

LODZ CREATES INNOVATION

NEWS MAGAZINE OF THE CITY OF LODZ

NO. 1 (13)/2017

IN THE MIDDLE OF THE NEW CENTRE OF LODZ

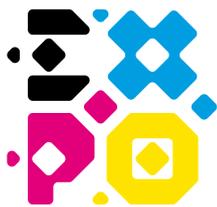
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THE BUSINESS OF THE FUTURE

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GATEWAY TO SUCCESS

●
BY ROAD, AIR AND RAIL

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ENTHUSIASTS FOR ENTHUSIASTS





EXPO 2022
ŁÓDŹ POLSKA

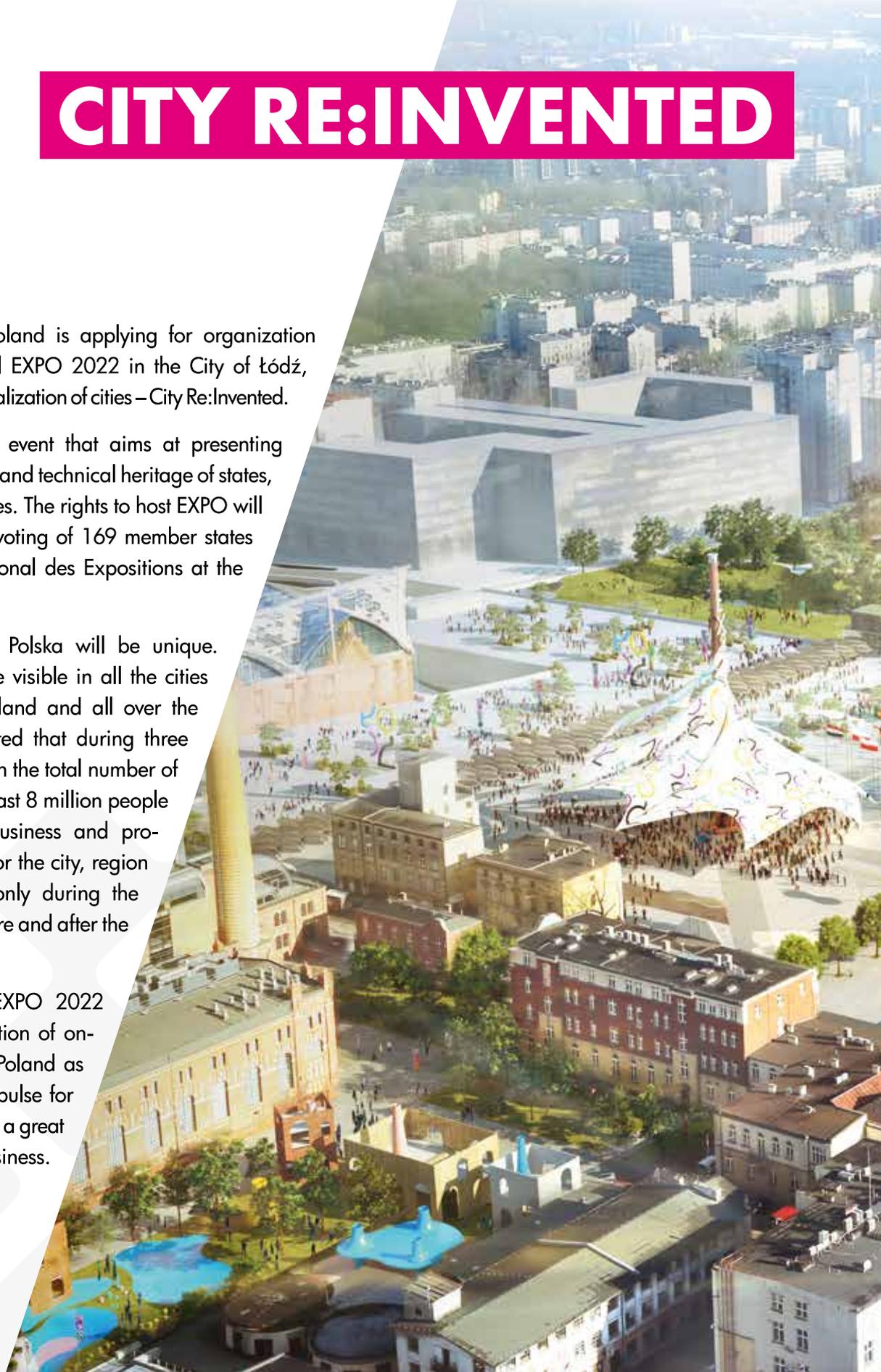
CITY RE:INVENTED

The Republic of Poland is applying for organization of the International EXPO 2022 in the City of Łódź, on the theme of revitalization of cities – City Re:Invented.

EXPO is a global event that aims at presenting cultural, scientific and technical heritage of states, nations and societies. The rights to host EXPO will be awarded after voting of 169 member states of Bureau International des Expositions at the end of 2017.

EXPO 2022 Łódź Polska will be unique. Its influence will be visible in all the cities and regions in Poland and all over the world. It is estimated that during three months of exhibition the total number of visitors will be at least 8 million people what will bring business and promotional benefits for the city, region and country not only during the event, but also before and after the exhibition.

Organization of EXPO 2022 will be a confirmation of on-going changes in Poland as well as another impulse for its development and a great chance for local business.





ANNA KRAWCZYK
EDITOR-IN-CHIEF

The Lodz Fabryczna railway station, which was opened to the public in December last year, cost PLN 1.8 billion. It demonstrates even further how rapidly the city has developed. The railway station is a part of the huge European-scale project called the New Centre of Lodz. This beautiful new building, which is a kind of architectural hallmark of the city, quickly gained many followers; and social networking portals have been bursting with more and more new photos of this beautiful station which combines glass, stone and steel elements. It is worth noting that – when we consider its dimensions – this is one of the four largest buildings of this kind in Europe. Surely, however, it is the most modern one in the Old Continent. This is also the regional communication centre for trains, buses, trams and cars. And it is not the end of railway investments in the region. At the end of last year, PKP PLK announced a tender for the construction of a tunnel to connect the Lodz Fabryczna railway station with two other stations: Lodz Kaliska and Lodz Zabieniec.

So it is not surprising that more and more investors, after Paris, Berlin and Warsaw, have been interested in Lodz. Okam, an Israeli joint-venture company, can be a good example here. At 217 Piotrkowska Street within post-industrial premises, it created the Lodz Creative Zone. Residents of the city are keen to spend their leisure there due to its numerous attractions, for example the Street Food Festival or 'Before Food Market', the latest culinary start-up project.

No one needs to be convinced that the market for IT services and creative industries will grow as well. Michał Kreczmar, Digital Transformation director from PwC, will tell us where exactly the industry has been heading for. In his opinion, this is pointless to get engaged in each and every technology. It is better to study consumers' needs and behaviours. The market for online services will certainly develop. But is it the right time now for virtual reality? What does development really depend on: content or availability of devices? We invite you to read the interview of the Issue. ●

Photo: Pawel Lawreszuk



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The business of the future

MICHAŁ KRECZMAR is responsible for digital transformation at PwC, a consulting company. He talks to Jarosław Zaradkiewicz about the industry of the future, the challenges it's facing and prospects of development.

We associate the term “industry” with factories. Is industry becoming now “virtual” and “creative”?

Companies with most capital at stake represent the so-called new economy, i.e. Apple, Alphabet (the parent company of Google), Microsoft, Amazon and Facebook. All of them rely on digital rather than conventional industries. The growing power of these American businesses is dwarfed by those based in the Far East, like the Chinese giants – Baidu, Alibaba and Tencent. The worth of goods sold on Singles’ Day (November 11 – a holiday converted by Alibaba into a shopping day) amounted to USD 17.8 billion. This is more than money spent during Black Friday and Cyber Monday. In fact, it’s more than what was spent during the whole American shopping week.

Which technologies do you think will develop most extensively in the future?

The smartphone and all its ancillary technologies are definitely ruling the hearts of consumers. Surely, this won’t change soon. I don’t mean applications but the mobile market as such and the way it helps to use other goods and services. The US is now witnessing how services are rendered thanks to the use of Uber-like applications used to do washing, tidying up, walking the dog or ordering meals.

Certainly, the meaning of those areas which deal with large amounts of data will grow soon, e.g. analysis, machine learning as well as artificial intelligence. At PwC, we have recently started MatchBeta, a pioneer programme that makes use of artificial intelligence in the process of career planning and recruitment.

E-commerce is also likely to develop because in Poland online shopping still plays a minor part. Also, it’s worthwhile to take a look at how social video develops. It’s a massive trend – a cross between social media and live video, mostly on telephone.

You didn’t mention virtual reality. On purpose?

Virtual reality (VR) and augmented reality (AR), with which many people have high hopes, haven’t displayed their full potential as yet. Actually, this market is only now being shaped so it’s too soon to be able to predict whether it will grow extensively or not. I wore my first VR headset back in 1995 and little has changed since. Still we see a shortage in the content and quality which could provide a unique experience for consumers convincing them to buy such devices.

What could give them a boost? Availability of equipment or content?

It’s like asking “What came first? The egg or the hen?”. As long as there is no interesting content suitable for VR, people won’t buy the devices. The cheapest VR device is Google’s paper glasses which cost almost nothing. On the opposite side of the scale is Oculus by Facebook costing a couple of thousands of dollars. Content providers must make the people want to buy these devices. The majority of experiences offered by VR are still quite primitive. You can see an aquarium from inside or be inside a game and make simple moves. At the same time, the reality which computer games and 3D cinema uses is light years away. The films are now three dimensional and games are available to thousands of customers at the same time.

Are the perspectives for the Internet of Things (IoT) more optimistic?

The Internet of Things opens huge possibilities but it is also still being shaped. Its application in the industry, the so-called sensorization, looks interesting. It may be used to equip a production line with sensors collecting data about how the line works, whether something is damaged or when something may stop working properly. This is predictable, safe and controlled by the user. I’d like to emphasize that in such application, the process is safe, unlike some other possible uses offered by IoT. Since IoT is prone to cyberthreats, we must be aware of them and try to minimize the risk.

Some IoT devices are overdone. They target rather abstract needs. Some, however, answer significant needs of a larger group of people, e.g. a thermostat which identifies if I’m home or not and sets an appropriate temperature. First it must learn to identify this and then it reacts on its own.

In the age of digital revolution that we’re now experiencing, we can witness a rapid development of many products out of which only a small part will turn out to be successful. The same future awaits IoT, but once it’s applied properly, needs that we’re not yet aware of will be created. Who would have predicted many years ago what needs Facebook would address? The basic ones are, of course, connecting people and communication but another one, also very important, is “liking” people and companies. No one could have expected this 10 years ago because then the market was interested in links rather than likes.

Gartner Hype Cycle illustrates that the actual implementation of an idea comes only after a period

of fascination with it. However, some of the trends frequently don't make sense to start with. For venture capital firms as well as organisations with long term policy, it is valuable to look at these trends, which are elusive and hard to discover. The measure of trends in the cyber world will be the upcoming stockmarket debuts of Snapchat and Spotify. We'll see how they'll be received by the market or whether it's only another bubble.

Are companies under high pressure to apply mobile solutions?

Applying any technology without giving it a thorough consideration makes no sense. Companies should analyse customer behaviour and needs, how they can reach these customers and address their needs. Creating a fancy application answering an isolated need makes no sense in a situation when Responsive Web Design would be sufficient.

● **Michał Kreczmar heads the team responsible for digital transformation at PwC, a consulting company. He chooses tools which the digital transformation will be made with as well as adapts international solutions to suit customers in Poland and the region. He has been working in the e-business for over 20 years. Kreczmar was the editor-in-chief of the first Polish magazine about the Internet. He used to be a member of the supervisory board at IAB Polska and headed the internet branch of IDG Poland, an international media organisation.**

However, there are applications which address real needs important for customers, e.g. online grocery shopping. If what is in my basket looks similar every week, applications will make it easier for me to buy it. The case is similar with ordering taxis. In other words, repeatable activities and these fit for it will be made easier to a large degree if we use an application.

Presently the idea of "mobile first, mobile only" is fashionable. There are businesses which keep their website only as a place where you can download an application – and it sometimes makes sense. However, we should bear in mind that in the US we're dealing already with a post-app world. Consumers practically don't install new applications. They use communicators – instead of installing an app, they are using a messenger platform to communicate with a given company, e.g. to check where a parcel they're waiting for is.

Is it supported by people or bots?

Some of these systems are supported by people and those partly automatic operate as decision trees. There is a separate trend called conversational commerce which uses bots. Amazon Echo, for instance, is a smart speaker used at home. You can ask it to play a given song, order a taxi and even ask the name of the US president or the name of the highest mountain in the world. It seems that this invention may become more and more popular.

There are many start-ups in the tech business. Not all of them, however, stand chances of success...

The fact that we live in a medium-sized country hampers us from acting on a global scale straight off. The Czechs and Estonians live in smaller countries and their start-ups want their products or services to have a worldwide reach. Besides, many people act basing on what is fashionable (e.g. apps) and not on real needs of consumers or on creating a new trend.

I've been mentoring in many competitions for innovative solutions. Very often the participants find it difficult to explain what they want to do and cannot summarize their idea in one sentence. Sometimes the participants think their idea is innovative, but during the discussion it turns out that somebody has already done that. Yet, they will often stick to their belief that the concept is unique. The participants are frequently afraid of challenging their idea, whereas adjusting it to the market and consumers is what they ought to do. When Facebook was first launched, it was something else than what it is now. It was brilliant that people managing it were able to make so many changes in such a short period of time. Facebook moved away from a desktop character to mobile in two years, which is a huge achievement. That's how start-ups should work, because they face a global competition.

Thank you. ●



BY EWA KLEPACKA

Sport stands for health – yes, but...

Do you wish to be a successful person? Run, dance, practise yoga – get a move on. But... act reasonably. Choose physical activities which suit your age, health, life habits and body capabilities.

In today's world, regular physical activity is a must; it is even considered a kind of religion confessed by more and more people. But – for many of us – running for better health is actually not the primary motivation to practise sport. The point is... to escape from problems: emotional emptiness, stress, old age, lack of life success.

We want more, harder, faster: “beat fatigue”, “you can do it”, “do not give up” – we wish to shift corporate incentive slogans to gyms smoothly and painlessly. We torture our bodies ignoring pain, fatigue or injuries. The employer has paid for your admission to fitness clubs throughout the city? OK: a swimming pool before work in the morning, gym during the lunch break, pole dancing in the evening.

Physical activity is rooted in genes provided you treat your body with attention, care and love. Nowadays, however, Poles spend 8 to 10 hours at the office almost motionless sitting with their spine, hips, knees much burdened. Afterwards, they get into a car and go to the park or forest to run their “set” 10 km, or run around housing estates, often along sidewalks and close to busy streets swallowing car exhaust fumes. And at the end, they are eager to run a marathon, because sport means competition and pursuit for victory.

We believe that running, intense yoga or rock climbing are activities which require no special preparation. We treat our bodies like machines which can be smoothly and painlessly switched from “stillness” to a maximal level of activity, not paying attention to capabilities and performance of our locomotor and cardio-respiratory systems, as well as restrictions imposed by diseases which we have gone through, injuries or even age. But, to tell the truth, no one can get away with such practice... We should get prepared for each and every physical activity: make basic check-ups, visit a physiotherapist who professionally selects sport disciplines which suit our capabilities best. And, above all, control stress.

Clenched jaws, tense face, closed chest, round fists, short breath, pounding heart – these are symptoms which accompany us through the day and which we often ignore, or we believe that sport will provide us with relaxation. But when our body is tense, sport fails to release tension it strengthens them even further. And then it is easy to get injured.

Conscious physical activity is mainly about changing the existing habits. It also stands for recognition of our own rhythm of activity and rest, dieting adapted to the number of burnt calories, understanding and acceptance of capabilities and limitations of the body, ability to recognise and live through emotions and read signals coming from our body, choosing appropriate sports discipline. •

● BEFORE CHOOSING YOUR SPORT:

1. Consider how much time you wish/can spend on physical activity.
2. If you feel that your body is tense, start with relaxation exercises, massage and walking.
3. Ask yourself why you want to practise sport right now and what type of activity would be appropriate for you. Or maybe you should return to the discipline that you liked at school? But do it slowly and attentively, all the while paying attention to your body messages.
4. Learn to distinguish your moderate physical activity from backbreaking body exploitation.
5. Watch your breath every day: when you are at rest and in motion. Pay particular attention to breathing out: try to deepen it. You may add sounds and intention to eliminate body tensions while breathing out.
6. Try to move at work as well, for example, every two hours take a break; get a feeling if your body is relaxed or tense, stretch your body, tighten and loosen your fists several times, relax your abdomen through breathing, stroll down the office.

BY JACEK BRYLSKI

Gateway to success

Students from the Lodz University of Technology won the Tekla Global BIM Awards 2016 at the global competition for the best 3D construction model.

The competition was aimed to select the best model using the application of BIM Tekla Structures software supporting the process of designing structures of any type and use. The local stage of the Contest was organised in Poland by Construsoft, a distributor of the software. Upon its successful completion followed the international stage organised by Trimble, the owner of Tekla.

The fourth-year students: Karolina Malańska, Krystian Warda (both of them study construction), Robert Szuba (architecture) and Katarzyna Kaczorowska (environmental engineering) submitted their project – the Gates to the City in Nowe Centrum Łodzi (the New Centre of Lodz) being a part of a larger project intended to revitalise the city centre. The students' concept was an alternative version with regard to the design made by Daniel Libeskind, the world-renowned architect.

The competition winners are members of the Students' Scientific Organisation on Design of Steel Structures at the Lodz University of Technology being focused on expanding practical knowledge and skills through both teamwork and individual development.

GLOBAL COMPETITION

Trimble Co. organises the competition for the best model made with the application of Tekla Structures software provided by the company. Its objective is to promote the company customers, their projects and achievements, as well as provide wider audience with more details on investments based on Building Information Modelling (BIM). In 2016, the Contest covered several categories of projects: commercial, public, industrial, infrastructure and sports. At the last year's edition also models at the category of student projects could be submitted; they were not restricted to any subject, however there was one requirement – to use the educational licence of Tekla Campus software.

“Through this application the team could efficiently exchange information on the project. Students working on the architecture and installations could – on an ongoing basis – monitor all the changes taking place within the model,” explains Karolina Malańska.

THEY RE-DESIGNED IT

The 'Gates to the City' project covers a building divided into three main parts with a convex-concave glass facade. The main support structure is made of steel square-sectioned pipes with their



Modern look and complex form as well combined steel, concrete and glass elements are the project characteristic features

screw connections being hidden in order to keep the building aesthetics. The students considered that some parts of the lower floor, as well as the viewing point located on the top of the building, are treated as open public areas.

To reduce the weight of the structure, cellular beams were used to hide installations and increase usable room height. The shape of beam openings was inspired by Angelina made by ArcelorMittal.

“Our project envisages a modern look and complex form, as well as a combination of steel, concrete and glass elements. Its complexity made connections and their modelling one of the most time-consuming tasks. Each of them was set at a different angle, thus impossible to copy. The combination of the architect’s vision and the applicable engineering solutions also turned out to be problematic. Therefore, we had to make some significant changes which required extra time and efforts,” says Karolina Malańska explaining further that, in spite of the above, the whole project was created in less than a month.



Team members, from left: Krystian Warda, Katarzyna Kaczorowska, Robert Szuba, Karolina Malańska

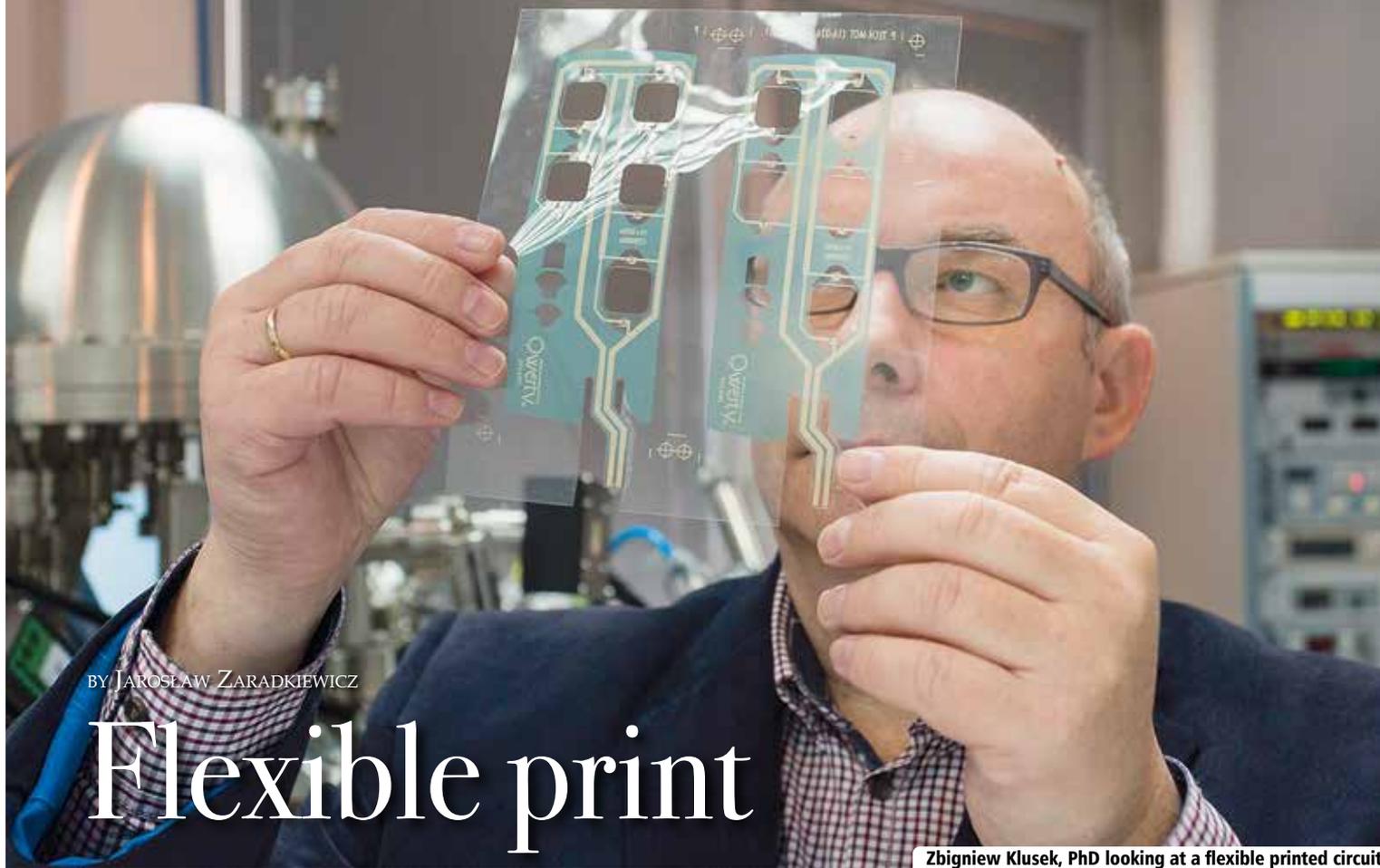
UNIVERSAL TOOLS

It was made possible, among others, with the application of Tekla Campus. The students have already met this 3D modelling software. In 2015, they attended a training course on how to use Tekla Structures, a series of CAD applications, run by Construsoft Poland for students at the Lodz University of Technology. In the meantime, they got practice on Trimble Tools during their traineeship in one of the project design offices in Lodz. “Experience gained while working with Tekla Structures software let us work quickly and efficiently both in modelling, as well as exchange information with other team members. Thanks to 3D modelling, the project was much more thought-over and obviously we worked faster than in case of traditional 2D modelling. 3D modelling is future-oriented, better, more efficient,” says Karolina Malańska.

Tekla BIMsight software considerably facilitated work on the project – the whole team could exchange information about the project in an easier and faster way. Students working on the architecture and installations could – on an ongoing basis – monitor all the changes taking place within the model. Prior to starting their work, the team could accurately set up the main project objectives and its action plan, which shortened their time of work.

Excellent cooperation between the students, modern and complex structure, application of a variety of materials contributed to holding the first place at the local contest and participation in the international stage, during which – as decided by the jury composed of BIM specialists from around the world – the Lodz City Gates was considered the best student project at the Tekla Global BIM Awards in 2016. The team beat designers from China, Indonesia, France and India, as well as other countries. ●





BY JAROSŁAW ZARADKIEWICZ

Flexible print

Zbigniew Klusek, PhD looking at a flexible printed circuit

Researchers from Lodz University joined the elite group that received funding from the National Centre for Research and Development (NCBR) under the Regional Science and Research Agendas (RANB) framework. Out of 168 applications, only 19 won the financial support. ML-InkJet project is one of them.

Regional Science and Research Agendas are scientific areas defined on the basis of the voivodeship marshals' suggestions. RANB aids in carrying out the objectives specified in priority axis IV of Smart Growth Operational Programme (Measure 4.1). Projects selected in a competition receive funding to support their industrial research and experimental development of products or to support only the experimental development which complies with RANB's objectives.

WELL-ESTABLISHED COLLABORATION

NCBR had more than PLN 55 million at their disposal in this programme. Out of this sum, 3.7 million was the share of the consortium of Lodz University and QWERTY Ltd., an electrotechnological association. They joined forces to work on multilayer flexible printed circuits.

"The consortium was set up in mid 2016, but our collaboration with QWERTY Ltd. goes many

years back," says Zbigniew Klusek, PhD, the head of the Department of Solid State Physics at the University of Lodz, where the ML-InkJet project is carried out. He adds that there are about 70 people on staff at QWERTY and that the company has an extensive market experience in the field of flexible electronics. "The project's aim is to develop a solution enabling the printing of flex circuits with a single use of just one printer. It will open up entirely new possibilities like creating ultra modern devices," explains Klusek.

The new technology will make the integration of flexible keyboards, sensors and displays possible. Such circuits may be used in mobile devices and they can also be applied by the automotive industry. The new technology offers a chance to make such devices during a single production process. In the future, it may help to bring about the production of flexible mobile phones and control panels in cars.

TECHNOLOGICAL BREAKTHROUGH

According to Zbigniew Klusek, this technology will not only be cheaper and faster, but also far more ecological than the printing systems of electronic circuits to date. The basic task of researchers working at the Faculty of Physics and Applied Informatics at Lodz University will be testing and analysing prints provided by QWERTY and searching for solutions to technological problems that occur in the production process.

These research and development works focus on multilayer inkjet print optimization, enabling the production of one complete electronic circuit during one technological process. "Such technology hasn't been implemented anywhere in the world so far. This is a cutting edge project and we plan to spread information about the results during scientific and technical conferences as well as publish them in international journals," says Klusek.

PRECISE RESEARCH

The research carried out at Lodz University will deal with technology optimization, and physical processes will be critical in this. "Optimizing the technology is particularly important for the production of printed solar cells and OLED systems. The active layers must be precisely set together and covered with a protective film during a single production process," says Klusek. To optimize such a process, it is necessary for science to collaborate with industry. Entrepreneurs, thanks to their experience, are able to pinpoint and define technological problems,

whereas the knowledge and skills of scientists will help to diagnose and eliminate their causes.

As a result of the project, the researchers will be able to produce functional multilayer systems during a single printing process. Presently, the transition from one printing cycle to another is made difficult by the fact that the printed material must be positioned very precisely. Besides, they cannot control the degree to which the former layer is fixed while another layer is being put. This is a crucial process for forming interfaces between layers functioning as they have been set. That's why replacing the established methods with the new technology based on multilayer inkjet printing will be very beneficial.

MODERN APPLICATION

Multilayer flexible printed circuits can be applied in solar cells, organic light emitting diodes (OLED) and sensors. "These systems' efficiency depends on the homogeneity and parameters of the areas between layers, which cannot be controlled when the printing process consists of many stages. Moreover, because we don't have the technology enabling us to print complete systems, their components become partially degraded already during the production process," adds Zbigniew Klusek. It's a significant technological obstacle which we hope to overcome with the new solution developed by the consortium of Lodz University researchers and QWERTY Ltd.

The new inkjet technology is still being researched and, so far, it has to wait to be used on an industrial scale. However, QWERTY's results suggest that implementing the new solution will make its products by far more competitive. The products may have new practical uses and enhanced quality, unlike anything we can see in the world's market today.

The new technology, however, will not only enhance the quality of products as such. The process itself will become more efficient and cost-effective, and the extent of production could be controlled more precisely. As if this wasn't enough, it will be possible to produce new groups of products, such as OLED, solar panels and sensor systems. So far, producing them with the inkjet technology wasn't competitive enough, in comparison with other, more expensive technologies. The objectives laid for this project promise a technological breakthrough in the field of printed flexible electronics and printed organic electronics. ●



The building of the Faculty of Physics and Applied Informatics of Lodz University

BY JAROSŁAW ZARADKIEWICZ

Proteins of the future

As the first company in the region of Lodz, NapiFeryn BioTech, set up by two enthusiasts, was awarded with a grant under the Horizon 2020, one of the largest EU programmes funding the development of innovations. Such grants are intended for the most innovative projects from all over Europe. And so far, just a few Polish companies can boast of getting them.

Magdalena Kozłowska and Piotr Wnukowski, the founders of the company worked in western corporations specialising in biomedical science and nutrition. "We have noticed that the world economy tends to shift towards the production of healthy and organic food in order to stop the negative climate changes generated by human activity," says Piotr Wnukowski, vice-CEO of the company. There, we happened to come across first attempts to get proteins out of new sources which so far had not been used in the food industry. The founders' knowledge, experience and passion let them set up NapiFeryn BioTech in Lodz in 2014. It owes its name to the combination of napin and cruciferin, two major proteins found in rapeseeds, as it was actually rapeseeds with which the company started extracting proteins.

WEALTH OF EXPERIENCE

Magdalena Kozłowska and Piotr Wnukowski, scientists with excellent education, studied at universities in Poland and abroad: among other titles, she holds PhD from the Delft University of Technology and he took his doctorate at the Royal Institute of Technology in Stockholm. He is also an inventor and experienced leader of R&D teams specialised in the optimisation and scaling of biotechnological processes. He worked for international corporations at the position of chief technologist, joining various projects on the development and implementation of technologies aimed to produce vaccines or APIs (Active Pharmaceutical Ingredients). She has been an experienced staff member of R&D teams specialising in the development and optimisation of biotechnological processes.

The founders themselves build up the company strength and its potential. "Apart from us, there is also a team of ambitious and talented scientists from the Faculty of Biotechnology and Food Sciences, Lodz University of Technology," adds CEO of the company.



Magdalena Kozłowska,
CEO, NapiFeryn



Piotr Wnukowski, PhD

ASSISTANCE AND SUPPORT

The company main office is seated in the Lodz Bionanopark, which lets it cooperate with the leading scientific institutions in Poland, such as: the Industrial Biotechnology Laboratory, the Lodz University of Technology, Institute of the Polish Academy of Sciences in Olsztyn or the Warsaw University of Life Sciences in Warsaw.

NapiFeryn BioTech is the first company in the Lodz region which was granted the prestigious distinction under the Instrument for SMEs, a part of the Horizon 2020 Programme. And, as the first company in Poland, it was provided with funding in the 'Food' category. Let it emphasize that these grants are given to the most innovative projects from all over Europe. And so far, just a few Polish companies can boast of getting them. In addition, NapiFeryn was provided with funding from the National Centre for Research and Development under the "Fast Track" Contest which will be earmarked for the further development of technology and its commercialisation. The company also obtained funds from a private investor, Impera Alpha Fund, and was granted under the Bridge Alfa programme which awards the most innovative



NapiFeryn team

projects in Poland. All of that provides evidence that the company has been working on the highly-innovative technology. And the Economic Award of the Region of Lodz in the “Start-up” category in the “Strong in Business 2016” Contest was the crowning touch in 2016.

UNIQUE TECHNOLOGY

This team of young and ambitious scientists (having already filed its own patent application) is aimed to develop and disseminate technologies to acquire natural and functional plant proteins. “First of all, we will focus on rapeseed, which is the key source of valuable oil in Poland and in Europe. We want food enriched with our protein reach shop shelves and consumers’ tables around the world as quickly as possible,” explains Magdalena Kozłowska, CEO of the company and adds that – on the grounds of its research studies – the company wants to meet the mankind’s needs in the acquisition of new protein sources by making the most of oilseeds.

Proteins are involved in numerous processes in the human body, therefore eating them is a must. According to the WHO estimates, around two billion people suffer from a shortage of protein. “Meanwhile, the ‘health and wellness’ segment has been the key driver of market growth of protein components on the developed markets, and a steadily growing group of vegans and vegetarians seek alternative sources of protein,” says Magdalena Kozłowska and adds that the world is faced with the challenge of the population growth from seven to nine billion in 2030–2050. Animal products cannot meet the global demand for protein in an

ecologically sustainable manner due to insufficient land and water resources needed to intensify the production of meat. NapiFeryn BioTech can solve this social problem with rapeseed protein (not used nowadays for production), which is characterised by a high content of nutritious proteins, yet not consumed by people.

RAPESEED MAKES THE FUTURE

Proteins acquired under the unique NapiFeryn technology will be used as a food ingredient to enhance its nutritional value. “We have been working on the technology to get protein out of rapeseed as well as from other oilseeds. When applying our technology, we are able to extract protein isolates, i.e. proteins in their pure form. Our products will be an alternative to animal or soy proteins,” explains CEO of the company. Isolates will be used to enhance the nutritional value of food products. They will do in sauces, ice cream, drinks, bread and bars. Actually in all food products in which soy protein has been used so far.

The company has already managed to produce first protein isolates from oilseed rape under laboratory conditions. The goal is to produce them in oil mills on an industrial scale.

“NapiFeryn is a technology company, so our know-how, the ‘product’ of its business operation, will be sold to others. As a matter of fact, it will not be us to produce isolates on an industrial scale. Our technology will be implemented via licensing agreements concluded with oil mills,” says CEO of the company adding that it may take about four years to finish the research stage. ●

BY JACEK BRYLSKI

They will print... human skin

On a new surge of interest in printing medical implants, several students at the Lodz University of Technology have also resolved to explore its potential. However, they sought innovative, cheaper and more practical solutions. As a result, at present, they have been at the brink of developing a new technology which will allow to print human skin digitally.

“Several years ago, the popularity and – at the same time – the availability of 3D printing technology revolutionised the market. Today, scientists around the world have been working on making the most of its features in almost all industries, among others to manufacture ready-made medical implants,” explains Agnieszka Madej, vice-president of the “BioMed-Spec” Students’ Scientific Organisation of Biomedical Engineering seated at the Lodz University of Technology. Young people engaged in this students’ organisation, assisted by doctoral students and their scientific supervisor, also took up the challenge.

HOW TO MAKE IT GROW?

More than two years ago, a group of students specialising in biomedical engineering and materials science decided to expand their knowledge on this medical issue. At the beginning there came out an idea to use a standard inkjet printer and adapt its mechanism to print a substitute of artificial skin. “However, after many weeks of our work, the project did not yield the expected results. Therefore, we changed the method of implementation without abandoning the concept itself,” says Agnieszka Madej emphasizing her team’s determination. “Thus, we began to construct it from scratch, making use of a 3D printer made available to us by the university.” The students designed and developed most of the components needed to create a functional prototype of the printer.

They aim to build a 3D bio-printer to produce medical implants applying the bio-printing method i.e. using a mixture of stem cells and hydrogel. “The bio-printing methods applied today are based on forming a hydrogel construction first and then filling it with living cells. It is vital to provide them with all the conditions necessary for their development, such as the adequate temperature, humidity, oxygen and

carbon dioxide,” explains Agnieszka Madej and adds that consequently, cells grow over the base material and get multiplied. As stated by the students of the Lodz University of Technology, the ideal solution would be to create such a product which will reduce costs and increase operational efficiency due to the application of one header which simultaneously feeds hydrogel and stem cells. “It would provide the



Stand for soldering electronic components

immediate functionality of the developed solution,” explains vice-president.

FUTURE POTENTIALS

Traditional 3D printing is similar to bio-printing in terms of one thing only – their print schema (i.e. feeding). It is poured on the table – layer by layer – to make a spatial, physical structure. “As for bio-printing,



The prize for winning the 'KoKoN' National Competition of Scientific Circles and Organisations for the project: "Construction of 3D bio-printer - printing implants of biological materials"

things get complicated because, apart from providing the right conditions for cells to develop, it is also necessary to provide a bio-ink supply system aimed not to damage cells or harm their life," stipulates Agnieszka Madej.

So, the „BioMed-Spec” Students’ Scientific Organisation of Biomedical Engineering runs tests in various fields. One of their projects is aimed to create a 3D bio-printer at minimum cost. The prototype is low-cost indeed and fulfils the requirements to be met by the team research studies. Currently, the team has been involved in refining the print-out technology.

Another area of their research studies covers testing substances with different densities. “A variety of food substances with different properties have been tested by us: from jelly through chocolate up to gelatine. At these tests we observe their reactions and – on a current basis – modify the final products, including various methods applied to cool and heat substances,” explains Agnieszka Madej.

The ongoing research studies are intended to acquire skills and knowledge through the

Currently the team is made by students of the following faculties: Mechanical Engineering, Electrical, Electronic, Computer and Control Engineering, Chemistry and the International Faculty of Engineering (IFE) in the following fields: biomedical engineering, materials science and chemistry. Mateusz Bartniak, Paulina Jędrzejczak, Karolina Przybyszewska, Dawid Zimoń i Agnieszka Madej are the team members.

They are supported with knowledge and experience by Aleksandra Jastrzębska, Krzysztof Jastrzębski, doctoral students and Marcin Mróz, a graduate of the Lodz University of Technology who ran the project aimed to construct this printer as early as he was a student.

The team and its scientific activities are supervised by Dorota Bociąga, PhD. Eng.



The team behind the prototype of their bio-printer. From left: Krzysztof Jastrzębski Eng. MSc., Mateusz Bartniak Eng., Dawid Zimoń, Karolina Przybyszewska, Agnieszka Madej, Paulina Jędrzejczak Eng.

implementation of projects aimed to develop and increase the availability of personalised medicine addressed to individual patients. “If we succeed to lower the production cost of this bio-printer, it could facilitate and speed up treatment, e.g. skin burns, in the future,” explains Agnieszka Madej.

The „BioMed-Spec” Students’ Scientific Organisation of Biomedical Engineering has a chance

to accomplish its ambitious goals. Its 3D bio-printer is to be ready in less than half a year. The concept, students’ efforts and achieved results have already been appreciated. They won the first prize at the ‘KoKoN’ National Competition of Scientific Circles and Organisations under the category of Material technologies, chemistry and bio-technologies. They managed to beat 40 other students’ teams there. ●

BY JACEK BRYLSKI

Kilometres run on one droplet

No need to convince anyone that students of the Lodz University of Technology can be the winners in a variety of contests and competitions. Last year, the Iron Warriors Team from Lodz broke... its own Polish record.

For a couple of years student teams have participated in the competition where they do not complete to get a high speed but... low combustion. Students from around the world construct their own vehicles, which – thanks to low rolling resistance, good aerodynamics and innovative solutions – are intended to run the longest possible way on one litre of fuel.

The Iron Warriors Team from the Lodz University of Technology was one of the teams taking part in the TEK – XLI Pisaralla Pisimmälle competition in the town of Nokia in Finland. They were supervised by Przemysław Kubiak, PhD from the Department of Vehicles and Fundamentals of Machine Design, the Faculty of Mechanical Engineering. The team is made up of more than 20 students. “We were keen to construct this type of vehicle because we wished to participate in this international project. It has given us a chance to use and expand our knowledge in this field,” says Anna Markiewicz, one of the students and participants of the project.

LITTLE KNIGHT

The origin of this name – as she admits – is purely coincidental. “Before the competition was held for the first time, we were so focused on designing our



The team at the Shell Eco-marathon

vehicle that we forgot to give it a name and five minutes before midnight – that is before the end of the registration procedure – we just made it up quickly. The name may refer to a metal frame – the only component that we had at that time,” says the student. The warrior who was to sit in the racing car built on this frame was also crucial. Not all people can do that because vehicles are really small. “Thus the driver must be tiny – about 50 kg heavy and not more than 160 cm tall,” explains Anna Markiewicz.

Before joining the competition, the team must go through a technical check and – when passed – may start test-driving on the track. And the task is to go a certain number of laps on the closed track within a period of time set by the organisers, while keeping a minimum speed of 25 km/h on average. After such tests, they measure how much fuel was consumed and, consequently, calculate the distance which this car would make on one litre of fuel.

NEW RECORD

837 km/l was the new Polish record set at the Finnish “Driving on one droplet” competition. “Beating 1000 km/l is our target to be reached in the future. We hope that we can get it as early as the forthcoming year, because now, we have been much into designing our new vehicle – Eco Arrow 3. Most of all, learning through fun and enjoying the time spent together is the most important part of this project,” explains Anna Markiewicz.

The Iron Warriors Team – apart from setting the new record – has recently competed in the EducEco competition in Valenciennes and the Shell Eco-marathon of Le Mans where they took the first and second place, respectively. This year, the team also intends to take part in the Shell Eco-marathon to be held in Brazil. •



The racing car in action

BY JAROSŁAW ZARADKIEWICZ

By road, air and rail

Companies focused on international trade may take advantage of cargo services provided at the Wladyslaw Reymont Airport in Lodz. Yet, if they plan to cooperate with China, they are offered a direct railway route to the Chinese city of Chengdu.

It was six years ago when the Lodz Airport began to provide cargo services on a larger scale and two years later, a direct rail link with China was launched from the container terminal Lodz Olechow. The beginnings were not very impressive, but now there is much to be proud of.

PLANE I.E. TIR LARGE GOODS VEHICLE

Regular cargo clearance was launched at the Lodz Airport in late 2011. More than 130 thousand tonnes of goods were cleared in December that year. Today, this figure amounts to 600 thousand tonnes. However, goods do not go to their destinations by air. Most often they go by large goods vehicles – right to intercontinental hubs in Germany.

Most of the traffic at the Lodz cargo terminal is run under the Road Feeder Service (RFS) system. It is made of regular routes run by trucks which shuttle-link airports and intercontinental hubs. The bulk of air cargo traffic to and from Poland goes via this RFS system. Virtually all European airlines have accepted this system to be the primary channel of goods transport to transcontinental cargo planes. Goods are transported by trucks to cargo ports and then cleared and stacked on airplane pallets. And finally, they are ready for loading into aircraft. There are also regular routes from Lodz made by Lufthansa Cargo, SAS Cargo, Swiss WorldCargo and LOT. The airport also offers charter cargo flights.

In terms of cleared goods volume, the turnover generated by this airport ranks second in Poland.



YEAR MARKED BY CERTIFICATES AND DEVELOPMENT

In 2016, the LCJ Cargo (this is a symbol of the Lodz Airport assigned by the IATA International Federation) passed two extensive audits on shipments containing hazardous materials. "One of them was conducted by the renowned Swiss Air Lines, the second – by the Civil Aviation Authority. Both were passed faultlessly. In the first case, it authorised the LCJ to handle hazardous materials to be treated as certifying airport shipments and in the second case, it prolonged the certificate issued by the ULC for another three-year period," says Magdalena Mossakowska-Borys, marketing and sales director at the Lodz Airport while presenting the Airport achievements. Moreover, the negotiations with LOT Cargo ended with a success. The agreement was concluded in line with the SGHA IATA rules, which provides LCJ Cargo customers with an access to the increasingly wider PLL LOT route network.

The Lodz Airport – upon its trial cooperation – signed a cooperation agreement with AGO, a local customs agency. "It will provide our customers with an access not only to the customs office, but also to customs agents' services (clearance) 24/7," says Magdalena Mossakowska-Borys.

INVESTMENTS MADE FOR THE FUTURE

Recently a dedicated computer program has been set up at the terminal to streamline internal processes, increase the quality of services and widen its range.

To implement the 'no limit' cargo policy, the Airport purchased a forklift with its nominal capacity of 12 tonnes. This is probably one of three largest forklifts in operation across all airports in this part of Europe. The LCJ Airport – expanding its cargo terminal – launched the first phase of the planned infrastructure development. It stands for an extension of the existing manoeuvring area, mounting extra unloading ramps and setting up a storage site under a temporary light hall with its area of 450 square metres. In addition, a controlled-temperature storage site (15–25°C) is planned to be made. Also storage facilities to store goods at temperatures between 2°C (or even below 0°C) are projected.

This infrastructure development will make the Airport Cargo facilities more and more

attractive and put volumes of cleared goods on the rise.

CHINESE WAY

It was in 2013 when the first train on the Lodz–Chengdu route set off from the rail terminal Lodz Olechow (owned by Spedcont). "At the beginning the route was thoroughly subsidised by China. There were not many containers loaded with goods," says Michał Gawin, operational director at Spedcont and adds that for almost two years there was just one train which imported goods to Lodz. De facto, it went one way only because there was no export run at all. It all changed when RTSB became the route operator – import and export traffic revived. "At present the Chengdu–Lodz route is operational on a daily basis. The route regularity and stability led to an increase in its significance for the region, because from now on, you can send a container practically overnight to



Spedcont container terminal in Lodz

WITOLD STĘPIEŃ, MARSHAL OF THE LODZ PROVINCE

The Lodz Province has recently become a major player on the international market. Local companies are more and more eager to seek cooperation with foreign business contactors, but also conclude agreements to do business together. The cargo route with the Chinese city of Chengdu can be a good example here. The first regular rail connection has made us the leader among other regions in business relations with this powerful partner. The Lodz Province has been much involved in the promotion of this project and its development in the future.

This cooperation is utterly important for our companies – just like for companies in other regions in Poland. Each and every entrepreneur entering into business relations with a foreign partner strives to expand trading, looks for opportunities to increase turnover and observes good business practice run by other entrepreneurs. For that reason, the Marshal Office of the Lodz Province provides

assistance in establishing such contacts. Centrum Obsługi Inwestorów i Eksporterów (the Investor and Exporter Service Centre) – in operation at the Office – offers, among others, market identification for any type of service, information on foreign traders, acquisition and provision of foreign reports, analyses, market research papers, sectoral studies, thematic publications as well as other administrative, legal and financial information (incl. on safety in trade and doing business on foreign markets). Making the most of EU funds we pursue the project which helps entrepreneurs establish their business relations with foreign contractors and provide export incentives. Via this project financed under the Priority: Economic promotion of the region we offer, among others, training courses for entrepreneurs to get them prepared to run export operations, organise economic missions and participate in trade fairs. ●



reach Lodz within 10 days,” says Joanna Kujko, RTSB branch director supervising the route and adds that over 700-metre long trains taking about 50 containers go both ways. “The point is that this high number of trains lets it run large-volume business. Currently, several leading manufacturers of IT equipment, electronics or household appliances have decided to use railway to reduce time spent on the road to transport their production parts. Also production components, chemical and construction products are transported,” explains Michał Gawin.

GROWING INTEREST

In 2013–14, trains were little loaded with goods. “Since 2015, this level has been on the rise, and this year, virtually no trains run empty. As for import 90% of containers are loaded, while export has still been building up its potential, but it can be seen that it will also increase significantly,” explains Michał Gawin.

The growing importance of the Lodz–Chengdu route is best proven by the figures themselves. On a weekly basis there are eight trains in operation: five to handle import and three – export. It is good news for Spedcont, one of the leading terminal operators in Poland, which also runs a customs agency. “It is used by many customers clearing containers on site or commissioning such clearance – it significantly facilitates the entire logistics process because there is no need to go with containers to external agencies,” says Michał Gawin. His company has already expanded the Lodz unit making it the largest onshore terminal in Poland. Nowadays, this is one of the Big Three. ●

BY JAROSŁAW ZARADKIEWICZ

The late 90s of the last century ushered in extensive changes in road infrastructure investments in Poland. Worn-away roads were under renovation and new ones – under construction. At that time, Krzysztof Cichocki decided to invest in the manufacture of road machines and equipment.

On the wave of the last century economic and political changes, Hydrog – Zakład Budowy Maszyn (Machine Construction Company) was set up. “Faced with a limited supply of construction machines and equipment, our initially low production let satisfy the then demand so effectively that it has opened up prospects for our further business development. In retrospect it can be said that the decision to choose this business path was right,” says the company owner and adds that nowadays, the Hydrog product assortment occupies most of the home market, gaining throughout the years more and more recognition abroad. “Our machines do their job very well all over the world – from Siberia via Dubai to Canada,” adds Krzysztof Cichocki. “For example, attention should be turned to our innovative Hydrog SH Premium emulsion sprinkler used to sprinkle road pavements with asphalt emulsion. This product was awarded at the ‘Łódź Proponuje’ (‘Lodz Proposes’) Contest and received a distinction at the ‘Autostrada-Polska’ (‘Motorway-Poland’) Fairs in Kielce.”

MODEST BEGINNINGS OF THE BIG SUCCESS

Like thousands of companies which started their business upon the overthrow of the previous system, Hydrog was built virtually from scratch. The business name was intended to refer to hydraulic drives which the company started to manufacture at that time. The name (“Hydrog”) comes from the combination of the word: “hydraulika” (“hydraulics”) and the word: “droga” (“road”). The company still manufactures road construction, repair and maintenance machines equipped with hydraulic drives.

Krzysztof Cichocki asserts that the company establishment and development up to the level it has reached nowadays would not be possible without a group of trusted staff – specialists in the industry who let the company spread its wings in a short



He just chose the right path

time. “There were some obstacles at the beginning, but they did not differ much from the ones faced by other enterprises. Among them we can point out financial issues such as raised tariffs on imported goods or high corporate tax rates,” says the company owner and adds that the company development was by no means supported by the then inadequate level of telecommunication services. Today, with the application of modern IT and technological solutions, all processes in the company are run much more effectively than they used to.

FOR ROAD WORKERS

Within 25 years the company has grown to be a business entity employing nearly 100 people. Following the principles of CSR, Hydrog invests in the development of staff and their competence, strictly adheres to working time norms and ensures the fair system of remuneration. The company management takes care of good relations with employees and provides them with an adequate level of health and safety at work. As a result, the company is able to accomplish its mission, defined briefly by Krzysztof Cichocki as follows: “With passion we support road builders”.

Hydrog aims to create and develop innovative and efficient solutions in the field of machine designing in order to maximally facilitate and enhance the operation of contracting companies in the road building sector. It can be achieved thanks to the specialised team of designers who work with



Chip spreader for road rollers

passion and commitment and offer outstanding solutions. “Machines made by Hydrog are based on many years of users’ experience and their individual needs. We always do our best to meet specific customers’ requirements and, at the same time, offer full support and technical advice at every stage of their project,” declares the company owner.

The company has implemented a dedicated internal quality management system with regard to the implementation of its non-standard solutions. “We often go beyond the set boundaries taking into consideration customer’s expectations,” explains the owner and emphasizes further that all the products are designed with due diligence and the quality control is run at every stage of their production. The products made by Hydrog comply with the applicable EU standards in the range of health protection or safety of use and bear the ‘EC’ declaration of conformity.

FROM A ROADSIDE UP TO AN AIRPORT

The company accomplishes its mission through the implementation of new products and development of the existing ones, high standards of customer service, effective communication and openness towards cooperation and regular marketing of its innovations.

The product range includes machines for construction, repair and maintenance of roads and roadsides as well as street cleaning services rendered in summer and winter. The product portfolio is

complemented with airport machines. The complete assortment offered by Hydrog covers about 30 types of machines – each of them in several variants.

WINNERS

Last year Hydrog was the laureate of the “Mocni w Biznesie 2016” (“Tough in Business 2016”) Economic Award of the Lodz Province which honours business entities which contribute to the promotion of positive image of the region and development of its economy. The award in the “Dynamics of Export” category – granted to companies operating in the Lodz regional market and representing the largest growth of export within the last three years – was personally handed to the company representative by Witold Stępień, the marshal of the Lodz province during the ceremony closing the 9th European Economic Forum. Its participation in the Bauma 2016 – the world’s largest construction machinery trade fairs in Munich – was another unprecedented event. At the Fairs, which regularly attract the industry giants and, at the same time, a wide range of audience, Hydrog proudly exhibited its products being the only Polish machine factory there. The last year’s ‘Bauma’ fairs were by no means the only event attended by Hydrog. In September, machines made by this company were exhibited at the StroMa Expo 2016, the most important fairs in Bulgaria. In 2015, Hydrog displayed its products at the Doroga fairs in Moscow.

The company representatives have noticed that a couple of recent years have seen the increasing demand for road machines and equipment. Hydrog meets this increase in sales by investments made to expand its production capacities. Currently, the company has expanded its modern assembly hall and enlarged office space. Simultaneously, it consistently strives to find business partners at new markets. •



Production of emulsion sprinklers

Photo: Hydrog



Magdalena Grądzka, CEO of Amii, at the inserts production hall

Good idea is the key in business

MAGDALENA GRĄDZKA, CEO of Amii Sp. z o.o., talks to Jarosław Zaradkiewicz about her company, its growth, challenges and plans for the future.

You produce fur hooks, water filters, sell breathalysers. How did you come to that?

All of that is based on the long history of Amii and our motto: „Only the best is good enough”. I think that products will appeal to customers for long if you care about them and provide after-sales services. The diversification of business lets you move from one market to another and at the same time ensure your stable financial standing. Our company is based on own capital only; we did not take any commercial credits.

And we manage to achieve success at all the markets. The company supplies breathalysers, among others, to the police and it is the largest manufacturer of fur fasteners. Moreover, we export filters to dozens of countries all over the world. Still, water filters, their production and sales, are the core business which engages most of the staff.

The 70s of the 20th century was not the golden era for „privateers”. How did the company start?

Amii is a family company which has been run by its founders' third generation. The beginning of our business dates back to 1977, when Jan Siniarski set up a factory and based its production on the technology of plastic injection moulding. The company gradually widened its product range. In 1985, it started to cooperate with the National Centre for Medical Technology and – under government anti-import procedures – launched to produce dialysis filters.



Bluefilters water filter

From 1989 on, the company has focused on trading and began selling water filters; since 1992 it has expanded its business to sell imported sobriety testers.

Based on your business experience, how do you assess doing business and its conditions over the past decades?

The key is to have a good idea for your business. The economic transformations gave us opportunities and we just made use of them. The founders put a lot of work to move the company where it is today. Over the decades, Amii went through various stages.

The 90s saw a launch of the production of water treatment systems such as household and industrial filters in which we applied the latest water treatment technologies. The first decade of the 21st century stands for fast growth and strengthening our position on the markets where the company has already ran its business. It led to a rise in the production of filters, fur hooks and increased sales of breathalysers.

In 2012, we were TÜV-certified on water filtration systems and filter inserts for our three brands: Fitaqua, RX and Bluefilters. The 'B' construction certification for softeners and the NSF certificate for filters was the next step. Just a few companies in the world can boast about it.

In order to make our company grow further, we set up dedicated R&D and QC departments. We bought specialised machinery and renewed the lab, so now our staff can run research studies and tests to customise products as requested by customers.

Has the Polish accession to the EU provided you with more opportunities?

It has definitely made us spread our wings. Since then, the company has been growing dynamically, as evidenced by the seven Business Gazelle Awards received in 2006–2015.

Armii has benefited from national subsidy programmes as well as EU grants to implement its innovative solutions. For that, it accomplished several investment and product promotion projects. And currently, there has been one more in progress under the Operational Programme – Smart Development POIR. All of them are aimed to prepare our innovative filter solutions for production, sales and promotion in the domestic and foreign markets.

What achievements do you consider essential for your business?

By all means the awards and distinctions we received. The 1st position at the „Forbes” Ranking for 2015 and 2016 under the category of companies with PLN 50–250 million revenues is our greatest pride.

We were also honoured with the title of the „Kamerton Innowacyjności” at the ‘Leader of New Technologies 2010’ Gala. In 2012, at the „Łódź Proponuje – Innowacyjni i Kreatywni” [„Lodz Proposes – Innovative and Creative”] Contest organised by the City Council in Lodz, Amii was awarded under the category of ‘creative business – socially responsible’ enterprises for its public-awareness campaign targeted at drivers under the slogan: „How much can I drink?”. The company also received the prestigious title of the Regional Leader of Innovation and Development in the contest organised by the Foundation for Innovation and Development. Then, in 2012, we won two titles of the Regional Leader of Innovation and Development under the following categories: IT visionary and Innovative product for our ultrafiltration membrane filter.

In 2015, I personally received the prestigious award and was listed as one of the 100 most entrepreneurial women in Poland. This is my great success, not only in professional, but also in personal terms.

All the awards are important to us and give a feeling that all we do is worth our work and efforts. Of course, we would not get it without all the people working in Amii and their engagement. They themselves and their efforts make the company grow.

How do you assess doing business in Lodz?

We have been successfully doing business for years here in Lodz and I must say frankly: yes, Lodz is a good place to run business. Our company manages to operate in harmony with the city council; we have got a dedicated

officer to get in touch with us there. Our cooperation with various other local institutions also runs smoothly, so we manage to tackle day-to-day problems efficiently. The company participates in a variety of EU-financed programs and thus promotes Lodz and our region.

How does your company take and manifest social responsibility?

We care about the natural environment at every stage of production and investments. Our filters are made of recyclable materials. The company buildings are fitted with environmentally-friendly solutions such as geothermal heating, air recuperation, high-standard thermal insulation, energy-efficient lighting.

We planted 300 trees around the factory, filter water used for lawns and flowers growing around the company.



High-storage warehouse in Amii

Our products have been certified by the NSF International which is an independent health and safety organisation. In order to be certified by them, the products passed rigorous tests and met all the highest standards.

What are the company plans for the forthcoming years?

We have been still absent on many attractive and challenging markets, thus, the key goal is to get into new countries, for example African ones. At the same time, the company has been expanding business in the markets where we have been present so far. That's loads of interesting work for the sales staff and others employed at the company. There has been a growing demand for clean drinking water, so, in spite of fierce competition, I believe that our contribution into the search for new solutions will be reflected in the future.

Thank you for the interview. ●

DOROTA WÓJTOWICZ

It all starts from the grain

Barry Callebaut is the world's leading chocolate and cocoa company that dynamically develops their branch in Lodz. The company masters every step from the sourcing of cocoa beans to the finest chocolate product. Barry Callebaut is inside a quarter of all consumer products around the world containing cocoa or chocolate.

The Barry Callebaut Group is present in all kinds of grocery products. The company was set up in 1996 in Zurich, when two companies with more than 150 years of chocolate and cocoa heritage merged: the French Cacao Barry and the Belgian Callebaut. The Group had its debut on the SIX Swiss Exchange in 1998.

COFFEE AND CHOCOLATE

The company's history is closely linked to the successes of its founder, Klaus J. Jacobs. Having worked as a coffee trader in Central America, he took over the family business Johann Jacobs & Co in 1970. He didn't stop at that, however, but kept on expanding the company. In 1973, having



acquired the Suchard and Tobler brands, he moved the headquarters to Zurich. In 1990, he sold his shares and started a new project that resulted in the founding of Barry Callebaut.

Today, Barry Callebaut is the largest manufacturer of both chocolate and cocoa products in the world, with close to 10,000 employees, more than 50 production facilities worldwide and customers in 131 countries.

LODZ AND THE WORLD

The company has been present in Poland for more than 20 years and has been expanding its local operations since. In 1995, the company established

Chocolate plant in Lodz





Pralines

● CSR actions at Barry Callebaut

- “Forever Chocolate” sustainability strategy.
- Chairman’s Award – recognizes employees with strong social commitment in their local communities.
- The Graduate Trainee Program at Barry Callebaut.
- Supporting local public benefit organizations from Lodz with donations and volunteer work.

its factory in Lodz thus laying foundations for the conquest of the city. In 2015, Barry Callebaut opened its Shared Service Center in Lodz, which is an integral part and the main support of the Barry Callebaut Group in areas such as Finance, IT, Master Data, Customer Service and Logistics. The Polish branch is one of the fastest growing within the Barry Callebaut Group.

“The company’s vision is to be both the heart and engine of the chocolate and cocoa industry. Our experience and expertise of the chocolate business – from the cocoa beans to the highest quality products – make us the first choice partner for the entire food industry, from food producers to confectioners. The goal is clear: to be on top in all segments of the food industry and in all major world markets,” says Piotr Trzeciak, member of the board.

RESPONSIBLE PARTNER

Barry Callebaut’s expertise, together with its focus on innovation, enables it to cater to many different customer needs and preferences throughout the world. Barry Callebaut’s portfolio features a wide variety of chocolates, semi-finished products, fillings and decorations. In response to the current market demand, the company also offers chocolate without sugar, lactose-free chocolate and vegan chocolate.

“As a global leader in innovation, we offer a full range of services in the field of product development, manufacturing processes, training and marketing,” says Piotr Trzeciak.

Barry Callebaut has a long-standing commitment to sustainability and has made it one of its strategic pillars. In November 2016, the company announced its new sustainability strategy “Forever Chocolate” to make sustainable chocolate the norm. The aims to be achieved by 2025 include: supporting more than 500,000 farmers in the development of cocoa plantations, using renewable sources of energy and protecting forests.

In 2016, the company partnered with members of the World Bank Group to provide credit to cocoa farmers and co-operatives. In terms of quality management, a recent example is the introduction of Katchilè, an innovative data management tool that enables the company to track cocoa beans from the farmer to Barry Callebaut’s warehouse.

THE SWEET TASTE OF THE FUTURE

Barry Callebaut is committed to a long-term engagement in Poland. The factory in Lodz increases its production capacity through the expansion of the production plant and the installation of new production lines. Moreover, the Shared Service Centre is also being expanded. “We create a friendly working environment fully engaging employees and ensuring their development. At the moment, we employ in Lodz more than 300 people and keep on strengthening our Polish branch,” says Piotr Trzeciak. ●

Dorota Wójtowicz, HR director at Barry Callebaut, Poland



BY ANNA KRAWCZYK

Enthusiasts for enthusiasts

Lodz Creative Zone at 217 Piotrkowska Street

Okam is an Israeli joint-venture company which has been present on the Polish market for over 10 years. In 2007, it started business in Lodz and purchased investment premises at 6 and 18 Dowborczyków Street, and 217 Piotrkowska Street. The latter investment is known to Lodz residents thanks to the Street Food Festival, as well as numerous restaurants and cafes tempting them with cuisine from around the world. 'Before Food Market' is its latest project, a kind of culinary start-up.

Followed by Paris and Berlin, now Warsaw and Lodz attracted much foreign investors' interest. It could be seen for the last five years. The growth of this investment climate can be noticed when we look at the increased number of air connections between Poland and Israel. And investors have become more and more courageous.

SUPPORT OF THE CITY AUTHORITIES

Investors are provided with comprehensive services by the Investor Service and International Cooperation Bureau. Here – at one place – you can get information not only about the offer, but also on the specificity of the Lodz market and its regulations. This is a great help.

Among others, the city development strategy is aimed to support IT and other creative business fields. Okam Co. perfectly fits into these city

development plans. At 6 Dowborczyków Street a co-working office, will be established within an area of 1,000 square metres. It will be opened to public this autumn (a tender will be announced soon to select the contractor).

“For sure, the rapport of the Lodz higher education institutions and the business is an excellent incentive. It contributes to the development of IT industry which is seen when we look at its growing interest in office space. In this respect, Lodz is ahead of some other academic centres such as Poznan or Wroclaw. The analytical studies provided by Colliers or Cushman & Wakefield (which have already been present in Lodz) confirmed that the city authorities excellently recognise this IT industry's need for office space. And it will certainly increase even further,” says Radosław Szwugier, manager of the Lodz Branch in Okam.

LODZ CREATIVE ZONE

The city tempts investors with post-industrial premises which make their emerging investments unique. The former J. John Iron Foundry located at 217 Piotrowska Street is one of them.

“When choosing this investment, we made use of the existing space and its history. We wish to restore the former glamour of this forgotten historic post-industrial site by creating the Lodz Creative Zone within. And now – out of more than 8,000 square metres – we have just made the first part available,” adds Radosław Szwugier.

For Okam, 217 Piotrkowska Street is not just another investment, but also the space where CSR (Corporate Social Responsibility) rules are implemented. The company is willing to co-operate with foundations and associations, as well as support their activities to jointly create this unique place on the map of Lodz.

A comprehensive offer of gastronomy, culture, entertainment and art is to be offered here, so entrepreneurs operating in these businesses can benefit from preferential letting conditions.

“We are keen to restore the splendour of this place, and I mean the splendour of the times when even production halls were furnished with decorative details. Lodz residents have already appreciated it, as many of them took part in events organised at the Lodz Creative Zone. At the moment, we have got eight restaurants: Japanese through French up to vegan one. ‘Before Food Market’ is our latest project. This is a kind of catering start-up involving 18 restaurateurs. From Thursday to Saturday every week they serve their own dishes,” says Radosław Szwugier.

The Cooking School intended for people who want to eat healthily is another project at 217 Piotrkowska Street. Regional dishes, drawn from the rich four-culture history of Lodz, will be promoted. Adepts of this course can learn skills in quick food preparation in order to have more time on their celebration with the families. The zone is also an ideal place for families with children. Open-air restaurant areas are no-traffic zones, so it is safe here.

‘Manufaktura Czekolady’ called Chocolate Story is one of the recent projects; a cocoa tree will be planted here when the cold weather is gone. So we can say that products offered at ‘Manufaktura Czekolady’ are basically made of original grains, and you can ‘produce’ a bar of chocolate by yourself.

Nearby, there is a roller skating rink with an area of 500 square metres. This is another creative and interesting project created by several young enthusiasts, which makes an attractive way to spend your free time, especially in winter.



Before Food Market



Comprehensive services in gastronomy, culture, entertainment and art are to be offered at 217 Piotrkowska Street

It also houses interior designers’ ateliers and art galleries.

GLOBAL CONCEPTS

“We support people with passion, because this is what the philosophy of Okam is based on.

The staff are given much freedom, but still they may benefit from support provided by our management board. Arie Koren, president of the Polish company is the best mentor for the staff and customers,” says manager of the Lodz Branch.

Much emphasis has been placed on the staff development. Even people with no experience may get a job if they are eager to work and wish to learn and train.

“There is no place for complaining in the company. We focus on solving problems rather than on making them. We treat it as a challenge, as work is to be a pleasure, not a compulsion. We have been constantly expanding our team, so we invite people who identify themselves with our philosophy,” encouraged Radosław Szwugier.

At the moment, Okam has been looking for event manager for the emerging Cooking School and ‘Before Food Market’. Especially the latter job may be quite challenging. This is the first initiative of this kind in Poland, and the idea was taken from Barcelona, Madrid, Tel Aviv and London. ●

BY JAROSŁAW ZARADKIEWICZ

Crazy about retro roller skates

“Everything in life starts from interpersonal relations and amicable ties, thus ‘KoloWrotki’ wishes to create a cosy and friendly space to anyone. No matter if our guest is 2 or 99 years old, he or she will feel exceptional being here,” says Anna Szawara who, together with Patrycja Miarka, opened a roller skating rink in Lodz. Fourth such place in the country.

The start of ‘KoloWrotki’ was also triggered by close ties and relations or, more precisely, friendship between these two young and creative women. During the studies they got acquainted while working in one of the trading companies. In the course of time, new resources of energy and creativity emerged, which led to the opening of ‘KoloWrotki’ roller-skating rink in Lodz in autumn last year. It is situated at 217 Piotrkowska Street in one of post-industrial halls. You can find this type of facilities at three other locations: in Warsaw, Katowice and Radlin (Silesia) only.

Although the facility has been open since October, it was already in July, during the Lodz Birthday Event, when first daredevils could have a try on skating. During the Event, part of Kościuszki Street, adjacent to the hall, was closed to traffic and made available to roller-skaters.

CLIMATIC PLACE

Both women are passionate about retro roller skates, although Anna Szawara admits that at first she was fascinated by figure ice skating. “I used to practise it when I was young, but then, as the time went by, I swapped ice skates to roller skates. But even today, I can watch ice skating competitions for hours,” admits the co-founder of ‘KoloWrotki’.

The idea to open the roller skating rink was born at the end of 2015. In February, our works on the project speeded up, and in October, we opened the roller skating rink to first customers. It was a challenge to find an attractive location. Finally, we chose the former factory hall at 217 Piotrkowska Street, but had to run renovation to adapt this place for its new role.

“We wished to keep the post-industrial climate and we managed to do that,” says Anna Szawara. Furniture in the hall interiors was designed by the company founders together with their friends, enthusiasts on the renovation of old furniture and equipment. Each and every piece of furniture in the hall cafeteria, even the smallest one, has its own

history. Currently, the interiors of ‘KoloWrotki’ closely refer to the post-industrial climate of Lodz, and its name – to its textile background.

Since skates are inevitably associated with the climate of disco music and a flashing ball, they could not miss it. It flickers in the rhythm of music, which encourages people to be active and move on.

FOR THE YOUNG AND THE OLD

The climatic interiors combined with this retro sport make both the younger and the older generations visit the place. “When the passion for roller skating



Skating area occupies 350 m²



‘KoloWrotki’ fits into the liking for retro style



'KołoWrotki' team, from left: Marcin Bujacz, instructor, Anna Szawara, co-owner, Patrycja Miarka, co-owner, Agata Jabłońska, instructor

is rooted in our youngest guests, it will certainly be one of the favourite topics to talk about with loved grandparents, who used to skate in their childhood," says Patrycja Miarka adding that roller skates, apart from their emotional aspect, are good for your health and body condition. "It is widely known that a healthy body means a healthy mind. To take the best care of our skaters and their fitness, the cafeteria next to the skating rink will serve healthy snacks and drinks only," invites the co-founder of 'KołoWrotki'. The company wants it to be a friendly place for people at all ages. "We want families with children, students and the elderly who used to roller-skate come to us at any time," explains Anna Szawara.

The hall in the courtyard of 217 Piotrkowska Street occupies 500 square metres. The skating rink takes as much as 350 square metres; the rest is a chill-out zone. There is the cafeteria with healthy food, vegetable-fruit chips and fresh juices. No alcohol is served.

On the spot, there is an equipment rental centre offering roller skates, pads and helmets. Everyone will find the right sports equipment: 26' up to 46' roller skates are available. The lovers of roller skates do not discriminate against those who roller-blade. "If anyone brings inline skates, he will be able to skate at the rink as well," explains Patrycja Miarka.

The rink, which can be used by about 40 people at the same time, is open from Tuesday to Sunday, from 12.00 to 20.00, and on Friday and Saturday till 21.00. 'KołoWrotki', as a partner the "Youth in Lodz" Discount Card, provides card holders with 20% discount on admission tickets.

COURSES AND EVENING PARTIES

You can enjoy skating on your own or take lessons with a professional skating instructor. Our basic-level course is intended for beginners who want to learn posture, balancing, starting to move, braking and managing falls. In addition, participants of this course learn how to skate under the pole. Our medium-level course is intended for more advanced users who will learn back-skating, turns, jumps and crossovers when moving forwards and backwards. Introductory slalom will be an add-on to this course. Courses for the most advanced skaters cover various types of slalom skating with obstacles.

Apart from healthy physical activity, 'KołoWrotki' also offers plenty of fun and laughter. "You will not regret any minute spent with us," says Patrycja Miarka and adds that the company expanded its offer for organised groups. Today, at 'KołoWrotki' you can organise a birthday party, Holy Communion meal, as well as stag and hen parties. The offer also covers the organisation of integration events for companies and groups, as well as theme events at the rink.

The roller skating rink is another idea to respond the active lifestyle of residents of Lodz. There are more and more outdoor fitting gyms in parks; urban bikes are very popular and whenever you go – not only in the Łągiewnicki Forest – you can come across people who practise Nordic walking. This new activity (or, in fact, the old one), i.e. reactivation of roller skates fits perfectly into the current liking for retro style. •

BY JAROSŁAW ZARADKIEWICZ

Recipe for success

30 months of work and thousands of hours spent on designing and development have resulted in the premiere of the 'Superhot' game in early 2016. The creative industry in Lodz sets new trends, which may revolutionise the approach towards gaming.

The idea of 'blurring' the boundaries between the cautious strategy and the uncontrollable chaos – as Piotr Iwanicki describes his project – was born in August 2013, under preparations for the 7 Day FPS Challenge. "I wanted to go along an experimental path of creation: work in a very large team of quite accidentally-met people, under time restrictions, which is always motivating," says the originator of the 'Superhot' game. "I was looking for an idea which would reveal our skills best and make use of minimal design media, but still maximal enough to develop a complete game," he adds.

MASSIVE INTEREST

In FPS, i.e. "first person shooter" games, a participant takes part in a shooters' gameplay looking at it from his/her own perspective and eye level. This type of games



Piotr Iwanicki

derives, among others, from 'Doom' which is considered to be the most iconic shooting game.

Earlier, Piotr Iwanicki created other applications in Flash for a couple of web portals. In the course of time, his projects became more ambitious and recognisable. So he decided to try his luck to launch a development studio. And in this way, the idea for 'Superhot' emerged. "The game was born as a project implemented at a game jam (spontaneous creation of games by groups of designers sharing their ideas) and, as its popularity increased, I transformed our amateur team in a development studio," explains Iwanicki.

They needed money, though. The company opted for a novel solution, which was to make use of Kickstarter, a crowdfunding portal. They wanted to get USD 100,000, but managed to collect more than twice as much. This social financing opened many doors; it let them hire office space and pay remuneration to the enlarged team. The funds they got were also spent to purchase software licenses, for example, to run the engine which powers the game.

Getting the money socially gave the developers incredible flexibility; on the other hand, there was no buffer between them and the ones who supported the project. "We knew that we cannot disappoint them, and offering an excellent product was a must. We were aware that they were having a close look at us, and all we wanted to give them was the best game," recalls the head manager.

The project was unexpectedly well received in the industry. "'Superhot' is the result of our passion for creating games. It quickly won thousands of followers from around the world," says Piotr Iwanicki, emphasizing that the project received numerous awards (starting from Berlin up to Taipei) and dozens of industry distinctions.

The enormous success shared by the company made it participate in the Lodz Gamedev Cluster attended, among others, by Microsoft and other leading



design studios such as Blue Brick, Corre Studio, Le Polish Bureau (a division of UNIT9) and Wastelands Interactive.

STOP AND THINK

At first glance, 'Superhot' seems to be a standard shooting game available on most operating systems: Windows, Linux, Mac OSX and Xbox One. So what is the secret of its success? We see the game world from the perspective of a player who shoots and is shot to. However, bullets move only when... the main character of the game moves; thus, you can evade them. The game

And the game graphics came from such this search. Its creators wanted to have their own style which is relatively easy to create and yet utterly unique. "I wanted 'Superhot' to be the icon of itself. You see game screenshots, you see replays and you know that you cannot mistake it with any other game," says Piotr Iwanicki.

SECRET OF SUCCESS

"Don't pretend" was the key behind the work on 'Superhot,'" explains the head manager, adding that the developers realised that they were making a unique



Zespół Superhot

has been quickly hailed as the most innovative FPS in recent years. Not only in Poland, but also throughout the world.

For the group of people who developed the game, graphics and finding their distinctive visual language was a challenge. "We were looking for something which would make our project recognisable. At the same time, we realised that we have no potential to compete with the Big Titles," says Piotr Iwanicki and explains that for them, it was important not to pretend in their creative work. "We did not want to cheat ourselves that we could make better stuff than others simply by imitating their style. You need to seek and find your own way," emphasizes the creator of 'Superhot'.

game and did not feel 'forced' to incorporate any familiar elements seen elsewhere. The same applied to choosing the name of the company and to the game itself. "We have been looking for something that would stick in mind. Thus, simple, yet enigmatic, 'Superhot'. This is the name which means as much as its user wants it to mean," says Piotr Iwanicki.

The game developers argue that its success lies in its unique, stylised graphics which brings something novel into (and thus develops) the FPS genre. The minimalist visual language expressed in simple graphics in 'Superhot' makes you focus on the most relevant part of the game – a flow of play and movie-like beauty of destruction. •

BY JAROSŁAW ZARADKIEWICZ

For the love of books

Nowadays, there are only two private bookshops in Lodz. Others were taken over by large shopping chains. It looks a little better when it comes to the market of old book lovers who are frequent guests at second-hand bookshops. Still, there are just few of them left. However, tourists are sometimes impressed.

The book market is far from stabilisation. Companies rise and fall. There are just few of the ones “with traditions” left in Lodz. “Currently, the market has been flooded with books, however, not with second-hand books. Prices of new books start from PLN 29, but are quickly discounted and finally, books end up in baskets, supermarkets and discount shops sold for PLN 5. It just kills the market and second-hand bookshops,” says Benedykt Wandachowicz, president of the Polish Booksellers Association in Lodz and adds that customers who bought books for PLN 30 or 40 get frowned when the second-hand bookseller offers them just a few PLN for these books.

TRADITION IS THE COMMITMENT

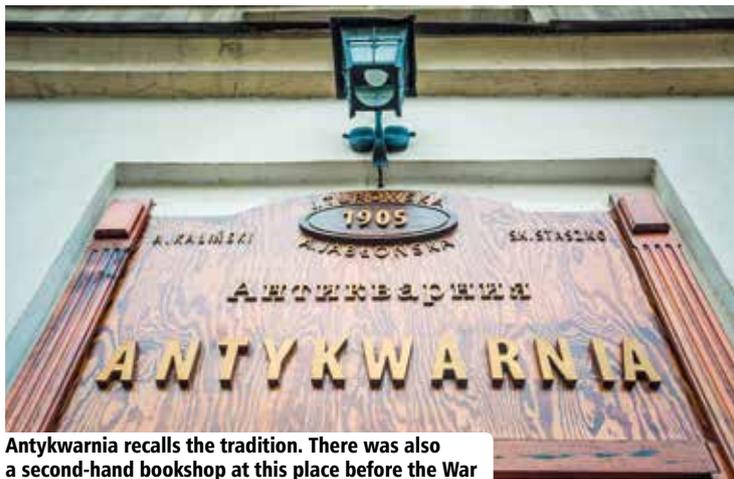
Benedykt Wandachowicz started working as a bookseller in 1970 in ‘Dom Książki’ (Book House), in ‘Księgarnia Naukowa i Medyczna’ (Scientific and Medical Bookshop) at 102 Piotrkowska Street. After obtaining the professional title of senior bookseller, he made a request at the Ministry of Culture to open his own second-

hand bookshop. “At that time, private companies were not favoured. After more than two years I received the permit, but the issue was that I had no place to run my bookshop. After two years I managed to solve this problem and one year before the Martial Law was imposed, I opened my own company at 152 Piotrkowska Street. It was called ‘Oficina’ as it was located in ‘oficina’, a kind of out-building at the corner of Piotrkowska and Mickiewicz Streets in the heart of the city,” says Benedykt Wandachowicz, who used to keep not only books, but also underground and banned publications there. “Those times were politically difficult, however favourable for selling books. TV was of poor quality, nothing good was shown in cinemas, theatres were boycotted. Books were not available in regular bookshops, so people ‘discovered’ second-hand bookshops,” says Benedykt Wandachowicz. However, the good times were over when the free market came. So private publishing companies started to emerge in the book sector, which was also flooded with western publications. Translations of ‘easy-to-read’ thriller novels such as books by Robert Ludlum turned up.



'Pegaz Tuwima' Bookshop at 47 Piotrkowska Street

"I closed the second-hand bookshop at 152 Piotrkowska Street and, on the wave of privatisation, we purchased – from 'Dom Książki' – 'Księgarnia Akademicka' (Academic Bookstore) at 50 Narutowicza Street. Apart from regular book selling, we also had a second-hand book section which I moved from Piotrkowska Street," says Benedykt Wandachowicz. Over the years, the bookshop provided services to the academic community. Students used to photocopy books, but now, they just get digital files from their tutors. So 'Księgarnia Akademicka' lost its customers and five years ago it was closed.



Antykwarnia recalls the tradition. There was also a second-hand bookshop at this place before the War

A little earlier, 'Pegaz' Bookshop at 47 Piotrkowska Street was shut down. "Now we carry on with its tradition at 'Pegaz Tuwima' second-hand bookshop. We took over its logo – the winged horse. The city authorities provided us with premises at 4 Narutowicza Street where we have continued our bookselling traditions for nearly three years already," says Benedykt Wandachowicz and adds that a second-hand bookshop was also run at this place before the Second World War.

The bookseller emphasizes that people visiting Lodz (but still living abroad) are his frequent customers. "Today's 40-year-old emigrants often pop in here. Also people of the '68 generation come and like to buy books out of sentiment. They are grateful customers, because they have this 'hunger' for books which people had at that time," explains the bookseller and regrets that these days, books – when bought as a gift – lose with the majority of other products. Young people prefer playing games. "Today we see a big flood of current production. Crime stories are trendy again at second-hand bookshops, but the young generation does not read Chmielewska or Christie," he regrets.

'ANTYKWARNIA' AS IT USED TO BE

"In my opinion, Lodz is a unique city in many ways. It certainly stands out with a number of old buildings, unfortunately most of them are neglected. Thus, this city is unique in its character and has a huge potential. People living here are much involved in anything that is associated with the restoration of splendour of this city and its revitalisation," says Piotr Jabłoński from 'Antykwarnia'. As an example he gives Księży Młyn (the Priest's Mill) or its second-hand bookshop.

"There are fewer and fewer places where children can spend time getting to know the history, and where



Antykwarnia is a place where you can touch the history

new passions and interests are created. When we were opening our bookshop, we wanted to make this place just like that – to let children have lots of opportunities to learn about the history of Lodz and do it in an interesting way. 'Antykwarnia' is not a museum where everything is behind glass; here you can touch the history, take an old print or coin which is 400 years old and get the emotions. They make us start our interest in something," convinces Piotr Jabłoński. For people who established 'Antykwarnia' this is not only a business, this is also the place where you can pursue your passions and dreams. They put all their hearts and souls into it and hope that it will become a magical place, which lets you slow down and do not run after money, at least for a while.

The idea for this second-hand bookshop had been growing in their minds for years. They always liked to be surrounded by books. One day it turned out that there was some space available at 27 Targowa Street in Lodz. In 1905 it housed an 'antykwarnia' (an old Polish word for a second-hand bookshop) – as this type of place used to be called. In those years, Russian was the official language, hence the names of its former owners and inscriptions above the door were also in this language. Piotr Jabłoński emphasizes that nowadays, there are

not many – let’s call them – simple-idea businesses. “It’s best when you do what you like or love to do – then it is much easier to deal with difficulties and adversities. Certainly, just like in any business, what counts is your zest, potential, capabilities and passion,” emphasizes the co-founder of ‘Antykwarnia’.

When asked which books are sought by customers most often, he responds just like other second-hand booksellers. “It cannot be said easily. When something is going on in politics, political titles are looked for; when blockbuster films are released in cinemas, books on which they were made attract more attention. Each and every second-hand bookshop has its own ‘character’ and most often they sell different items,” explains Piotr Jabłoński.

‘BOOK IS BORN’

“Three years ago, just before Christmas, two men came to us and said they had made a ‘Book się rodzi’ (‘Book is born’) logo to one of their customers, but he quitted. And they asked us if we would like to take it,” says Jarosław Józefacki from ‘Komiks-Antykwariat’ at Piotrkowska Street. They liked it. And though the latter is still the official name for one of the oldest and largest second-

hand bookshops in Lodz, this sentence from the logo got stuck to the company.

Jarosław Józefacki, just like Benedykt Wandachowicz, began his work in ‘Dom Książki’. They worked in different departments, but still remember those times. The owner of ‘Book się rodzi’ spent several years in ‘Dom Książki’ and later worked for ‘EMPiK’. And 25 years ago, together with his partners, he founded the bookshop at 50 Piotrkowska Street. “We did not think about the second-hand bookshop then. We got on well with the bookshop,” explains Jarosław Józefacki, adding that the founders made it for a living for ten years. With time, however, it was getting worse and worse, as big trading companies emerged on the market. “For fear of bankruptcy we came up with the idea of this second-hand bookshop. At the beginning it occupied one fourth of the space, then half of it and finally, new books ‘faded away,’” explains Jarosław Józefacki. Finally, in 2005, they withdrew from selling new books and used the whole space for second-hand ones. The co-founder of one of the largest second-hand bookshops in Lodz adds that customers often look for sentimental titles which are unavailable on the market these days. And in the second-hand bookshop most often there are items which... no one wants. “We have got books which no-one currently needs or are fairly needed as room is made for new ones. There is also a set of popular titles and names which are still on the top. Apart from them, there are plenty of books which have their fans, but it is not easy to get them, because they were published in small volumes. Then people make a search, but the chance to buy them is very low, because – due to small volumes – they reach second-hand bookshops after two years,” reveals Jarosław Józefacki.

The second-hand bookseller convinces that all literary genres are sold “little by little”, with an emphasis on “little by little”. “Sometimes this or that title is trendy because it was shown on TV. Customers ask about various types of books. Sometimes they buy an old Harlequin and sometimes a book about killing,” explains Jarosław Józefacki and adds that currently, science fiction and fantasy are à la mode in his second-hand bookshop. “Apart from crime books these are the ones which we have most in our offer. Currently, Katarzyna Bonda is the most popular, though hardly anyone brings it to us, but customers often ask about it,” explains Jarosław Józefacki.

The second-hand bookseller points out that most customers come in the summer. They arrive from Poznań or Wrocław and are surprised that there are still such places like ‘Book się rodzi’. Though Jarosław Józefacki or Benedykt Wandachowicz are still impressed by second-hand bookshops in Cracow or Warsaw. ●



Also the lighthouse keeper's sculpture in front of the second-hand bookshop makes this place climatic

BY JACEK BRYLSKI

Well-chosen clothing

Ewa Kozieradzka
in front of her
atelier in Księży
Młyn

“The prime function of clothing – that is to protect people against the nature – has disappeared. Nowadays, clothing is a reflection of our lifestyle. Through our clothes we manifest political, social, cultural and even sexual choices we make,” says Ewa Kozieradzka-Kurpeta, a designer and stylist who – as one of the first – found home for her creative workshop in Księży Młyn (Priest’s Mill).

She is a graduate of the Academy of Fine Arts in Lodz at the Department of Painting and Graphic as well as attendee of the scholarship granted by the French government at the Jean Moulin University Lyon III in the field of fashion market management and marketing.

NOT SUCH AN UGLY DUCKLING

Ewa Kozieradzka-Kurpeta likes comparing styling and selection of garment to the fairy tale about Ugly Duckling. “It is not an ugly duckling at all, it just still has not found the style that stays in line with its character, personality, profile. It has not got to know the strengths of its body yet,” says the stylist and adds that she is the one who can help to shorten this time so that each and every woman could feel like the fairy-tale swan as quickly as possible. “Our image – when well created – lets us accept ourselves, open us to other people and, at the same time, adds confidence and belief in our own skills and capabilities. A sense of uniqueness opens us to a kind of new perception of our surroundings,” says Ewa Kozieradzka-Kurpeta.

This creative designer from Księży Młyn offers individual and tailored-made clothing projects. She has got evening, cocktail, wedding and casual gowns to choose from. “The strength of my outfits lies in the latest fashion trends, fabrics provided by Italian manufacturers and cooperation with the most experienced fashion maker,” says the designer. You have to wait three up to six weeks for your image-matched and unique dress.

Apart from designing, Ewa Kozieradzka-Kurpeta is also active as a personal shopper and specialist who

provides customers with a piece of advice during their shopping. She offers individual garment projects, shopping together (also in Paris) and creation of sets of clothes which match individual people and their lifestyles. You can also learn from her how to arrange and set together clothes and colours according to the latest fashion trends.

ABUNDANT EXPERIENCE

The designer regularly visits the Pret-a-porter and Premier Vision fairs to follow the latest trends in fashion. She passed on her knowledge in this field during trainings organised by Krajowa Izba Gospodarcza (the National Chamber of Commerce), working as a SMSC consultant for the light industry, participant of the European Textile Network and, finally, as a teacher at the Academy of Entrepreneurship in the field of self-presentation.

As it can be seen in her extensive portfolio, this designer and stylist has cooperated with renowned brands and companies; here are just a few of them: ZPDz Iwona, Modesta, CORA Garwolin, Lubelskie Zakłady Futrzarskie KURÓW, KAROLINE and SIGMATEX. Ewa Kozieradzka-Kurpeta was the chief designer and stylist of the Pierre Cardin product line in MODENA and the chief designer of Dom Mody Telimena.

In her career she also has a filming episode. As a costume designer she took part in the creation of costumes for such films as: “Kancelarz” (“The Chancellor”), “Żelazną ręką” (“With the iron hand”), “Napoleon w Europie” (“Napoleon in Europe”) and “Borys Godunow” (“Boris Godunov”). •

BY JAROSŁAW ZARADKIEWICZ

It all will be fine

The “Będzie dobrze” (It all will be fine) Team made up by students of the Faculty of Technical Physics, Information Technology and Applied Mathematics at the Lodz University of Technology submitted their project for the ‘UNIT9 VR Challenge’ National Contest. Their installation took up the highest place on the podium beating companies commercially involved in the development of virtual reality projects. The students were awarded with PLN 10,000 and invited to implement the winning VR installation at Coca-Cola.

Sonia Jach, Aleksandra Buczek, Adrian Fijałkowski and Michał Stasiak comprise the team. As they say, they did not want their team name to be too serious or run a reign of terror among competitors. “In fact, we are just a group of students – enthusiasts. The team name was supposed to be funny and easy to remember. We quietly tried to make it up at lectures, but it was not easy. After rejecting a couple of dull ideas, Adrian Fijałkowski spontaneously said: ‘Będzie dobrze’. And that was it, it was our perfect team name,” says Sonia Jach and adds that, as it turned out in difficult moments when they were just about to give up, this name really lifted their spirits.

BIG-LEAGUE CONTEST

The UNIT9 VR Challenge 2016 Contest consisted of a conference, contest and fairs on the VR technology. Each team had its stand at the exhibition area and all people visiting the fairs were free to have a try of all the contest installations. The festival was organised by Le Polish Bureau, the Polish branch of UNIT9, interactive production studio implementing marketing campaigns for the world’s largest advertising agencies and their clients. The competition being a part of the ‘UNIT9 VR Challenge’ Virtual Reality Festival was held for the second time. Its final stage took place at the EC1 premises. “Primarily, the UNIT9 VR Challenge stands for the promoting virtual reality and companies involved in VR productions, as well as setting up a strong community focused around the technology. This is the place to exchange experience, share knowledge and run business networking. The second edition goes around the concept of VR



Będzie Dobrze team, from left: Michał Stasiak, Aleksandra Buczek, Adrian Fijałkowski, Sonia Jach

applications in business, hence the participants were asked to develop VR installations to be implemented in Coca-Cola marketing campaigns,” explained Jakub Brzózka, UNIT9 marketing manager and organiser of the festival.

CONTEST CHALLENGE

The gist of the last contest edition was to prepare a running prototype of VR installation based on a Coca-Cola bottle. All the works were evaluated taking into consideration several categories: product, concept, design, technology, control, initialisation and scalability.

Each VR contest experiment had to last one minute at maximum or be manually completed within this time. The application of traffic controllers and multisensory devices was another challenge. “This task kept the team members awake all night. The Kinect controller and its operation caused most difficulties. In the game it turned out how difficult it was to use VR goggles and movement sensors. We had to change the position of our player and the method of control. It was our first project making use of virtual reality goggles and we had to learn a completely new approach towards the game development,” says Sonia Jach.

Out of all the works submitted at the contest the jury selected ten projects which took part in the final game. The projects were evaluated by UNIT9 and Coca-Cola representatives.

MONTHS OF WORK

The students developed a simple VR-oriented game, which – through the feature background and creation of its fairy-tale world – emphasised the

JAKUB JAKUBOWSKI, CREATIVE TECHNOLOGIST, UNIT9, JURY MEMBER OF THE UNIT9 VR CHALLENGE 2016 CONTEST

Just from the very first meetings most of the jury members considered the “Będzie Dobrze” Team as their favourite. Compared to all other contest participants, this project stood out in many ways and had no equals under many categories.

The fantasy world in which we appear when we put on VR goggles made fantastic first impressions. All the models created in the low poly technology, warm colours and cartoon designs created the fairytale atmosphere complemented by the charming dancing creatures looking like stuffed animal toys. From a technical point of view, the world under the „Będzie dobrze” team project was implemented in the best possible way.

importance of friendship and fun in life. A player – after taking a sip of the drink – was transferred into the virtual world full of colours and his/her task was to bring more Coca-Cola bottles to the party of forest creatures. “In the course of project development we paid much attention to passing on the values promoted by the sponsor. The jury appreciated our efforts made into the project and the world we created emphasising the values passed on in Coca-Cola campaigns,” explains Sonia Jach adding that they wished to show how important friendship and cooperation are. The project was full of colours and fun. And – as stated by its creators – these features made it appeal to many people.

The game was under development for a couple of months. The IT students created all the project elements making use of 3D Blender and 3DS Max graphics applications. “Working on the contest project has taught us a lot. If we wish to create

Apart from the leading contest theme, i.e. Coca-Cola bottle, the project also aimed to present the values which are associated with the brand itself and used in its advertising campaigns: joy, warmth, optimism and freshness. The project settings positively tune in the user, but still the gameplay itself makes the core of the work.

The winning project was complete in its scope; it had a clearly-defined beginning and definite ending which made one, ready-to-implement product. And a chance to dance with the game creatures after completing the main part of the game was the icing on the cake. •

a similar game again, we will tackle some issues in a different way. So we can say that, for this reason, we have won the double prize,” discloses Sonia Jach adding that their participation in the UNIT9 VR Challenge Contest was a valuable lesson to learn in the field of game development. •



Screenshot of the game



Award ceremony at the VR Challenge 2016 Contest



'Będzie Dobrze' team at the VR Challenge 2016 Contest, from left: Adrian Fijałkowski, Michał Stasiak and Sonia Jach



BY JAROSŁAW ZARADKIEWICZ

Let the web be called video

Paplus International team

Web analysts predict that in the near future we will see a significant growth of video platforms on the web. Paplus International – currently working on its in-house project named Booyka – fits into this forthcoming trend. Based on the functionality of YouTube it follows the latest trends in the field of video and video marketing on the web.

Nearly five years ago, Bartłomiej Chmielewski together with Ashoka Shewakramani, his friend from Dubai, established Paplus International. The partner provided financial support required to bring ideas into life and was really a helping hand in the development of the company. One of these ideas, which was the driving force of this development, was to create an innovative mobile application aimed to help bringing people together. Currently, most sites and applications 'take care' of virtual interpersonal relationships; thus the phrase: "Meet people in real life" has become the slogan of the SeeU application (the first application developed by Paplus was named like that). The second version has come out this year, but actually the one which raises even higher hopes is its newly-born baby – 2017 will surely be the year of Booyka. "It thoroughly fits into the

current video trends on the web and in social media," says Bartłomiej Chmielewski, vice-president of the company.

MODEST BEGINNINGS

In the meantime, this two-man company has started to attract more and more programming enthusiasts. As new people joined the team, the company could start transforming their ideas into real products. SeeU had its premiere in 2014. Less than a year later, the first game turned up on the market and 2015 saw the debut of a mobile puzzle game named "Ghosts of Memories" available on iOS and Android platforms.

Based on the cooperation with the University of Lodz and the Lodz University of Technology, new young talents – considerably strengthening the company team – were discovered. Bartłomiej

Chmielewski considers forming this highly-determined team as his personal success.

Michał Zwoliński, a web developer, is one of the newly-employed people in the company. He considers having a wonderful family as his greatest achievement, but professionally, he has found his place in Paplus International. "I fulfil myself as the initiator and co-founder of Booyka.com. And working with my team gives me the highest satisfaction. It is made of the best people I have managed to find. They are not only my colleagues, but also great friends. We are on the same wavelength even though they sometimes bring me down to the ground when my ideas seem too crazy. As a result, we have reached the balance in our cooperation confronting all ideas with the pragmatic approach," says Michał Zwoliński.

THEY DIVERSIFY THEIR OFFER

The company activity on the gaming market is one of its key business areas. Currently, the company can be proud of its two products. The creation of the first one – a type of 'endless runner' game – was treated as a sort of paving the way in business and opportunity to evaluate the team. The "Ghosts of Memories" adventure puzzle game is their second production. It has received a positive feedback from players from all over the world and been favourably reviewed by the international gaming community.

Paplus International also develops mobile applications and web solutions. SeeU, the one mentioned earlier, was its first in-house product, but the company has still been working on it.

"After releasing the original version and getting feedback from users they started to implement version 2.0 which is slated for release at the beginning of 2017," says Bartłomiej Chmielewski.

The company also provides IT services to online clothing shops. "Trzy Igły", the local brand and its closest partner, has been IT-supported since it was established.

PROJECT FOR THE FUTURE

Booyka.com, the last project into which the company puts its highest hopes, is deemed to revolutionise YouTube, its features and usage. The key concept behind the platform is to compare videos and run competitions based on them. Apart from providing entertainment, this functionality can also be applied, for example, to evaluate two or more products. As a result, in a simple way, you can ask your friends for their recommendation on

one of them after watching two reliable video-reviews. Moreover, you can create top-lists and KO tournaments which is a dream way to run video-competitions for your audience. Booyka has been designed in such a manner that every company is able to set up its own competition which will perfectly suit its needs. You need no graphic designer or application developer to do that. A good idea and a few minutes in front of your PC



Michał Zwoliński, initiator and co-founder of the Booyka site

will do. Booyka is the gist of video marketing in an unprecedented form.

"We hope that in the near future the quality of video contents will be determined not so much on a number of page views and likes, but also on voting. We plan to establish cooperation with companies, encouraging them to effectively engage their communities to organise prized competitions or set up video rankings," says vice-president of the company.

Michał Zwoliński, the key architect and initiator of the Booyka.com project, emphasizes that for him, the most important issue is to 'put a high bar', implement ideas that can change the world, fight for them and never dare to give up. "I like to draw inspiration from the better and bigger ones living on this planet. I am their strong supporter and, at the same time, I wish to compete with them," says the creator of Booyka.com.

His dream is to 'be himself' with the head full of ideas and succeed in business together with his team. "And to do that with the portfolio of many successful projects and even more ongoing ones," says Michał Zwoliński with a smile. This innovative project can help him make his dreams come true. •

BY JAROSŁAW ZARADKIEWICZ

In the middle of the New Centre of Lodz

The end of 2016 saw the opening of a new railway station in Lodz – the Lodz Fabryczna. It is not an ordinary one, but one of the four largest railway stations in Europe. And it can also become a touristic hallmark worth a visit. Anyone who remembers the old local railway station may be much surprised.

Nowadays, the Lodz Fabryczna is considered to be one of the most modern railway stations in Europe. Its new image was created and developed by PKP Polskie Linie Kolejowe and the City of Lodz. The total value of the investment amounted to nearly PLN 1.8 billion co-financed under the EU Infrastructure and Environment Operational Programme. The railway component was subsidised at 95%. Part of the investment made by the City under the 'Nowe Centrum Łodzi' revitalisation programme also obtained EU support. This revitalisation programme covers the central city area within Narutowicza, Kopcińskiego, Tuwima and Piotrkowska Streets.

NEW TIMETABLE, NEW RAILWAY STATION

The new, three-level Lodz Fabryczna railway station was opened to travellers on 11 December 2016 – just when the new timetable came into force. On average, 100 (and up to 130 in summer) trains depart the new station every day. They are run by the following train operators: PKP Intercity, Przewozy Regionalne and Łódzka Kolej Aglomeracyjna.

The railway station is equipped with voice and visual information systems. It includes loudspeakers, LCD displays and information boards with timetables and direction signs. Train and timetable information for passengers is provided by 56 illuminated electronic boards. At the railway station, there are 14 displays which show current information on train departures and arrivals.

TAKING CARE OF PASSENGERS

Easy access within the three levels of the railway station is ensured by 24 escalators and 14 elevators (also with Braille signs for the visually-impaired). Each platform is equipped with two elevators, escalators, as well as conveyor belts for easy luggage transport.

The new station may be reached by public transport or by car (nearly 1000 parking lots available). Going this or that way, you can quickly get to ticket offices; it takes around one minute from tram stops.

Sunlight – going through glass roofs of the railway station – reaches four platforms at the second level which is 16.5 metres underground. Three of them are 400 metres and one – 300 metres long.

At the first level, 8 metres underground, there is a waiting room and ticket offices. All the premises are lit by 9,000 energy-saving lamps. 340 kilometres of cables (which is equal to for the distance from Lodz to Gdansk) were used to arrange them inside the building.

The total area of the station and parking lots is approx. 65,000 square metres, being the equivalent of six full-size football pitches. This state-of-the-art railway building – with regard to its underground facilities – has been often compared to the Hauptbahnhof Station in Berlin or the Main Railway Station in Vienna.

FUTURISTIC LOOK

Stone, glass and steel are characteristic elements of the new railway station. The building is dominated by charcoal (in terms of colour) and triangles on its walls



(when it comes to shapes) – you can find them at the glass roof (made of 10,000 triangular panels), in elevators and within staircases. Murals in the waiting rooms refer to its progressive geometry and the tradition of placing paintings at such premises. Katarzyna Bogucka, closely related to Lodz, is the author of four of them; the fifth one was made by Beata Szczecińska.

Residents of Lodz having in mind the old monumental station find its old facades in the roofed premises close to the new bus station. Based on pre-made castings, the historic exterior facades of the old train station were restored in line with the monument conservator's requirements.

TREMENDOUS CHALLENGE

Under the investment, nearly 2 million cubic metres of ground were moved away and approx. 750 thousand cubic metres of concrete used to build the station. This is three times more than for the construction of the National Stadium in Warsaw. The tunnel external wall goes beyond 1 metre and the upper slab – up to 2.5 metres in thickness. Approx. 100 thousand tons of steel were used for building reinforcement and structural components; skylight elements over the station have an area of 17 thousand square metres.

Every day around 1000 people worked at this construction site, covering an area of 2 square kilometres. These figures clearly show how tremendous challenge this investment was when it started in late 2011. Its major aim was to revitalise and transform the

Lodz Fabryczna railway station, thus setting up a multi-modal hub to be incorporated within the cross-city line infrastructure. The Torpol – Astaldi – PBDiM – Intercon Consortium aimed not only to build the new station, but also to modernise railway tracks heading for Lodz Widzew with a length of approx. 2.5 kilometres as well as to construct a tunnel with a length of approx. 1700 m to handle long-distance, regional and agglomeration-generated traffic.

TUNNEL OF THE FUTURE

In late 2016, PKP Polskie Linie Kolejowe S.A. opened a tender for the construction of a tunnel connecting Lodz Fabryczna, Lodz Kaliska and Lodz Żabieniec. "Only when these two investments are finished, you will see the potentiality of the Lodz Railway Junction at the railway map of Poland," said Ireneusz Merchel, CEO of PKP Polskie Linie Kolejowe S.A., just prior to the opening of the new station.

Its construction will enable to thoroughly incorporate Lodz within the national railway network. Hanna Zdanowska, the Mayor of Lodz, believes that upon the construction of the cross-city tunnel connecting the said stations, Lodz has a chance to become a major interchange in Poland when it comes to railway transport.

The investment includes, among others: construction of a new rail link along with two new stops inside the tunnel: at the intersection of Zielona, Zachodnia and Kościuszki Streets ('Centrum' stop) and at the junction of Ogrodowa, Karskiego and Drewnowska Streets ('Ogrodowa' stop). The tunnel, already called a small tube by residents of Lodz, will be more than 4 kilometres in its length. Some works under the investment will be tunnelled by means of a drilling shield, 11 metres in diameter, others – by opencast. Railway tracks will go as deep as 30 metres underground.

Still, even now, you can visit Lodz to see its numerous attractions and, by the way, pop in at the newest and most modern railway station in Poland. ●



Photo: PKP PLK SA

20TH EDUCATION FAIR IN LODZ

2-3 MARCH

LODZ INTERNATIONAL FAIRS

UL. KS. SKORUPKI 21

WWW.TARGI.LODZ.PL

CESAR MILLAN, "LIVE ONCE UPON A DOG TOUR 2017"

3 MARCH

ATLAS ARENA, AL. BANDURSKIEGO 7

WWW.ATLASARENA.PL

"ŁÓDŹ STORY" – AN OPERA MUSICAL

4, 5 MARCH AT 6 PM

CONCERT HALL OF THE ACADEMY OF MUSIC IN LODZ

UL. ŻUBARDZKA 2A

WWW.AMUZ.LODZ.PL

POLISH CABARET NIGHT LIVE

10 MARCH AT 7 PM

ATLAS ARENA, AL. BANDURSKIEGO 7

WWW.ATLASARENA.PL

ANIA DĄBROWSKA'S CONCERT

10 MARCH AT 8 PM

WYTWÓRNIA CLUB, UL. ŁĄKOWA 29

WWW.WYTWORNIA.PL

PIWNICA POD BARANAMI, "TA NASZA MŁODOŚĆ"

13 MARCH AT 7 PM

THE GRAND THEATER, PL. DĄBROWSKIEGO 1

WWW.OPERALODZ.COM

MOSCOW CITY BALLET, "THE SLEEPING BEAUTY"

14 MARCH AT 7 PM

THE GRAND THEATER, PL. DĄBROWSKIEGO 1

WWW.OPERALODZ.COM

TOMMY EMMANUEL'S CONCERT

17 MARCH AT 8 PM

WYTWÓRNIA CLUB, UL. ŁĄKOWA 29

WWW.WYTWORNIA.PL

23RD FAIR – TOURISTIC SITES "WHERE CULTURES MEET"

17-19 MARCH

LODZ INTERNATIONAL FAIRS

UL. KS. SKORUPKI 21

WWW.TARGI.LODZ.PL

KULT AKUSTIK

18 MARCH AT 7 PM

WYTWÓRNIA CLUB, UL. ŁĄKOWA 29

WWW.WYTWORNIA.PL

THE BALLET HIGH SCHOOL AND GRAND THEATER'S BALLET IN LODZ'S GALA

23 MARCH AT 6 PM

THE GRAND THEATER, PL. DĄBROWSKIEGO 1

WWW.OPERALODZ.COM

THE CONCERT OF NIGHT OF THE PROMS

25 MARCH AT 7 PM

ATLAS ARENA, AL. BANDURSKIEGO 7

WWW.ATLASARENA.PL

ANNA MARIA JOPEK'S CONCERT

26 MARCH AT 7 PM

WYTWÓRNIA CLUB, UL. ŁĄKOWA 29

WWW.WYTWORNIA.PL

THE 70TH SESSION OF MUSICA MODERNA

27 MARCH AT 6:15 PM

CHAMBER MUSIC HALL OF THE ACADEMY OF MUSIC IN LODZ

AL. 1 MAJA 4

WWW.AMUZ.LODZ.PL

REAL ESTATE FAIR & HOUSE CONSTRUCTION/ INTERIOR DECORATION FAIR

1-2 APRIL

ATLAS ARENA, AL. BANDURSKIEGO 7

WWW.ATLASARENA.PL

17TH SCIENCE, ENGINEERING AND ART FESTIVAL

3-10 APRIL

WWW.FESTIWAL.LODZ.PL

20TH FAIR OF PHOTOGRAPHIC, FILM, AUDIO, VIDEO AND MULTIMEDIA EQUIPMENT

6-8 APRIL

LODZ INTERNATIONAL FAIRS,

UL. KS. SKORUPKI 21

WWW.TARGI.LODZ.PL

MARILLION WEEKEND

7-9 APRIL

WYTWÓRNIA CLUB, UL. ŁĄKOWA 29

WWW.WYTWORNIA.PL

1ST CLARINET AND BASSOON FORUM IN LODZ

21-23 APRIL

CHAMBER MUSIC HALL OF THE ACADEMY OF MUSIC IN LODZ

AL. 1 MAJA 4

WWW.AMUZ.LODZ.PL

5TH FAIR OF MILITARY LOGISTICS

9-10 MAY

LODZ INTERNATIONAL FAIRS

UL. KS. SKORUPKI 21

WWW.TARGI.LODZ.PL