in the region are from abroad

FUNDS ALLOCATED FOR RESEARCH AND DEVELOPMENT

In 2019, funds allocated for R&D amounted to

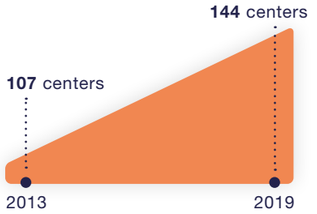


Since 2016, the amount allocated for R&D has **increased by nearly 50 percent**, primarily in the business sector.

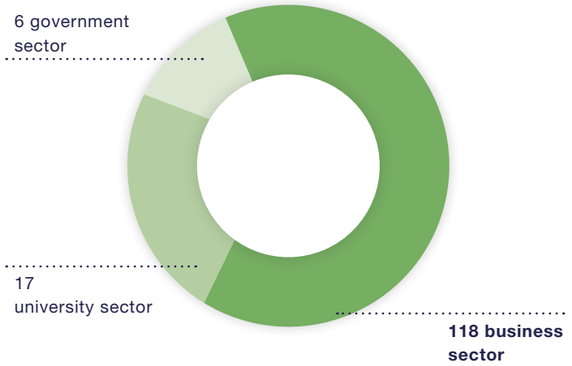
The funds allocated for R&D in the business sector amounted to **1.3% of the GDP** (4th highest share in Czechia).

Czech national average	1.1% GDP
South Moravian Region	1.6% GDP
Prague	1.2% GDP

RESEARCH AND DEVELOPMENT CENTERS



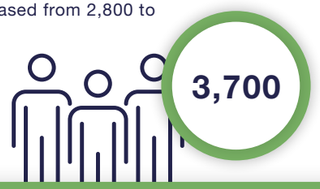
The number of R&D centers in the region increased to **144** in 2019.



Most R&D centers are in the business sector.

PEOPLE EMPLOYED IN R&D

Between 2016 and 2019, the number of people employed in R&D has increased from 2,800 to



2,500 BUSINESS SECTOR	**1,100** UNIVERSITY SECTOR

In 2019 the region had **the largest share of researchers** of the total number of people employed in R&D from all Czech regions.

Prague	59%
South Moravian Region	52%
Czech national average	54%

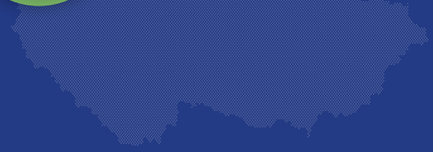
COLLEGE STUDENTS

Between 2018 and 2019, the number of students at the University of West Bohemia **increased** by

Number of students at the University of West Bohemia and the Faculty of Medicine of Charles University in Pilsen:

Students in STEM fields

of college students in the Pilsen region have chosen a STEM field of study (2nd highest share in Czechia)



Zlín Region	19.9%
South Moravian Region	17.1%
Prague	10.7%

More information and the latest news available at **www.inovujtevpk.cz** or at the **GetSmart** Facebook page

R&D supervisory board for the Pilsen region, autumn 2021

Major trends and data from the Pilsen Region are monitored and processed by the analytical department of the Regional Development Agency for the Pilsen Region. Data sourced from the Czech Statistical Office and the Czech Ministry of Education.

NEWS FROM THE REGION

AWARDS FOR AIMTEC

The Pilsen-based technology company Aimtec had a very successful year. The company celebrated 25 years of operation and its founders and co-owners, Roman Žák and Jaroslav Follprecht, won the regional round of the EY Entrepreneur of the Year 2020 competition organized by the Pilsen Region. The jury especially praised their hard work, perseverance and vision which they managed to transform into innovative digital solutions for both their domestic and foreign clients. In 2020 the company moved to new, state-of-the-art premises, which, although leased, have been refurbished following the "activity-based office" approach. This has garnered the approval of the jury in the Office of the Year competition, in which Aimtec won the award for best regional office outside of Prague.

BEE INSPIRED

There is no doubt about the importance of bees for the ecosystem. They pollinate more than 70% of crops, flowering trees and plants. Thanks to modern technology, we can now see how the bee community actually works. It is generally known that bees communicate information by performing a kind of dance. Did you know, however, that they are actually capable of providing their fellow bees with the exact coordinates of their destination? Or that the angle in which they tilt their bodies in relation to the sun can show the other bees in the hive the direction in which they need to fly to find food? If you're wondering how a hive actually works, come to Pilsen's Techmania in Pilsen, where hives have been installed on a so-called BEE TOWER and visitors can observe the interior of the hives through cameras installed inside them. Students of the 21st Elementary School in Pilsen have installed beehives with cameras on the school's roof and study them during science lessons. And then there is the ProBee project, supported by the City of Pilsen through its BIC Entrepreneurial and Innovation Center: a unique combination of science and nature. Selected beehives in the city are monitored by artificial intelligence, and information from the hives, such as images or sounds, is being analyzed with the help of neural networks, which provides beekeepers with a wealth of useful information. The project has an educational outreach since the data collected can be used to organize educational and leisure activities for schoolchildren. Two beehives have also been stationed on the roof of the Faculty of Mechanical Engineering at UWB, and are being continuously monitored by cameras and sensors. Students may utilize the data obtained in their bachelor's or master's theses. A glimpse into the world of bees is also available for students at the Children's Technical University, University of the Third Age, and the general public.

30 YEARS OF UWB

The University of West Bohemia in Pilsen has celebrated 30 years since its inception. It was founded on 28 September 1991 by merging the former University of Mechanical and Electrical Engineering (4 faculties – Mechanical Engineering, Electrical Engineering, Applied Sciences and Economics) with the Faculty of Education in Pilsen. Back then, the university had 4,200 students; that number has nearly tripled since then. The University's research centers have made numerous achievements in the fields of science and research. These include the New Technologies Research Center (NTC), established in 2000; New Technologies for the Information Society (NTIS), opened in 2014; the Regional Technological Institute (RTI), established in 2015; and RICE (Research and Innovation Center for Electrical Engineering), which opened in 2016. In 2019, the National Accreditation Office for Higher Education granted UWB an institutional accreditation which allows it to approve new study programs autonomously. Seven UWB departments have been granted the HR Award, awarded by the European Commission for the successful management of human resources in science and education. In 2021, UWB launched a new five-year strategic plan, with a new motto for the future: The best thing WE can do for the future is to help YOU do it.

CUTTING-EDGE BIOMEDICINE

The Biomedical Center of the Faculty of Medicine of Charles University in Pilsen has been operating for seven years now. Due to its outstanding researchers and the high standard of their work, the center has been awarded the prestigious project CHAPERON – ERA Chair Position for Excellent Research in Oncology under the European Horizon 2020 program, becoming only the fourth successful applicant in the Czech Republic. Sadly, the Pilsen region ranks first in the incidence of cancerous tumors. The Biomedical Center is home to several teams researching various types of cancer. The project has provided the center with funding of approximately EUR 2.5 million. Thanks to these funds, the center has been able to establish a new Laboratory of Translational Cancer Genomics, headed by Kari Hemminki, a leading expert in this field. The project will run until 2024.

THRIVING RESEARCH

Research centers in the Pilsen region are thriving. COMTES FHT a.s. was granted a new patent under the number 308 776, "Monolithic object containing a memory alloy and the method of its production." By its nature, such an object is deformable from its initial shape and is capable of at least a partial subsequent controlled return to its initial shape. The Research and Testing Institute Pilsen has significantly contributed to the development and deployment of state-of-the-art diagnostic methods, utilizing the so-called neural networks and artificial intelligence, which the ČEZ power company has been using in their turbine diagnostic systems at the Temelín nuclear power plant. The new diagnostics will not only help to predict and reduce unwanted vibrations but will also allow the detection and utilization of reserves in the technology to increase the generated power. An international team of scientists from the New Technologies Research Center at UWB has identified and described the material in which rare particles, the so-called three-point fermions, are formed. Experts expect them to play an important role in quantum computers. Researchers from the RICE Research Center at the University of Science and Technology have developed a unique technology for separating plastics, based on the principle of freefall electrostatic separation.

The Brand Is Just Another Tool

by **Tomáš Hrivňák**

The Devil promised Doctor Faustus unlimited knowledge in exchange for his soul. To this day, the Faustian legend remains one of the most popular stories about science and innovation, and its potential seems inexhaustible. Is there any way to compete with it?

Research and Innovation Strategies for Smart Specialization (RIS3) have been a part of the prescribed strategic toolkit of European regions and countries for some time now. Apart from being a prerequisite for obtaining various European grants and subsidies, these strategies are intended to steer EU countries toward sustainable, innovative, knowledge-based development. The current versions of the Czech RIS3 strategies indicate that the marketing of science, research and innovation is a frequent priority. In the Pilsen Region, marketing is identified as one of the "key areas of change" within the RIS3 strategy, with the proclaimed aim to "improve the reputation of the Pilsen Region in the world of research, development and innovation" (RDI). So much for the official document – but how to turn it into a practical, functional plan of action that would indeed improve the region's reputation? The short answer is, build a strong regional RDI brand. The long answer, which we offer here, is based on thirty years of experience in designing and implementing similar projects in other Czech regions and in a number of scientific, cultural and educational institutions.

Brands are an integral part of our lives. We interact with them whenever we make everyday decisions: what yoghurt to buy, which supermarket to go to, which online news site to read, which specialist to pick, which school to send our children to, or which concert to go to. Brands play an indispensable role in all this, helping us navigate the vast, ever-expanding array of options, services, products and experiences. Brands are signals of quality: through various communication channels (including, but not limited to advertising), they promise a certain level of quality that consumers then rightly expect – and are disappointed if they do not get it.

The world of science and research is no different. Names such as CERN can easily compete for attention with such heavyweights as Milka chocolate or the "Swiss-made" mark. In today's world, where everything is marketed to everyone, attention is the currency that alchemically transforms into gold – the gold in this case being grants, investments, the influx of quality professionals, or media coverage. Obviously, you cannot buy CERN in a supermarket; but in today's "attention economics," all brands are floating in one giant pot.

A brand is a multi-layered marketing concept. In today's society of excess, the brand can be a key tool through which to create value. From a functional point of view, there is often little difference between various brands of products and/or services – or the differences are so minor as to become virtually indistinguishable for the average person. It is difficult to compare, for example, Evian and Vittel bottled water in terms of their effectiveness in quenching thirst – yet each brand has its own distinctive profile. In other words, producers of bottled water have managed to give a transparent, colorless, odorless liquid shape and face.

This is not to say that in the world of contemporary science, one research institute is just like another, and the only thing that matters is how strong a brand they can build. It is true, however, that it is much easier to obtain a grant, find research partners or attract the world's best researchers if your institution has a prestigious name or if the eyes of the world are fixed on you in breathless anticipation, waiting for you to prove the existence of the God particle or synthesize antimatter.

If we accept the notion of marketing as a practice that imbues "real" products and services with some kind of a "meaning" as an added value, building a brand is an indispensable part of the whole process, and it is equally important for freelance designers, spiritual leaders, doctors, universities, zoos, and multinational corporations.

A brand is a sign; it carries meaning, just like any other signs and sign systems (a language, a work of art, a poem, or a road sign). Brands help us navigate the world of excess supply, just like trail signs help us not to get lost on a mountain hike. When we look at the RDI brand of the Pilsen Region, the first thing we should consider is what it should actually refer to, the direction it should point toward. We need to make sure that we create a clear, well-organized system of "scientific trails," instead of a drooping, battered wooden signpost in a small town square.

The key is to stop equating "brand" with such things as "logo," "slogan," "advertisement," or "Facebook." We need to think of a brand as a network of threads which can spin a fascinating, dramatic, positive story. We can imagine this process using a simple "equation:"

$$\left(\frac{\text{THEME}}{\text{LOCATION} \times \text{SCIENCE}}\right)^{\text{COMBINED}}$$

What does it mean?

First and foremost, the brand of an innovative science region is a complex mechanism whose individual elements each carry their own internal dynamics, and the effect of the "brand" is only created by their correlation. Let us now take a closer look at the structure of this "brand fraction:"

The numerator is the theme: the core of the brand's story, which is unique, engaging, and meaningful, and can be developed over time. It can be based on history, a scientific field, a breakthrough discovery, a distinctive personality, etc. Examples include CERN's "discovering the limits of the possible" or Silicon Valley's "digital technologies that are changing the world."

The denominator contains two factors that multiply each other. Location means the character, spirit, or, if you will, the DNA of a given geographical location (city, district, or region). It does not have to be directly related to science or research. It may even partially clash with it, which can create an interesting brand dynamic (a good example of this is the historical image of India as a technologically backward colony, contrasted with its recent technological and educational success story; or the dramatic improvement of Berlin, a city that had been deeply scarred by the division of Germany. It is important to consciously emphasize this genius loci, articulate it and incorporate it into the presentation and promotion of the given location. Unfortunately, locations and regions in Czechia do not actively utilize this type of brand profiling, apart from several attractive tourist destinations that capitalize on an established, more or less stereotypical positioning. Most local public administration departments and organizations tasked with handling this issue limit their effort to

churning out generic slogans, such as “XY – a great place to live” or “XY – a place where innovation thrives.” Pinpointing that which is distinctive and unique about a city, area or region requires a dash of ethnography, some literary and dramatic skills, and a lot of business acumen.

It is precisely this multi-genre process that sometimes discourages the responsible parties from taking it up altogether or completing it successfully. A well-created brand profile, however, will not only benefit the regional science and innovation ecosystem, but
all other areas that depend on the professional presentation of the region.

The second part of the multiplication is science. This seems quite self-evident: science, after all, should be the main focus here. From a marketing perspective, however, this is not the case. Science marketing is not the same thing as scientific communication, the parameters of which often directly clash with the needs of marketing. Scientific communication has its own fixed rules, expert terminology, strictly defined practices and a code of conduct. Science marketing often needs to transcend these strictly defined boundaries so that it can fulfill its mission to make science widely accessible to the general public and decision-makers who are generally not familiar with the current scientific discourse. Scientists at CERN were probably not very happy when PR specialists came up with the “God particle” metaphor, or when they stirred up sensational speculations about the end of the world once the Large Hadron Collider manages to create antimatter. Modern science, however, needs these simplifications and “Hollywood-like” metaphors – all the more so as it becomes more and more impenetrable save for a handful of experts, and more and more difficult for the public imagination to grasp.

The key element is the product of the region’s essence and its scientific profile: if both elements are formulated correctly, their effect is multiplied. This means that a certain field of science, a certain type of innovation is only possible in a given region – and nowhere else. I have already mentioned Silicon Valley, which is the best example of this kind of connection.

The value of the fraction, which consists of the three aforementioned elements, will be even greater if the “size” of the theme is larger than the product of science/innovation and the regional profile. In other words, the brand theme should always be more ambitious than the product of the actual RDI and the region’s potential.

Regional science and innovation marketing often suffers from being too “literal.” Official communication simply enumerates all the important players, achievements and capabilities, and the authorities responsible are convinced that this “phone book” format is more than adequate for their marketing needs. However, this is woefully inadequate. There are dozens of regions in Europe with similar scientific, natural, infrastructural and socio-demographic potential. The role of marketing is to mix these ingredients so as to make the region a “big hit.”

The last element of the regional brand equation is the “combined” exponent. This has the potential to either make the regional brand an unqualified success, or to doom it to obscurity. One of the most hackneyed marketing phrases is “a logo cannot be invented at a committee meeting.” We already know, however, that a logo does not a brand make. Moreover, a regional innovation and science brand will be utilized by a very broad and diverse range of institutions, teams, businesses and individuals. They all own the brand, each in their own way, and they help co-create it by giving it substance. Finding a productive and meaningful way of creating and managing a regional innovation brand is absolutely crucial for its development and maintenance. Fortunately, we now have experience and methodologies from other areas where participation has proven to be the best strategic modus operandi, and we can learn from them. These include, for example, participatory urban or budgetary planning, various forms of crowdsourcing, platform collaboration, or orchestration programs.

Harnessing the power of the brand to develop a region’s scientific and innovative potential can bring numerous benefits to the region: greater visibility, increased attractiveness on the human resources and investment markets, and often a better quality of life. Just like other powerful sources of energy, however, a brand requires competent, professional management. This does not mean simply deciding whether to align a logo on the right or left margin of the letterhead (which already has a few logos anyway), where to put a flag or a colorful roll-up. What you need is holistic management and setting up a story in which you want the relevant target groups to get involved. It is not enough to say that we are a “country of stories.” You need to act the story out, perform it, dance it, and keep retelling it over and over again, long enough to make it famous. Doctor Faustus will have nothing on you.

The Pilsen Region Knows Where It's Going

When people think of the Pilsen Region, most immediately recall the best beer in the world, the beautiful Šumava landscape, or the Pilsen Škoda industrial plant. But there is much more to the third largest region in the Czech Republic than that. As the fourth largest city in Czechia, Pilsen builds on its successful industrial history and focuses especially on research and innovation, following the Regional Innovation Strategy of the Pilsen Region (RIS3 Strategy) adopted in mid-2020.

Supporting research and development is one of the possible ways of responding to unfavorable demographic development in order to make the region more attractive for young families, students, companies and investors. In these uncertain times, investing in new technologies pays more than ever.

The aim is to bolster the importance of research, development and innovation at the regional level to achieve better economic competitiveness and to ensure a more effective utilization of public resources. The development of the Pilsen Region, with major changes in industry, employment and education, stimulated, for example, by advances in digitization and robotics, speaks strongly for changing the current approach toward supporting the region's economic development.

The analytical and strategic section of the strategy also outlines a vision for research, development and innovation in the Pilsen Region until the year 2035, defining the main areas where change is necessary:

Human resources for research, development and innovation
Acquiring sufficient, outstanding human capital

Better conditions for research, development and innovation
Developing relationships and infrastructure

Capacity
Increasing the capacity of research institutions and supporting the practical utilization of their results

Innovation
Developing innovation strategies in various sectors

Marketing
Promoting the region's brand through research, development and innovation

Sector Priorities – Specialization at the Highest Level

The strategy also identifies the so-called smart specializations for the Pilsen Region, i.e., areas which are currently at the highest level internationally. The concept of smart specialization has recently been utilized in strategies of economic development in many EU regions. First and foremost, it requires a convincing identification of promising fields in which the region has the potential to excel, and which may represent a significant factor in its future economic competitiveness.

In the preparatory phase of the smart specialization strategy in the Pilsen Region, which focused on identifying the region's best fields of smart specialization, the region applied both data analysis and the so-called Entrepreneurial Discovery Process (EDP). As a result, four sector priorities (domains) have been identified:

New materials

Smart manufacturing systems

Smart mobility

Biomedicine and technology in healthcare

For each of the sector priorities, the Pilsen Region has created a sector innovation platform, which involves representatives of business, research and the general public. Together, they will endeavor to identify further specific opportunities for cooperation and development within each domain.

Go West – To the Pilsen Region

Students or young families who would like to study, work and live in the Pilsen Region will probably not be particularly aware of these strategies. It is clear, however, that investments in science, research and innovation are going in the right direction. The Pilsen Region is home to a number of traditional companies producing highly specialized products such as locomotives, trams, trolleybuses, turbines and other power-producing equipment that is exported all over the world. However, we can also find many technology start-ups, promising young companies, as well as advanced innovative companies that work with modern technologies or actually create them. How is that possible? Thanks to its industrial tradition, the region has both the necessary human potential and technical expertise. "The potential for innovation is simply in people's blood. Moreover, the Pilsen region provides ideal conditions in which science, research and innovation can thrive. Supporting organizations, such as BIC Plzeň, CzechInvest or the Regional Development Agency of the Pilsen Region, which I represent, offer quality professional services, motivate people to start new innovative companies, and help existing ones to grow," says Jana Klementová from the Regional Development Agency of the Pilsen Region, who is also the Regional RIS3 manager of the Smart Accelerator II project.

The region is home to well-equipped research centers with a particular focus on research in materials, IT, electrical engineering, mechanical engineering and biomedicine. Unique in this respect is the Pilsen Biomedical Center, affiliated with the Faculty of Medicine of Charles University in Pilsen, which closely cooperates with the University Hospital in Pilsen. The University of West Bohemia has four research centers (RICE, NTIS, NTC, and RTI), which conduct their own research and collaborate with the private sector. Certain private companies also carry out their own research and development; they are not as numerous, but they have more available funds to invest in R&D.

The rapidly developing region has a great demand for fresh graduates. The city of Pilsen offers quality higher education, either through the University of West Bohemia (especially its STEM-oriented faculties) and the Faculty of Medicine of Charles University in Pilsen. Both the city and the region offer a large number of cultural, sporting and leisure activities, which attract both students and young families with children. Elementary and secondary schools boast state-of-the-art technological equipment, using specialized classrooms with high-end computers. Leisure activities for children are also available through such venues as the Robotics Center and Techmania Science Center, or through after-school activities, including ICT, mathematics and physics clubs. The Pilsen Region therefore offers both a high standard of quality living as well as excellent employment and study prospects.

ROMAN ŽÁK co-owner of the Pilsen-based technology company Aimtec

You Need to Understand the World Around You to Make the Right Decisions

Roman Žák and Jaroslav Follprecht, founders and co-owners of the Pilsen technology company Aimtec, have won the regional round of the 2020 EY Entrepreneur of the Year competition. The expert jury especially praised their hard work, perseverance and vision, which they have been able to transform into innovative digital solutions for both their domestic and foreign customers. Roman Žák reveals the secret of Aimtec's success and what makes Pilsen an ideal base for their business.

Your company has been voted Entrepreneur of the Year of the Pilsen Region for the year 2020, a year that was significantly affected by the pandemic. Has the pandemic had any impact on your business? How was your year, in general?

Thanks to the pandemic, we are now capable of delivering even large-scale projects completely remotely. We can implement a project with only the barest minimum of customer visits. By eliminating the travel involved, we are reducing our carbon footprint and operating more sustainably. However, the pandemic has affected us in other ways too. Our projects are often very complex, which makes communication and personal contact very important, especially within the implementation teams. The crisis had a huge impact on our employees – the shift to working online was extremely demanding and challenging.

Although we have chosen to maintain the remote delivery concept even after the lockdowns, we have been trying to find the right balance between remote and on-site work. The pandemic has greatly accelerated the digitization in our field. A fully digitized company is more resilient and can continue operating even if some people contract the virus and go "out of commission" for a while. Digitization also aims at eliminating labor-intensive or routine tasks so that people have time to grow, to learn to manage the technology instead of merely operating it.

Together with automation, digitization is a way for manufacturing companies to survive in the market. We strive to integrate all automation technologies and help to connect them digitally, both with the outside world and with each other. Integration and digitization are essential if you really want to make the most of automation. The advent of digitization has brought a major breakthrough in the industry; it reminds me of the time when Apple first introduced the iPhone.

You once said, "When you have been building a company for over 25 years, with a clear vision and values, surrounding yourself with great people, it simply has to work." Is it really that simple?

If you put in the effort, you can achieve whatever you want. If you know where you're going, it does not matter if you stumble along the way; you simply get back up and keep going in the right direction. Not like in Czech politics, where things keep changing from one day to the next and the whole society suffers for it. At Aimtec, we have the luxury of staying on track. Our company employs people who are looking for a meaningful environment where they can follow common-sense rules and trust one another. This is extremely important, both for us and our employees; that is why they have chosen to work for us, and the reason they work so well with our clients. That is why we place such importance on company values, beyond simply posting them on the company's Intranet. Things do not always work out the way we want, and sometimes we find that we have deviated from our values too much. It is the small decisions about doing things in a better way and following the values that lead to a better understanding and the sharing of these values. These also include sustainability, which I have already mentioned – a value that should be important to all right-thinking people.

How do you conduct job interviews in your company? How do you pick new team members?

Every manager at Aimtec chooses their team members based on the team's vision, values, and the technical requirements for the position. Radka, our HR manager, always makes sure that the "chemistry" is mutual. We invest a lot in all of our employees, so it is important to judge the person's potential and abilities and assign them a job that makes both them and us happy. Apart from expertise and skills, we highly value such qualities as focus, respect, humility and the ability to communicate with people. We are a service-oriented company, and our work is based on expert know-how and constant contact with our clients. It is the quality of our services that determine the clients' willingness to keep working with us.

It seems like you have been doing really well in that department, and your company is growing steadily…

Aimtec works by running a successful pilot project in Central Europe, in collaboration with the local management of a multinational company. They will then help us push the project further; even a pilot project requires the approval of the multinational company's HQ. We then use the pilot project to create a template that we roll out around the world – in such diverse regions as Africa, China, Mexico, and the US. We have managed to do this for the IAC corporation (building a pilot plant in Přeštice) and the company Eissmann (Bor u Tachova).

What do you think makes Aimtec so successful?

I struggle a bit with the phrase "so successful;" our success is the result of 25 years of hard work, so it would be rather sad if we hadn't managed to accomplish anything. We had two major turning points: the first came during the 2008 financial crisis, when we moved from the "pet project" stage toward actually generating profit. For many Czechs, the word "profit" still carries rather negative connotations. There is nothing wrong with making profit; a healthy company needs to generate enough funds, so it does not have to rely on banks and investors who frequently focus on short-term profit. The second breakthrough has been more or less ongoing for the past 10 years: we have been continuously improving in identifying and outlining our vision and strategy. We are still learning, but we have now defined both of those things as best we can; we know where we are going, and we have shared this vision with all our employees. We are continuously making decisions to further refine our vision. This has also included the decision to discontinue some of our activities, to streamline and specialize. Through all of these minor decisions, we have been constantly shaping, changing and developing our vision. It is also very important not to be afraid to take risks.

Pilsen is a favorite location for many engineering and technology companies, thanks to its industrial tradition, the University of West Bohemia, or its proximity to Bavaria. Was any of this a factor in setting up your business? What is it like to operate in Pilsen?

The Pilsen region is important to us, especially due to the large pool of educated people. We like to be a part of the community, and we have become such local patriots that we have even named our state-of-the-art conference rooms after various Pilsen landmarks. I think Pilsen is just the right size for running a successful business. Some of our employees have been working for us for 10, 15, or even 20 years; they have mastered all the know-how and they are happy to share their knowledge and experience with their younger colleagues, which is one of Aimtec's key values. We have a long-standing cooperation with the University of West Bohemia in Pilsen and the Secondary School of Electrical Engineering. We often take on interns who are still in high school or in their second year of university; we test the students' abilities and motivation and try to prepare them for working for us. We encourage them to finish their studies, but we also stress the importance for them to learn to function in a real business.

Your headquarters are in Pilsen, but you work for customers all over the world. Have you considered setting up local branches in other markets?

We have considered setting up a US branch a few times, but we have realized that we can provide the same range of services to our clients wherever they are in the world – the USA, China, or Mexico. We have set up our systems and processes to be able to provide 24/7 support to our clients across all time zones. Everything is handled online; even going to a city 150 kilometers away is too long a trip; the drive takes a couple of hours, but the problems we deal with require providing a solution in less than an hour, sometimes even within minutes. Furthermore, expansion is not our greatest priority; we want to be able to keep training all our employees in providing the best-quality service possible. For the next five years at least, we can keep growing here in Pilsen. We have actually been organizing one of the best and most interesting conferences in the industry here in Pilsen, which has a lot of benefits for the city. On September 21st, we will be hosting the 21st Czech-Bavarian TAL conference, organized jointly with the IHK Regensburg Chamber of Industry. We have had speakers from such corporations as BMW and Audi, and a former director of logistics from Škoda Auto delivered one of the last speeches of his career here.

"Thanks to the pandemic, we are now capable of delivering even large-scale projects completely remotely."

How do you see the future of digitization in production and logistics?

Everything is going to accelerate, just like the use of personal electronic devices, mobile phones, social media, cloud storage, or online shopping. Industrial production will also change radically. There are a lot of related social and societal issues, but much also depends on the parliaments and governments in charge of the country, as well as other European and world countries. Many services will become more flexible and efficient. What can this bring? The pandemic has taught us that the global supply chain is too sensitive and too interdependent. It only takes a single factory outage in China to cause a cascade effect. I am convinced that digitization will allow us to relocate a lot of production back to Europe, to increase local European competitiveness and thus also promote local self-sufficiency. Ten years from now, we will have self-driven cars, and internal logistics processes within companies will be similarly self-driven; transport and handling equipment will be merely monitored by a technician. Even so, people are irreplaceable in manufacturing companies. It is up to them to figure out how to improve processes even further, or to deal with non-standard situations. People can think. Nowadays, companies are predominantly looking for employees to perform unskilled, routine jobs. That will definitely change in the future; employees will perform activities with a higher added value which require a higher level of reasoning, decision-making and creativity. People will no longer physically perform unskilled jobs; they will continuously improve the processes, supervise them and deal with unexpected situations. BMW, for example, has developed autonomous mobile robots (AMR) that transport pallets in production facilities over longer distances. The logistical robots use elements of artificial intelligence, neural networks, and image recognition. And it was the former forklift drivers who provided the key experience for implementing the robots. Today, they are the ones operating the control panels, and they have become the company's most loyal employees. This is the way digitization should be introduced and utilized.

Roman Žák is co-founder of Aimtec, where he currently holds the position of Chairman of the Board of Directors. After graduating from the University of West Bohemia in Pilsen, he went to work for Deloitte. In 1996 he founded Aimtec, where he is in charge of formulating and implementing long-term visions and strategies. His goal is to make the Pilsen-based firm a globally recognized company that would help mid-sized manufacturing companies to implement digital transformation within their business. Aimtec builds long-term partnerships with key multinational clients and strives to improve the company's position in the global market. Roman Žák is also in charge of the company's activities leading to greater social accountability. That is why, for example, he initiated a long-term cooperation with the Alzheimer Foundation, and co-organizes one of the most popular mountain bike races in the region, the Aimtec Open Race.

Fields of Specialization in the Pilsen Region

Industrial history; technological advancement; cutting-edge research; ideal environment for innovation; a motivating education system; first-rate universities; excellent living conditions; proximity to Bavaria – these are the values and special circumstances that the Pilsen Region is well aware of and strives to utilize to the best advantage. The region is fifth in the Czech Republic in GDP per capita, which makes it one of the best-performing regions in the country.

The Regional Innovation Strategy of the Pilsen Region has defined four priority fields, the so-called domains of intelligent specialization, in which the Pilsen Region already plays an important international role. An innovation platform has been prepared for each of them, connecting representatives from the business sector, research and innovation sector, educational institutions, and public administration. The focus on carefully identified priority domains is geared toward creating the best possible combination of players and activities involved which have the greatest chance of unlocking the innovation and transformation potential in each field.

Domains of intelligent specialization in the Pilsen Region:

New materials

Materials with advanced properties
Materials for additive technologies
Special steels

This domain focuses on the research of new materials/materials for the future that have certain special properties, such as superconductivity, which expands their range of application and benefit. Research into new materials also requires new approaches in healthcare or the development of 3D printing.

Intelligent manufacturing systems

Intelligent diagnostics and maintenance
Intelligent production control
Embedded intelligence
Big data
Neural networks and machine learning
AI-based models, control, trends, and predictions
Sensors, sensor control technology

We can see all these as part of Industry 4.0, which uses neural networks, machine learning, virtual and augmented reality and data analytics in predictive systems and focuses on the development of embedded systems. All of this is geared towards intelligent production facilities as a way to ensure better efficiency and flexibility.

Smart mobility

New concepts for transport vehicles
Autonomous mobility
Charging systems for electromobility
Transport modelling and planning
Traffic monitoring and control
Shared transport

This domain addresses major changes in individual and public transport. Apart from the design of transport vehicles themselves, it seeks solutions for sustainability, ecology, new propulsion systems, energy, materials, self-driving vehicles and the segment of traffic monitoring and control, including the use of artificial intelligence.

Biomedicine and technology in healthcare

Oncology
Infectious diseases and antibiotic resistance
Multidisciplinary medicine
Reproductive medicine
Technologies for preventive medicine
Organ replacement
Medical diagnostics
Materials in healthcare

This field focuses primarily on the treatment of infectious diseases and antibiotic resistance issues; oncology; reproductive medicine; multidisciplinary medicine and the development of personalized medicine; medical diagnostics; organ replacement; and the use of new materials in medical practice.

A special platform has been set up for each topic, composed of experts and specialists from universities, research centers, and the commercial sector, as well as regional political representatives. Participation in the platforms is open to other interested parties from the region who wish to contribute to the development of the field, both in terms of education and research and applications in the commercial sphere, and who would like to have the chance to influence the direction of national support for research, development and innovation.

INCUBATION PROGRAM HELPING TO KICK-START FIVE INTERESTING PROJECTS

The Pilsen Region supports research and development and strives to create the best possible business environment in which start-ups and new projects will thrive. In June, the region launched a pilot run of an incubation program involving five companies from various fields. For six months, they were assisted by expert consultants who helped them develop a business plan, focusing on such things as approaching potential investors or involvement in follow-up programs; the mentors also monitored whether the companies actually stick with the plan.

Consultation on business plans and development projects in the Pilsen Region has been provided since 1992 by the Business and Innovation Center BIC Plzeň. It operates within the framework of networks for supporting entrepreneurship and innovation and cooperates with a number of other partners at regional, national, and international level. It provides corporate leaders with an unbiased, outside perspective. Thanks to the Center's expertise in business support tools, it helps companies decide which form of support can really help implement innovations and which would present more difficulties than benefits.

Connected to these activities is the new incubation program, the pilot version of which BIC Plzeň launched this year in cooperation with the Pilsen Region, and which helps budding entrepreneurs to implement and develop their plans so as to break into the market, without having to face a lack of interest in their product or service. "Apart from providing consulting services to existing innovative companies from the region, we have been mentoring emerging entrepreneurs for many years, although we have never differentiated between companies based on how long they have been on the market. As part of the new incubation program, we are shifting even more focus to start-ups than before," said BIC's Lenka Palánová, who, in addition to providing services for new entrepreneurs, also manages the operation of the BIC Port co-working center.

"We provide support to all sorts of innovative businesses in the region, tailoring our services for each individual company. But times are changing, and with them the overall approach and general awareness regarding support in starting a business. Thanks to awareness-raising activities and business incentives, more and more people are becoming interested in starting their own business. People are becoming more and more aware that support is available. We are being approached by more potential entrepreneurs than ever before. The needs of the market have evolved, which has triggered a change in the range of services and availability of support infrastructure, i.e., organizations that support private enterprise, both in Pilsen and elsewhere," added Palánová.

Support for a new business must be fast and tailored to the needs of the entrepreneur. But these two conditions are hardly compatible with the way public support organizations operate. That is why the incubation program has been set up specifically for start-ups. "We have made a huge effort to create a simple and fast-acting support tool that will really be able to help with whatever is needed, and to test it in practice. That is why we have created our own incubation program, which is based on a personalized approach," explained Palánová.

BUDDING ENTREPRENEURS MUST BELIEVE IN THEIR IDEA AND PUT ALL THEIR EFFORT INTO IT. THE INCUBATION PROGRAM CAN HELP.

The program is guided by a senior consultant who knows what a business plan should look like, and which forms of public support are available for developing it. Moving the plan forward requires experts with a thorough knowledge of the given field. BIC Plzeň approached more than a dozen young entrepreneurs for possible participation in the incubation program pilot run. The Innovation Center chose seven of them and presented them to the incubation program board. The board then selected five of these candidates to work with further. "All of them have already had some business experience, which means they appreciate our help all the more. We have talked to some very young candidates with little to no experience, who were convinced they had a perfectly thought-out plan and did not in fact need any help," Palánová explained.

The companies selected for the pilot program included Amitia Smart Solutions (application for oncology patients); Doklady Edicon (smart invoicing); TechConcept (butterfly turbine valves); Lepší.city (application for collecting and handling suggestions from city dwellers); and PlantControl (smart irrigation). Why these companies? "Our incubation program is generally geared toward start-ups that actually want to get advice. They may have only just started a company, may be planning to start one, or they have already had some experience and need to decide in which direction to go, how to specialize. Almost invariably, their founders' ambition is to keep growing and provide jobs to other qualified professionals besides themselves. Every project should be innovative in some way: it should offer a new and/or improved product or service or utilize new technologies and approaches to solve a relatively common problem. All of the companies and projects we have selected meet these criteria. The incubation program can help them to think things through and invest their resources and efforts in a project that actually has the chance of succeeding in the marketplace. Thanks to our support, they can afford to focus on what is important and to tailor their product to meet the customers' demand," said Palánová about the selection of participants in the incubation program. "When assessing each project, it is not about the field of the candidates' business; what is important is the founders' ambition and their dedication to developing their plan; they must believe in what they do and put all their effort into it. Those are the ones who deserve our support, because they would be in a much worse starting position without it," Palánová added.

"It has already become clear how important it is to choose an individual approach toward each candidate, which is one of the program's keystones. The program's structure is built around certain basic themes that are universal and can be discussed with all the participants together, in the form of a workshop, for example. The follow-up consultations, however, can vary significantly, depending on the companies' line of business. Customer needs, market competition or the right pricing are things that every entrepreneur must deal with, but the specifics are different for each of them. A company developing an app for cancer patients is dealing with different marketing issues than a supplier of automatic irrigation systems, or a manufacturer of components for large power plants. They each face different financial, technological or legal challenges. During the individual consultations, we try to identify each participant's specific needs. Based on these, our senior consultants then seek outside experts with the appropriate expertise and experience who can help the participants to finalize their business plans," said Zbyněk Doležal, who works as a consultant for BIC Plzeň and is in charge of guiding the participating companies through the incubation process.

Important factors in starting a new business

Understand the customer: How can you influence the customers' decision and convince them to choose your product or solution? What value can you bring the customers, what problems can you help them solve, and how will you do it?

Choose the right business model: Is your business model viable? Will it keep the company going and bring in enough income to pay your employees and generate profit?

Get the money: Raise the funds you need to get the business off the ground, to develop your product, obtain the necessary certifications, etc.

Specialize: Finding the right path is not easy and many emerging businesses are reluctant to turn down any opportunity that comes their way. However, they soon hit their limits and realize they have to choose which way to go next.

GetSmart and Travel

DISCOVERING THE PILSEN REGION'S INDUSTRIAL HISTORY

THE PILSEN REGION AND THE CITY OF PILSEN HAVE A STRONG INDUSTRIAL TRADITION. ITS INDUSTRIAL HISTORY HAS MADE THE WEST BOHEMIAN METROPOLIS FAMOUS ALL OVER THE WORLD. PEOPLE ON EVERY CONTINENT ARE FAMILIAR WITH THE PILSEN BREWERY OR THE SKODA INDUSTRIAL PLANT. THE PILSEN REGION, HOWEVER, BOASTS MANY OTHER TECHNOLOGICAL SITES AND UNIQUE INDUSTRIAL ATTRACTIONS THAT ARE WELL WORTH VISITING. SO WHAT ARE THE BEST PLACES FOR THE "INDUSTRY BUFFS" TO EXPLORE?

Annín Glassworks

Annín Glassworks, 1796

One of the oldest glassworks in the country is located in the Pilsen region. The Annín Glassworks is the second oldest continuously operating glassworks in Czechia. The glassblowing and glass-cutting plant have been in operation for over 224 years. The buildings of the glassworks, including the original manufacturing plant, are listed as a cultural heritage site and are situated in a beautiful location. Besides visiting the glassworks, you can also explore the beautiful Šumava countryside: plan a trip to the medieval Kašperk Castle, Pustý Castle, or the town of Hartmanice.

In the 20th century, the glassworks was known especially for its richly cut crystal glass. After the plant was nationalized in 1948, the glass furnace was shut down, and only the cutting plant continued to operate. After 1989, the glassworks changed hands several times, and the glass-blowing plant was again restored.

In 2015, Annín Glassworks opened its own glass museum. It focuses on both the history and the present of glassmaking in the area, from the turn of the 18th century onwards, and on the life of glass blowers and glass cutters. You can also visit the cutting plant and workshops, and the glassworks itself operates for part of the year. Master glassmakers again blow molten glass to create vases, bowls, candlesticks, and other items. You can do more than just watch, however; you can choose your own decor and blow your own original glass object. You can also visit the gallery and glass shop and buy a luxury glass souvenir.

www.annin-glass.cz

Centrum Caolinum, Nevřeň

In the village of Nevřeň there is a former underground kaolin mine. Kaolin had been mined in Nevřeň since 1870, first by strip mining, then by underground mining. The mine was only in operation for 27 years, but even in that short time the miners managed to dig an amazing labyrinth of tunnels, which you can explore for yourself thanks to Centrum Caolinum's nature trail.

The establishment of Centrum Caolinum is linked to an unfortunate event in Nevřeň's recent history. In 2012, a fire broke out in the building that housed the local pub, community center and fire station. In October of the same year, however, a reconstruction proposal was presented, and a new community center and meeting venue was opened in 2014. The center offers a multimedia exhibition about the mining and processing of kaolin and the history of the mine. After that, it took several years to make the kaolin mine accessible for public tours. The mine served various different purposes in the past and was even used as an air-raid shelter during World War II. Later it became a popular destination for both amateur and professional spelunkers. The mine was first opened to the public during the Industry Open festival in June 2019.

Centrum Caolinum, Nevřeň

On a tour of the Nevřeň underground, you will pass through corridors that are up to 12 meters high and 6 meters wide. The walls still bear traces of manual excavation and the black stains from carbide lamps. The labyrinthine passages of the kaolin mine were used by Czech filmmakers as a setting for parts of the children's film The Devil's Quill. Along the tour, you can see some of the film props the filmmakers left behind.

http://www.centrumcaolinum.cz

Dobřív Hammer Mill

Not far from the town of Rokycany is a unique technical heritage site, the Dobřív Hammer Mill, which is the largest and most important industrial monument of its kind in the Czech Republic and unparalleled even in Central Europe. It was built in the early 19th century on the site of the previous wooden hammer mill. Although the hammer mill was later equipped with other machinery, it has been restored to the state it had been in the 19th century. The hammer mill was originally used for forging blast furnace raw iron and included a blast furnace for processing iron ore.

Dobřív Hammer Mill

The hammer mill was powered by a total of four water wheels, installed on a millrace running from a nearby fishpond. Each wheel had a specific function. One of the wheels powered other machinery in the hammer mill, such as scissors, grinders, or the dynamo. One of the wheels was used for powering a set of wooden bellows for the furnace. Nowhere else in Central Europe can you find similar equipment that is still in operating condition, preserved and unchanged since the 19th century.

The Dobřív Hammer Mill includes a live exhibition of the blacksmith's trade, as well as the entire system of water wheels that powered the hammer mill. The premises also include a furnace and a blacksmith's workshop. The mill offers live demonstrations of the equipment, both using the large hammer and the small anvil. The hammer mill is easy to find; it is situated near the Huťský Pond on the outskirts of the town of Dobřív. It is open from April to October. In May every year, there is a festival and a competition of blacksmithing schools.

www.zcm.cz

Plasy Building Heritage Center

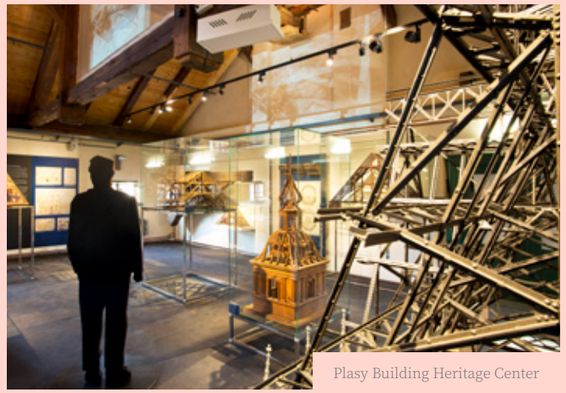
A trip to Plasy offers a glimpse into the history of the building trades. The Building Heritage Center is an exhibition affiliated with the National Technical Museum dedicated to the building tradition. It is located near the Cistercian monastery in Plasy, which was founded in the mid-13th century by the Czech king Vladislaus II.

In the previous century, the listed buildings were used for administrative and economic purposes and fell into considerable disrepair. After 2000, a systematic restoration of the premises was launched, which included the restoration of the former brewery and farmyard and the creation of the Building Heritage Center.

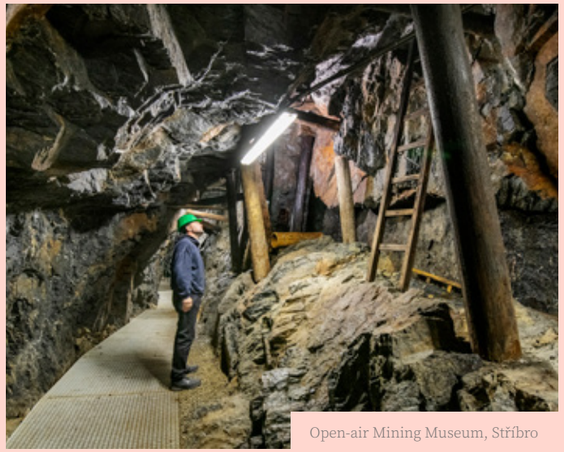
In the impressive premises of the former brewery and farmyard of the Plasy monastery, you can put yourself in a medieval builder's shoes, sample the commonly used building materials, and try out many practical building skills.

Museum exhibits are combined with historical workshops demonstrating traditional building crafts. The exhibition will take you through the entire building process, starting with the planning and design stage, through the building materials and rough construction, to details such as tiling, plaster, windows and doors. During the summer holidays, you can also try your hand at blacksmithing, masonry, carpentry, stonework or plastering in the building crafts yard. Children will enjoy the construction playground where they can build and demolish their first masterpiece. Even the greatest of architects once started with building blocks, after all. There is also a permanent exhibition dedicated to architect and visionary Jan Kaplický.

www.muzeum-plasy.cz



Plasy Building Heritage Center



Open-air Mining Museum, Stříbro

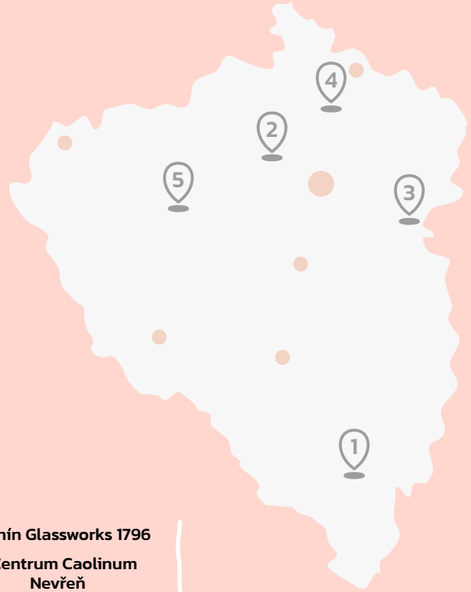
Open-air Mining Museum, Stříbro

You might think that the town of Stříbro would be known worldwide for the mining of metal of the same name (stříbro = silver in Czech), but you would be mistaken. The local mine district was most famous for the lead extracted from the ore mined here. Most of the ammunition used on the battlefields across Europe at the time of the Napoleonic Wars was made from lead extracted from ore mined in Stříbro. Mining went on in Stříbro from the mid-12th century until 1975, when the mines were closed and the premises were abandoned. To preserve the story of the local mines for future generations, spelunkers and former miners teamed up and established a mining association. Thanks to more than 40,000 hours of work, the open-air mining museum with an outdoor exhibition of mining technology welcomed its first visitors in 2005.

Among the most important mining works in the Stříbro district is the Prokop Royal Adit. The first written mention of the adit dates back to the 16th century. The adit has a unique feature: in order to be able to mine ore below the level of the adit and the Mže River, a waterwheel was built in a mill race chamber and powered by water from the river.

The open-air mining technology exhibition includes mining carts, drilling hammers, a hydraulic and mechanical tipper, and a mine loader. A replica of a mining tunnel demonstrates how ore was extracted. A visit to the Stříbro open-air museum will naturally take you underground. You can visit a 700-meter-long preserved section of the Prokop Royal Adit, view a stone gallery, and take a ride on the mine train.

www.hornickyspolekstribro.cz



1 **Annín Glassworks 1796**

2 **Centrum Caolinum Nevřeň**

3 **Dobřív Hammer Mill**

4 **Plasy Building Heritage Center**

5 **Open-air Mining Museum Stříbro**

Additional information about industrial tourism is available at the following websites:

GetSmart YouTube channel – video series GetSmart and Travel

www.turisturaj.cz – a comprehensive overview of the technological and other heritage sites in the Pilsen Region

www.industryopen.cz – a special website about industrial tourism in the Pilsen Region

Faculty of Medicine of Charles University in Pilsen

Every year, the Faculty of Medicine in Pilsen accepts around 300 applicants for the field of general medicine and 50 for the study of dentistry. The school has a total of some 2000 students. The school continues to build state-of-the-art facilities for its students. By the fall of 2022, the school will have fully moved to a new campus on Alej Svobody in the Pilsen district of Lochotín. The final inspection of the new premises is scheduled for May/June 2022. The campus will offer state-of-the-art teaching and learning equipment, including a simulation center where medical students will be able to practice real-life situations. Another advantage of the new campus is its proximity to the Pilsen University Hospital, where students undergo practical training.

Biomedical Center

In 2020, the Biomedical Center continued to explore its primary research topics: infectious diseases (sepsis, antibiotic resistance of bacteria, prophylaxis of viral infection in transplantology); oncological research in conjunction with experimental surgery; biocompatibility; stem cell research; neurophysiology; and reproductive medicine. In the past year, Biomedical Center researchers participated in 16 projects financed by the national grant agencies (14 projects funded by AZV, 2 by GAČR); projects sponsored by the Research, Development & Education Operational Program (Center for the Research of Infectious Diseases, Pre-Application Research for ITI, etc.) university projects UNCE and Primus; and a number of student projects funded by the GA UK and SVV. They have also made a significant contribution to the Charles University Science Development Program (Progress Q39) and worked on 23 contract research projects.

The National Sustainability Program project was completed in June 2020; during the so-called sustainability phase of the Center (a period of 5 years after the project's implementation, from 1 July 2015 to 30 June 2020), it provided 50% of the planned budget. In the final review procedure (October 2020), this large-scale project was awarded the highest rating of V: excellent project results (having international relevance, etc.); all of the project's objectives and expected results stated in the grant agreement were met.

Under the Research, Development & Education Operational Program, the Center carried on its FIND projects (Fighting INfectious Diseases, Center for the Research of Infectious Diseases, Excellence in Research Award) as well as its AMTMI projects (Application of Modern Technologies in Medicine and Industry, Pre-Application Research for ITI, in collaboration with University of West Bohemia). Besides providing the necessary operating and personnel expenses, the projects enabled a significant expansion and additions to the center's equipment, such as the procurement of a new MALDI-TOF mass spectrometer, or an experimental computed tomography scanner.

With the support of Charles University, Karel Blahna continued his ongoing research project (Sleep Dynamics of Neural Networks in Health and Disease; Primus program for supporting scientists in establishing new research teams and laboratories at the University), and so did Václav Liška (Center for Clinical and Experimental Surgery, UNCE University Research Centers program for targeted support of young and promising academics in top basic research teams).

The Chaperon project (ERA Chair Position for Excellent Research in Oncology) continued under the European Horizon 2020 program (ERA Chairs project). The Chair position was awarded to Professor Kari Hemminki, a prominent oncology researcher (formerly of Deutsches Krebsforschungszentrum, Heidelberg, Germany, author of more than 1,250 papers with 29,000 citations and an H-index of 79), who managed to succeed in several grant competitions and published 16 papers dedicated to the project in 2020.

The Laboratory of Reproductive Medicine has welcomed a new team member, Doctor María Iniesta-Cuerda, who is working on male fertility issues. "I heard about Pilsen in my working group in Spain. My colleague Olga García-Álvarez worked at the Biomedical Center in Pilsen for three years, under the guidance of Professor Milena Králíčková," Doctor Iniesta-Cuerda explains. The research team headed by Associate Professor Jan Nevoral utilizes a number of highly advanced methods, such as in vitro oocyte maturation; in vitro fertilization; embryo cultivation; intracytoplasmic injection of sperm into the oocyte; flow cytometry and sperm sorting; immunocytochemistry of gametes and embryos; epi-fluorescence and confocal microscopy, etc. All of these procedures facilitate thorough research into the epigenetic regulation of fertilization and early embryonic development, as well as the factors negatively affecting sperm quality and fertilization capability.

The newly established **Laboratory of Translational Cancer Genomics,** headed by Professor Kari Hemminki, has also acquired several new members. The laboratory was created thanks to the ERA Chair "Chaperon" project. Two of the new team members came from abroad: Filip Ambrożkiewicz, who specializes in colon cancer; and Andriy Trailin, who focuses on pathology and immunohistochemistry. Filip's main interest is gastrointestinal diseases, especially colorectal cancer and Crohn's disease. During his stay in Pilsen, he would like to focus on the detection of genetic changes that occur during the progression of colon cancer and try to ascertain whether they can be used as therapeutic targets. Andriy also expects that participation in the Chaperon project will be an opportunity for his professional growth as a pathologist and scientist to acquire new skills. He plans to test the hypothesis that the composition of the immune cell population in the liver reflects the degree of malignant progression from cirrhosis to fulminant hepatocellular carcinoma.

The team led by Lucie Vištejnová in **the Laboratory of Cellular Regenerative Medicine** is working on the interdisciplinary project ProfiBone, which focuses on the development of materials for bone tissue replacement and repair. The major challenge in this field is the requirement that bone substitutes not only facilitate osseointegration (integration of the inserted material into the bone and its transformation into bone tissue), but also have the ability to prevent bone inflammation, which is a frequent problem in such procedures as the insertion of bone implants. In the ProfiBone project, bone substitutes are 3D printed to the exact size of the specific defect, based on a computer model. The printing material is an original bone graft putty developed at the CEITEC technology center at Brno University of Technology. The bone graft putty can be enriched with antibiotics or bioactive substances promoting osseointegration. In addition to CEITEC, other partners of the Biomedical Center include Innovation Center Iceland and the company Genis hf., which provides mechanical and micro-CT material analysis and supplies bioactive additives for bone replacement.

The Laboratory of Cancer Treatment and Tissue Regeneration, led by professor Václav Liška, has received an award from the Czech Transplant Society for its paper "Novel morphological multi-scale evaluation system for quality assessment of decellularized liver scaffolds," which was declared best scientific publication of 2020. The primary author of the article is Vladimíra Moulisová, who, together with her co-authors, explores the considerable potential of native biomaterial suitable for liver tissue engineering, which could facilitate the production of transplantable liver grafts in the future.

The prize was officially awarded to Vladimíra Moulisová by President of the Czech Transplant Society Vladislav Třeška (left), and Scientific Secretary of the Society Tomáš Reischig (right), on 28 May 2021.

University of West Bohemia Celebrates 30 Years

At 30 years old, a person is only at the beginning of their adult life; but for a university, 30 years is quite a history. It represents three decades of educating students, fostering new talents, research and collaboration, networking and social engagement.

In 1991, the newly established university had five faculties – mechanical engineering, electrical engineering, applied sciences, education, and economics – and more than 4,000 students. In 2021, the university boasts nine faculties, four successful research centers, two university institutes, and almost three times the number of students.

Today, the university continues building on the industrial history of Pilsen from which it grew. However, its scope has expanded considerably over the years. The UWB now has over 11,000 students in STEM fields, liberal arts, health sciences and arts. It is the diversity and proximity of the various fields that has facilitated numerous interfaculty projects and unique interdisciplinary study programs.

For example, experts from the Faculty of Applied Sciences and the Faculty of Economics have teamed up to teach the follow-up master's program Civil Engineering – Modern Buildings. The interdisciplinary nature of the program directly reflects the demands of the labor market. For those who want to continue their civil engineering education, it offers a specialization in Building Design and Construction; the specialized program Administration and Management of Building Operations is suitable for graduates from other technical disciplines as well as students with a bachelor's degree in law or economics.

Another example of an interdisciplinary program is Philosophy for Artificial Intelligence. Jointly provided by the Faculty of Arts and the Faculty of Applied Sciences, it combines philosophical research with practical knowledge in cybernetics and computer science. Graduates will be able to navigate new technological trends and critically reflect on current issues such as machine learning, neural networks, automatic speech recognition, natural language processing, cyberspace, virtual and augmented reality, and intelligent control systems.

Study programs are but one part of the overall concept, however. For an impressive 17 years, the University has organized DESING+ (design + mechanical engineering), a multidisciplinary learning project in which inter-faculty teams of students collaborate in the areas of construction, industrial design, electrical engineering, healthcare and marketing, tackling topics commissioned and consulted by industrial companies. In the 2020/21 academic year, Lucie Šimečková from Škoda Transportation became a member of one the evaluation committees. A graduate of the Faculty of Mechanical Engineering at UWB and the DESING+ project itself, Šimečková still appreciates the program's benefits. "I would recommend it to absolutely everyone. I think the theory and methodology is very impressive and eminently useful. Working in a team is also a great benefit; it teaches you to communicate even with people with a completely different way of thinking," Šimečková told the project participants.

A similar project, albeit on an international scale, has been run under the Erasmus+ program since 2018 by the Institute of Language Training at UWB. The multidisciplinary teaching project is known as MUPIC (Multidisciplinary Projects in an International Context). The second pilot run of the project has taken place this academic year, bringing together 19 students from universities in Czechia, Belgium, Spain, and Finland. For 8 months, the students will work in international teams in which future engineers, designers, project managers and marketing specialists work together to find innovative and novel solutions to specialized issues commissioned by industrial companies.

Indeed, UWB intends to bolster interdisciplinarity even further, as it declared in its new strategic plan for the years 2021–2025. "We want to strengthen interdisciplinarity in education and creative activities. It is the interconnection and mutual collaboration between various disciplines that represent our greatest strength, and we intend to further increase and improve it," says UWB President Miroslav Holeček.

"Our priorities also include linking education and creative activities with their practical application. We also want to bolster cooperation with other countries and regions, especially with Bavaria," says President Holeček about two other key priorities of the strategic plan. "We believe that the university should play a beneficial role in the region, explore its potential, contribute to its growth and make it more attractive for both students and international collaborators. We would like to strengthen our influence in this field both in the Pilsen Region and in the Karlovy Vary Region, where we operate as the only public university," adds Holeček.

The university is celebrating its 30th anniversary in great shape: in 2019, it was granted institutional Accreditation by the National Accreditation Office for Higher Education, which allows it to autonomously approve study programs. It has also been awarded the HR Excellence in Research Award, bestowed by the European Commission for the care of human resources in the field of science and research, which has by now been granted to seven UWB departments with outstanding achievements in the field of science and research, and an ambitious strategic plan.

THE WEST BOHEMIAN METROPOLIS IS BECOMING A SMART 5G CITY AND A HUB FOR SMART MOBILITY

Like other Czech cities, Pilsen has been adopting smart technologies that make people's lives easier. It is particularly concerned with the transport mobility of the future, which involves not only self-driving cars, but a whole ecosystem of interconnected solutions that lead to safer and smoother transport in cities. By 2027, the West Bohemian metropolis will become a hub for smart mobility and a real-life laboratory for testing self-driving vehicles in the city. However, it has also become one of the five cities that have been chosen to test 5G technologies and may use the Smart 5G city designation as a result.

Pilsen placed among the top five in the 5G Cities competition organized by the Ministry of Industry and Trade (MIT) in cooperation with the Ministry for Regional Development (MRD). Fifty-eight municipalities entered the competition with projects for testing 5G technologies in various areas. Proposals were evaluated by a jury made up of MIT and MRD representatives, the Czech Telecommunications Office, the Association of Mobile Network Operators, the Association of Towns and Municipalities of the Czech Republic, the Czech Technical University, and the Czech Institute of Informatics, Robotics and Cybernetics. Pilsen has succeeded thanks to its smart mobility projects and can now boast the designation of "Smart 5G city." In addition to this title, Pilsen has also acquired free experimental radio frequencies, support to strengthen its task force, expert consulting, and reimbursement of costs for analytical and other related activities.

What made the jury choose Pilsen? The West Bohemian metropolis has become a flagship among Czech cities and the first smart city in the Czech Republic, thanks to the official cooperation between the Pilsen City Council, the Pilsen City Transport Company, and the Information Technology Administration of the City of Pilsen, and its partners – O2 Czech Republic, INTENS Corporation, Škoda Transportation, Škoda Digital and University of West Bohemia. Apart from the "smart" trams developed by Škoda Transportation, Pilsen will also have smart intersections, tram stops and tram tracks, ambulance and police cars, and even entire streets. All this will be facilitated by the 5G wireless telecommunication network which surpasses the current 4G standard in every way. The 5G network is faster, more powerful, and more economical, and Pilsen plans to utilize it in several areas.

Optimization of transport is very important, and the 5G network will allow the acquisition of real-time data from traffic on Pilsen's roads, evaluating it in real time and improving the traffic situation in the city. In the area of public safety, the new technology will allow the use of drones. Pilsen drone operators were the first in the Czech Republic to become part of the integrated rescue system. Thanks to the 5G network, it will be possible to transmit images from the drones to emergency response teams, which will provide firefighters, police or EMTs with key information for formulating a response strategy.

Pilsen has also begun building a smart dispatching system. The goal of this project is to manage the city's traffic and operation, and to improve its ability to respond to critical situations and handle them effectively. The 5G network will provide the necessary connectivity to control sub-systems and transmit so-called "big data." In the event of a fire, for example, the emergency response team commander would have a 3D model of the building, which would allow the rescue workers to better navigate the premises, make more effective decisions, protect human life and minimize property damage.

The 5G network can also be used in culture, social services, or to provide free Wi-Fi connectivity. One of the most important projects in Pilsen is smart mobility. The company Škoda Transportation has frequently been mentioned as a key player in providing transport for the future. The Pilsen-based company with a manufacturing tradition spanning more than 160 years, is planning far into the future, will most likely become a reality in just a few years. The leading European manufacturer of vehicles for urban and rail transport is a dynamic and fast-growing company that keeps up with the latest trends. The future will belong to autonomous transportation systems. For developing autonomous systems, Škoda Transportation established a subsidiary, Škoda Digital, in 2018: a state-of-the-art development center in the field of digitization and SMART technologies for ŠKODA Group vehicles.

"Linking our smart trams with the city's smart transport system is in line with our vision for managing and developing urban transportation. We are very happy to be involved in a project that will help monitor traffic in the city using new technologies and optimize it to meet the needs of all those who are part of it. Our vehicles will become an integral part of smart cities of the future," says Kamil Mrva, Vice-President for Digitization and IT at Škoda Transportation.

The Train Control and Management System (TCMS) ensures the correct functioning of all subsystems – both individual vehicles and entire trains. That is why it is often referred to as the "brain" of the entire railway system. Individual TCMS components produced by ŠKODA DIGITAL enable control, communication, visualization, and diagnostic functions in railway vehicles. TCMS also collects all required data on the individual subsystems deployed.

During the testing phase, autonomous control elements will be installed on two trams from the ForCity Smart Plzeň series, which is currently in production. The test car will be equipped with a number of sensors that monitor the tracks for potential obstacles. The tram car will also be fitted with a unit enabling C2X communication, which O2 has successfully tested as part of C-Roads, a European project for cooperative smart transport systems aimed at improving road safety. With the on-board unit, the tram can use ITS G5 hybrid communication and the 5G mobile network to communicate with other elements along its route. For example, it will alert drivers to roadworks or an approaching emergency response vehicle and can ensure priority passage through a busy intersection.

SMART BUILDINGS CAN CONTROL AIR CONDITIONING, RAISE AND LOWER BLINDS, AND COUNT PEOPLE

"Smart building" is not a phrase from the distant future, but a concept that is now being implemented quite commonly – and successfully, particularly for energy saving reasons. OMEXOM GA Energo, a company based on the outskirts of Pilsen, not only uses smart building systems but can also plan and implement them based on their clients' specific needs.

"The operation of smart buildings is now an essential part of the Smart City concept. The ever-increasing demands for operational efficiency and the associated optimization of operating costs automatically place increased demands on building infrastructure," says Pavel Němeček, Head of Smart Technologies at OMEXOM GA Energo. The company utilizes smart building management to monitor energy usage (gas, water, electricity); to monitor and control 1/4 hour peaks (with a known present-time usage of the designated 1/4 hour peak, the system is able to automatically react and regulate certain equipment to avoid exceeding this 1/4 hour maximum); to control the heating and cooling of buildings (heating and A/C switch off if there are windows open in the room); to automatically control outdoor blinds and LED lighting; and to collect data and instantaneously evaluate input from CO2, temperature, dust, noise and other sensors.

In addition to the above, smart buildings can also provide a comprehensive attendance system that can identify people upon entry or automatically count everyone present. Smart building management can also include the surrounding areas, i.e., parking lots, warehouses, etc. Smart systems can, for example, identify license plates, check speed limits in the warehouses, efficiently record all items in warehouses and their location, and, if necessary, set up alerts whenever an item is being removed from the building or the premises.

A smart building can be completely managed via your computer, and all settings can be monitored in real time, thanks to the AXIOM smart integration platform. This platform is essentially the brain of the entire smart building. It integrates building, manufacturing, sensor and component technologies; groups processes and logic functions to control technology; optimizes power consumption; oversees the building operation; and provides timely notification of breakdowns and malfunctions. Being an open platform, the system is able to integrate all essential components and communication protocols from different manufacturers and suppliers that are available on the market and most widely used.

The Academic Career in Pilsen project has brought academics from all over the world to the University of West Bohemia and the Charles University Faculty of Medicine in Pilsen. They are joining international research projects and some even choose to make the region their home.

COME TO PILSEN FOR AN INTERNATIONAL EXPERIENCE

Since 2019, the Academic Career in Pilsen project has attracted academics and researchers from all over the world – both foreigners and Czech postgraduates from abroad or participants in long-term research projects from other countries. The program provides annual and long-term scholarships for PhD graduates, postdocs setting up their own research teams, visiting professors and researchers.

Participants in the program join in international research projects. Thanks to the excellent career prospects and the quality of life that the Pilsen Region offers, many actually bring their families along and make the region their home.

"Academic Career in Pilsen applicants can either be postdocs, i.e., researchers who obtained a PhD or an equivalent degree less than seven years ago, or experienced researchers and professors. They will be involved in research and teaching activities, and use their experience to improve them," says Martina Nedvědová, who is in charge of internationalization of education at the Regional Development Agency of the Pilsen Region. "The two universities have agreed to share these experts if necessary, for example in teaching workshops or giving lectures," Nedvědová adds.

Some Go Back, Others Stay

"In 2019, we funded 3-month fellowships for six specialists from abroad, and over 20 short-term academic and research stays at different career levels. The short-term projects include conferences, symposia, workshops, lectures, or seminars. In 2020, we abandoned the short-term stay concept in favor of supporting 6 senior researchers for a 3-month fellowship and 2 postdocs for a stay of 8 months," says Markéta Ulčová, Principal Investigator of the Academic Career project at University of West Bohemia. "This year, it looks like we will be supporting 5 senior researchers and 2 postdocs. Due to the more difficult travel situation, we are again allowing short-term stays in justified cases," Ulčová adds.

"One of the most prominent experts we have managed to invite through the Academic Career in Pilsen program in 2019 was Ivatury S. Raju from NASA. At UWB's Faculty of Applied Sciences. He attended the DAS 2019 workshop and international conference. It was really fascinating to meet the man who is the head of NASA's Analytical and Computational Methods branch and chief technologist for Structures and Materials," says Ulčová.

Some of the program's participants come to Pilsen repeatedly, such as Dr. Ehsan Saebnoori from Iran, who has conducted research at the Department of Materials and Engineering Metallurgy of the Faculty of Mechanical Engineering, focusing on the corrosion resistance of steels reinforced by oxidation dispersion. Unfortunately, due to the current pandemic situation he will not be returning until early next year.

Some go back, others stay. Chemical engineer Fatemeh Gholami has been working at the NTC research center since 2019. Vitaliy Yanovich from Ukraine has recently started working at the Department of Power System Engineering of the Faculty of Mechanical Engineering. He conducts experimental research on aerodynamic equipment and is involved in experiments with a new type of equipment that the department acquired in 2018. Having become a key researcher in the department, he has chosen to stay in Pilsen with his family.

Sharing

In 2019, the Faculty of Medicine of Charles University in Pilsen chose to support 10 foreign experts through the Academic Career project, and 8 experts in 2020. "Our most important acquisition has been professor of gynecology Khaled Ismail, formerly of the University of Birmingham," said Milan Štengl, director of the Biomedical Center and vice-dean of the faculty. "In addition to teaching undergraduate and postgraduate students and conducting his own research, particularly in the field of perineal trauma, Professor Ismail focuses on creating a comprehensive platform for supporting doctoral students across the university," Štengl added. Thanks to Charles University partnering with universities in Heidelberg, Copenhagen, Milan, Warsaw, and the Sorbonne in Paris as part of the "4EU+" European university alliance, the effect of internationalization is being carried forward. Joint educational activities can attract students and researchers from all partner institutions and bring them to Pilsen.

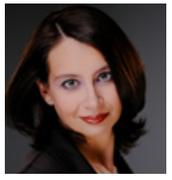
The "junior" members of the Biomedical Center's scientific team, supported through the Academic Career project, include Ibrahim Bitar, who has become a valued member of Professor Jaroslav Hrabák's team, which focuses on the issue of bacteria's growing resistance to antibiotics and the spread of multi-resistant bacteria. Dr. Bitar performs sequencing analyses of multi-resistant microbes and mobile genetic elements carrying resistance genes, using whole-genome sequencing on the Mizeq and Sequel I platforms and sequencing on the PacBio platform. He has been mentoring two PhD students and has been successful in obtaining support from the Agency for Healthcare Research and Development for his project "Antibiotic resistance routes of dissemination, means of evolution and adaptation: Incorporating WGS in the equation" – which means he has enough work for years to come.

WE ARE ON THE RIGHT TRACK

In the Smart Accelerator II project for the Pilsen Region, specific people are in charge of developing activities to support areas that are crucial for the continuing development of the region. How are they doing in the second stage of the project?

INFRASTRUCTURE, Jan Naxera

An important part of the activities to support infrastructure for research, development and innovation is the development of the so-called smart specialization concept for the Pilsen Region. Despite the limitations and restrictions due to the pandemic situation, we have managed to organize a number of meetings in all regional sectoral innovation platforms and produce reports for the national innovation platforms. We have also identified a number of topics which were further discussed at the 2021 Regional Smart Specialization conference. We use our experience and contacts acquired during the implementation of the international project Chain Reactions within the INTERREG program Central Europe to develop follow-up activities, especially in the area of "smart mobility."
As far as the Digital Innovation Hub project is concerned, we have moved from the preliminary stage toward creating a stable consortium of partners and signing the cooperation agreement. We are planning on developing a wide range of services that the consortium will offer, and on the promotion and pilot launch of activities to support the digitization of various organizations in the region. The project is being spearheaded by the University of West Bohemia, and we plan to involve primarily experts from technical faculties.
Another important activity is supporting the involvement of organizations from the region in international activities within the project International Advisory Center for International Cooperation in Research, Development and Innovation, implemented by the UWB Project Center. We have managed to improve cooperation with other R&D organizations in the Pilsen Region, and to build a network of experts for various international programs.



INTERNATIONALIZATION, Martina Nedvědová

Three projects in this area have continued in 2021 from the previous years: Academic Career, Welcome Center, and Foreign Languages at UWB. Academic Career successfully supports research exchange programs for foreign scientists at universities in the Pilsen region. In the upcoming months, we expect the arrival of more academics and researchers who have successfully passed the selection process at UWB. We will also continue to support Professor Ismail in his research and teaching activities at the Faculty of Medicine of Charles University in Pilsen.
By the end of 2021, we expect to open a Welcome Center at UWB, whose staff will assist foreign researchers and scientists coming to the Pilsen Region to conduct research or teach. The center will help them on arrival and throughout their stay in the Pilsen Region.
We are currently working on a project to create a network of experts in the Pilsen Region who have experience in international projects. The aim of the program is to raise awareness of international research projects among companies in the region and to increase their involvement in this kind of international cooperation, which will improve the Pilsen Region's overall competitiveness, not only within the Czech Republic but on an international scale.

INCUBATION/SUPPORT FOR START-UPS, Lenka Palánová, Zbyněk Doležal

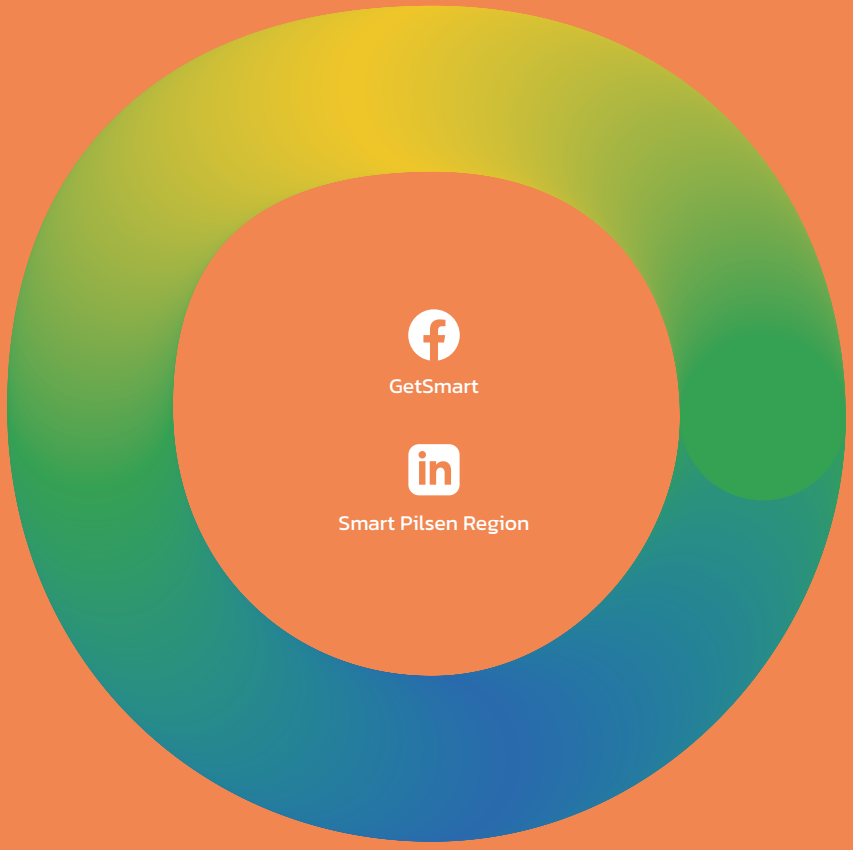
In 2021, we launched a pilot run of the incubation program. It helps budding entrepreneurs to implement and develop their plans so as to succeed on the market by offering products or services that are in demand. They are partnered with expert consultants who help them to develop a business plan over the course of six months. Mentors will help the emerging businesses to approach potential investors and engage in follow-up programs, and they will monitor whether the businesses stick to their plan. In June 2021, potential candidates presented their plans to the Incubation Program Board, which selected five companies from various fields. Participants in the program had time to test their business plan and were provided with expert mentoring tailored to suit their needs, which allowed them to speed up the stages of preparation to launch their product. Results of the pilot test could provide the Pilsen Region with a useful tool for establishing and supporting new innovative companies, which are essential for the functioning of a stable economy.

AKCELERACE/ROZVOJ FIREM, Martin Holubec, Pavel Duchek

In recent years, activities aimed at accelerating the growth of existing innovative enterprises in the region have been supported exclusively through the Pilsen Business Vouchers program organized by the City of Pilsen. However, thanks to the Smart Accelerator II project for the Pilsen Region, a new Platinn pilot program has been available from 2021.
Platinn aims to provide consulting services to businesses with ambitions to grow from experts with their own successful business experience. Prior to the expert consulting, we conduct a detailed identification and analysis of the problem areas that, in view of other circumstances, appear to be the main limiting factor for business growth. Based on our conclusion, we select an expert from the required area from our expert database. Examples of successful collaboration include the company CHRISTO GROUP which, together with a branding expert, set up a specific plan for the company's entering of foreign markets. The company Aimtec consulted with an IT and software expert in order to implement a successful transition to a new sales model for its products using cloud-based systems. Cooperation between companies and experts also occurred in the area of the commercialization of results of corporate development projects through establishing a spin-off company, or the innovation of production processes with an emphasis on circular economy principles. Based on all of these experiences we can conclude that the Platinn program has been extremely effective. To achieve further growth, what promising companies with a stable foundation built through good business practices need most is to share and acquire experience from other successful companies. In imparting their own experience to help other companies, experts are not motivated purely by commercial reasons; their involvement stems from the belief that it is important to help other companies and share examples of good practice with them. Like the Pilsen Business Vouchers program, Platinn has the potential to become a long-term program to support innovative enterprises in the Pilsen Region.

EDUCATION FOR THE 21ST CENTURY AND TALENT SUPPORT, Eva Rojíková

When it comes to the issue of supporting exceptionally gifted students, the general public usually thinks of athletes or artists. However, we have successfully managed to bring up the issue of systematic support for students gifted in the natural and technical sciences in professional debates.
We are currently monitoring the state of support for gifted students in primary and secondary schools, as well as other organizations offering non-formal education in the region. The survey will also provide us with insight into the willingness of companies to work with talented students.
In open interviews with gifted students across the region, we try to identify what they lack most and what they need to develop their own potential. We have also been continuously networking among organizations who work with gifted youth and collecting inspiring examples of work with gifted students.
We monitor the situation at UWB by noting the support provided to talented students by various UWB faculties. For a comprehensive overview of the support of gifted students, we have launched a survey in cooperation with FPE of the methodological readiness of future teachers to work with gifted and exceptionally talented students. The results of the survey will be used to set up an effective and sustainable system of talent support, cooperation among all organizations working with gifted students, monitoring gifted students, keeping them in the region and attracting new talent.



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