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ANNA KRAWCZYK, EDITOR-IN-CHIEF

n 13 June, in Novotel hotel in Lodz, the conference called 'Lodz innovations and creations' will be held. It is part of the project called 'Lodz Creates Innovations – promotion of innovative solutions introduced by companies as well as research and development units in Lodz and the Lodz region'. Our special guest is Professor Andrzej Pawlak from Stanford University, who will deliver a lecture on niche innovation. We will discuss the issues related to the transfer of education to business and tell how innovations are born. Details of the conference (which you are welcome to attend) can be found at www.miastoinnowacji.lodz.pl/konferencja.

I repeat all the time that if you begin your business, it is a challenge that needs to be rationally dealt with – Janusz Piechociński, Head of the Ministry of Economy and ViceChairman of the Council of Ministers, states in our interview. Data from the Ministry shows that the share of R&D activities undertaken by the Polish companies grows. However, these actions, according to the European Commission, are still insufficient.

In spite of this, science can meet with business, except for the fact that a dominant party in this marriage is business. It was understood at the Lodz University of Technology, where the Technology Transfer Centre was established. – If doctors, doctoral candidates, students work on solving real technical problems and witness effective cooperation with business partners, then their conviction to take up business is not difficult – Professor Piotr Kula, PhD, Eng., Vice-Rector for Innovation at the Lodz Technological University, one of the founders of innovative HART-TECH company, thinks.

Having a significant part in the Polish horticultural production, the Institute of Horticulture actively participates in the creation of the European Research Area. One of the projects being implemented there is a comprehensive study on the quality and safety of fruits and vegetables prepared for immediate consumption.

A very important issue is the nutritional value of the food we eat – especially for people exposed to continuous stress. Unfortunately, this is part of our life. What is more important: heart or mind? Rationalise or allow for emotions? Probably a bit of everything. However, which approach is better in coping with stress? Ladies and Gentlemen, we welcome psychologist Ewa Klepacka and physiotherapist Jacek Sobol on 'Lodz creates innovation' board. In the first columns, they indicate how to deal with stress. This is especially true of people who move forward. As my friend, a coach, says: the only thing that is certain in life is change...

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A project co-financed by the European Union from the European Regional Development Fund European Funds for development of the Lodzkie Region





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The 21st century economy

Anna Krawczyk and Jarosław Zaradkiewicz speak to Deputy Prime Minister and Minister of Economy Janusz Piechociński.

Has Polish economy become innovative yet? If so, what are the symptoms?

There are many symptoms. The government's priority is to create an investor friendly environment, which means creating such conditions that will ensure positive working experience and promote innovation. We also encourage the collaboration of science and business. Although Poland's economic situation is a challenge, we monitor the market and its demands, and we respond by simplifying the law and adjusting it to meet the needs of an effective and innovative economy.

What activities does the Ministry of Economy undertake to achieve just that?

These are comprehensive efforts aimed at improving law--making process as well as implementing solutions that will facilitate business activities. Let me add that our solutions are based on the analysis of real life problems raised by entrepreneurs themselves.

The data provided by Central Statistical Office of Poland show that in 2012, expenditures in the R&D sector rose significantly (by over 22% in comparison with the former year). What is most important, however, is that businesses are increasingly more involved in financing R&D activities. This means that companies invest more and more in innovation and are not afraid to do it.

That really sounds optimistic. Which way, would you say, should supporting innovation in Polish economy go?

These directions are named, e.g. in the Strategy for Innovation and Efficiency of the Economy approved in January last year. The document is available at the Ministry of Economy's website and I encourage you to take a look at it. In order to carry out the Strategy's goals, the government also approved the Enterprise Development Programme until 2020, which will definitely be of great help, especially to the SME sector. In this Programme we can find the National Smart Specialisation document, which diagnoses the areas in the R&D and innovation sector, where Poland promises to develop exceedingly well and outrun competitive markets in Europe and elsewhere in the world. The aim is to achieve fast economic growth and create new and better work opportunities by enhancing innovative approach among businessmen. Implementing the latest technological

devices will be instrumental in this as well as supporting companies that make use of innovative solutions. Our role will be to promote the collaboration between businesses and business environment. Moreover, we

What is most important, however, is that businesses are increasingly more involved in financing R&D activities. This means that companies invest more and more in innovation and are not afraid to do it

will encourage large companies to invest in research and implement its results.

The driving force of Poland's economy is...

Export. Despite a slowdown on EU's markets, trade exchange rebounded in 2013. It is a very positive sign for our entrepreneurs and our market. Export, after all, underpins economic growth.

Since the beginning of the last decade, Poland's turnover has been systematically increasing in relation to GDP. Between 2001 and 2012 Polish export grew by nearly 3.5 times – from EUR 40.3 billion to EUR 143.5 billion. I see it as a great success and a proof of the international character of Polish economy. We expect 2014 to keep up the positive trends. As an aside, I will add that 2013 was supposed to be the most difficult year of the economic crisis. Despite that, stable economic policy, strong focus on the development of export and investments as well as the growth in consumption, made it possible to maintain this positive trend.

Obviously, this positive picture depends on external factors.

Germany's economic recovery gave a boost to Poland's export. At the same time, the gradual improvement in the industrial and building sector provided an incentive to the labour market. This, in turn, should encourage further consumption and ultimately lead companies into investing more.

I am convinced that the strong Polish economy and its optimistic looking future guarantee that investing in our country is profitable. That is why the world's biggest companies choose Poland of all European countries to invest in. Maybe, I will give you some data on that. According to Bloomberg's 2013 ranking, among CEE countries, we were the best place to do business in. Ernst & Young's 2012 European attractiveness survey concluded that within three years, Poland is going to be the most attractive place in Europe (right after Germany) to invest in. We have been improving business friendliness for years and as the result World Bank's report 'Doing Business 2014' listed Poland on the 45th place among enterprise friendly countries. Our country climbed 10 positions up in comparison to the last year's report. This makes Poland Central Europe's leading country.

What have we got to offer then, to encourage foreign investors?

We are perceived as an attractive country to foreign investors due to, e.g. well educated professionals and

INTERVIEW



relatively low, compared to other EU countries, labour costs. Boasting excellent education, our employees are valued around the world. As a reminder, I can say that in Poland, there are as many as five thousand higher education schools with over hundred thousand academics (half of which with a PhD degree). Investors searching for highly competent employees fit for all sorts of jobs (e.g. administration professionals specialising in IT technology or biochemistry) can find them here.

Let's return to the subject of Polish entrepreneurs. What does the Ministry of Economy do to help them develop new products?

As I mentioned before, supporting entrepreneurs is one of our key tasks. We propose new legal solutions to make running your own business easier. We also foster business environment and improve the economic situation of

our home businesses. For instance we have approved deregulation bills, which curb bureaucracy and eliminate needless procedures.

The Ministry has also taken a number of actions enhancing

our companies' competitiveness, e.g. industry promotion programmes. We hold regular meetings with international businessmen and administrators to discuss areas of cooperation. We spread awareness and build a positive image of Poland abroad. Our country has much to offer.

Business and science tend to cooperate nowadays. The meaning of technology transfer and research commercialisation is on the rise. Does the government take this trend into account?

I believe that promoting positive attitudes and market behaviour as well as good consumer-producer relations is exceedingly important in the modern world. This builds trust and ensures that the interests of all market players are secured.

Our entrepreneurs' potential relies on their innovative approach, talent, diligence and creativity. Running your

We are perceived as an attractive country to foreign investors due to, e.g. well educated professionals and relatively low, compared to other EU countries, labour costs

own business is not just a matter of profit making – although, obviously, this is one of the key issues. But, aside from money, businesses must exhibit corporate social responsibility. The Ministry's initiatives are a proof that business is a priority for us. I have always said that to be a businessman (especially at the start up stage) is

I have always said that to be a businessman (especially at the start up stage) is a challenge that requires a rational approach

attitudes towards innovation and removing any obstacles that this might incur. Additionally, we strengthen business environment, create

a challenge that requires a rational approach. So, in my opinion, people who set reachable goals for themselves and are consistent in achieving them should be valued particularly high.

Now, regarding corporate responsibility, an opinion perpetuated for many years was that the Polish economy is not yet ready to approach social and environmental issues responsibly. The reason given was that in Poland, companies had to fight for survival on the market. In the light of such opinions, it seems a good idea to seriously talk about corporate social responsibility, especially that this year we are celebrating the 25th anniversary of political transformation in Poland and the 10th anniversary of EU membership.

In the context of Poland's present economic situation, what does corporate social responsibility mean?

For business, the following are indispensable: recommendation, good opinion and trust. That is why I define corporate social responsibility as doing business according to similar precepts, accentuating the human capital in the production, distribution and consumption process as well as the responsible use of natural resources and protecting natural environment.

Implementing these practices translates into building trust and mutual understanding. Entrepreneurs gain much by observing them. They can influence their surrounding if they act according to such rules when dealing with contractors, investors, clients, as well as local authorities and society. We know from experience that when a company is involved in the life of its region and makes long term decisions regarding social investment, the result is efficient and peaceful working environment.

Another aspect of this is that trust and ethical approach in business can decide about the success of a given venture. Volkswagen factory location can be an example of good negotiation. The Volkswagen case proved that it is essential to get to know your contractor, learn to show your assets and work together to build a common ground for agreement.

Unfortunately for the SME sector, implementing latest solutions is not yet made easy for them. The obstacles include, among others, high costs and too many regulations, which hamper

business activity. So the scope of our work includes both the change in companies'

For business, the following are indispensable: recommendation, good opinion and trust

business environment, create comprehensive tools for entrepreneurs and we devote more and more money to subsidies.

What about effects?

My belief is that the Ministry's initiatives clearly improved the climate around innovation in Poland and helped strengthen the collaboration of business and the R&D sector.

What is the role of special economic zones in the development of Polish economy?

From the very start, these zones have attracted investors. You can see it in the stable number of entrepreneurs who want to be based there. The zones also became instrumental in creating work opportunities and making use of former industrial properties.

Foreign large scale companies that build in our country modern factories and broaden the services market make Poland a competitive market on a global scale. Moreover, the entrepreneurs who invest in the zones transfer latest technological developments and administration systems to Poland. Employees' competence improves and the percentage of people working in the hi-tech sector rises.

I am particularly happy that there are increasingly more businesses allowed to operate in these zones. In 2013 the number of such companies rose by over a half compared with the previous year. One of the key factors that made entrepreneurs interested in working within the zones was extending their operating period till 2026.

Is Poland really making a profit on this?

Let me remind you that in 2013 the accumulated value of the investment was over PLN 93.1 billion, which translates into 8.5% increase in comparison with the previous year. At the end of December 2013, investors employed altogether 266.7 thousand workers, out of which 73.5% were work places newly created by entrepreneurs allowed to operate and invest in the zones.

We also support solutions allowing business clusters within the zones. It might be an important asset for local authorities in terms of investor attractiveness. Industry specialization might be a landmark of a given region setting it apart from another one. Cluster development might turn out to be a driving force of economic activity inside the zones. It might also secure long term profits

for businesses operating within them.

Thank you.

SCIENCE

by Jacek Brylski Fruity Skierniewice

There is one city in Lodz voivodeship that is associated with horticulture by every Pole. Without a trace of doubt, people will say Skierniewice. Here, you will find Research Institute of Horticulture established in 2011, which draws on a vast experience of other research institutes based in Skierniewice.

he research programme of the Institute covers all fields related to horticulture, i.e.: fruit, vegetable and ornamental plants' production, biotechnology, the protection of plant genetic resources, fruit and vegetable processing and storage as well as food safety. The Institute is recognised globally for its innovative solutions, which largely contributed to the development of horticulture in Poland. Over 200 varieties of fruit and vegetables have been bred here and they play a meaningful part in horticultural production in Poland.

Research Institute of Horticulture is actively engaged in developing European Research Area. Presently, it participates in the European Union's 7th Framework Programme, Innovative Economy Programme and in many other projects supported by the National Centre for Research and Development and National Science Centre.

MENU FOR THE ELDERLY

When you think horticulture, you probably think gardening – cultivating ornamental plants, vegetables and fruit trees. However, in Skierniewice they are paying more and more attention nowadays to processing fruit and vegetables.



Prof. Franciszek Adamicki, PhD – the Director of Research Institute of Horticulture

One of the projects addressing this issue is about creating optimized food for the elderly. In our ageing societies, both in Poland and the rest of the European Union, this social group is growing. To address the problem adequately, the European Commission will finance large-scale research under the 7th Framework Programme. The leader of the project is French National Institute for Agricultural Research. The European Union will cover two thirds of the total budget of EUR 4.5 million. Apart from Research Institute of Horticulture in Skierniewice, there are 20 other entities involved. Among them are, e.g. Medical University of Lodz and Ernest Adam Michalski – a proponent of wild rose products.

The aim of the project is to create a variety of food products suited to the needs, habits, eating preferences, limitations and fitness of the elderly. The basis of such food is mainly fruit and vegetables, which should play a major role in the diet of the elderly. Scientists have come up with recipes for solid food products which would be soft to eat and recipes for fruit juices, which sometimes include lesser known fruit rich in health-boosting nutrients. The scientists maintain that products they created will enhance the health of the elderly by preventing malnourishment caused by a decline in physical fitness and the loss of appetite.



Freeze-dried raspberry and currant fruit waiting for their bio-active elements to be determined

SAFE MENU

Another project financed by the European Union under the 7th Framework Programme covers multidimensional research on how to improve the quality and safety of ready-to-eat fresh vegetables and fruit. Research institutes spread around Europe are involved in this project. Apart from Skierniewice



Laboratory assessment of the shelf life of chopped ready-to-eat napa cabbage

Institute, other partners are based in Italy, Greece, Portugal, Israel, Great Britain and the Netherlands.

The aim of the research is to improve the quality and hygiene of chopped vegetables and fruit throughout the production process. The Institute's task will be to develop innovative technology facilitating the preparation process of chopped vegetables such as melon, rocket (arugula) and napa cabbage. They are also studying the influence of hot water on the quality and shelf life of chopped vegetables.

The scientists from Skierniewice emphasize that you can lower the risk involved in food production and improve nutritional value and taste of food products by proper planning and production management, implementing innovative technologies as well as new, effective microbiological and chemical food testing methods.

Research is only one of the areas that the project covers. Another aim that it tries to achieve is raising consumer awareness, which in turn will lead to increasing people's influence on the quality of products available on shop shelves. Introducing new legal provisions and quality--ensuring solutions will facilitate trade and enhance properties of minimally processed food products.

CURRANT HARVEST

If you own a currant or a blueberry bush, you are well aware of how tiresome and tedious harvesting the crops might be. Gathering the fruit from your own garden will reward you with vitamin-rich juice, but harvesting on large fields is another story. Until recently, big food processing companies used to employ legions of seasonal workers to gather fruit. Research Institute of Horticulture together with a commercial company Jagoda (Blueberry) are working on an innovative full--row self-propelled harvester to gather fruit from small berry bushes, so common at modern commercial farms. This project is financed by the National Centre for Research and Development under the Innotech Programme. Its aim is to help research entities and businesses join forces and help transfer science into commerce. Although there are already harvesters on the market, which are adapted to gathering fruit from bushes, they are not perfect. The new harvester will be equipped with, e.g. a hydrostatically propelled carrier, float system for scooping up and shaking off fruit and new type of heads for shaking off fruit. In terms of mass, the new machine is going to be half of today's harvesters. The price will be reduced as well, which translates into greater accessibility to fruit farmers. It is worth mentioning that the construction of the harvester's prototype will be preceded by investigating operating parameters and power indicators of the main operating sub-assemblies.

SCIENCE

by Jacek Brylski

A school of success

Young, creative, full of inspired ideas, but sometimes lacking the know-how to fulfil them. It is precisely for such people that the Interdisciplinary School of Innovation at Lodz University of Technology was created. The first edition of the programme started in October 2013 and it has already spurred the development of spin-offs, i.e. companies that separated from the parent body in order to transfer scientific and technological knowledge into commerce.



he school invites, among others, enterprising engineers specialising in all sorts of fields, medicine and market specialists, economists, lawyers and patent attorneys. The programme is aimed at supporting scientists, PhD students and the students of Lodz University of Technology. Under the supervision of instructors, they will be developing new business solutions and setting up innovative companies. On joining the programme, you don't need any ready-made business plan; it is enough to have motivation, challenge oriented

personality, an open mind, creativity and willingness to develop yourself. Classes are free of charge.

MODELLED ON THE US

The Interdisciplinary School of Innovation (ISI) is a project carried out by the Technology Transfer Division at Lodz University of Technology in collaboration with Technology Transfer Centre at Lodz University of Technology LLC. ISI was first thought of during a visit of the University's researchers in the US. In that country, projects aimed at creating spin-off companies are very popular. Their dynamic growth started in the late 20th century, whereas in Poland such ideas are at their hatching stage.

The authors of the programme describe ISI as a project that helps enterprising and creative people get together, trains them and then facilitates the development of innovative solutions ready to introduce into the market.

One of the aims of the programme is to stimulate, support and foster academic entrepreneurship. It is expected that the efforts will lead to establishing new spin-offs and assist in early stages of high--growth companies. Other goals include making science more popular, establishing partnership with commerce, promoting innovative solutions and their implementation. ISI also helps with the logistics and shares the know-how with would-be spin-offs. Such companies can expect support, also in terms of finding sources of financing.

THREE STAGES

ISI's programme consists of three stages. First, you attend courses, workshops and meetings with experts in law, the protection of intellectual property, business plan, marketing, financing, research and its commercialisation. At this stage, the participants will understand the role of market in innovation and will learn how to overcome barriers preventing people from establishing their own business. Moreover,

ISI's coaches share their knowledge about the following subjects:

- elevator pitch,
- financing innovative ventures,
- innovative company management,
- team management,
- time management,
- · project management,
- business plan and marketing,
- · coaching and mentoring,
- legal aspects of operating a business,
- innovation and technology transfer,
- intellectual property management,
- intellectual property protection,
- technology evaluation,
- implementing innovation in practice,
- brand management,
- design thinking.



they will know how to choose a successful strategy for commercializing technology and find a business partner. You can also learn how to legally proceed with the protection of rights to your own original inventions.

In the second stage, using their knowledge about innovation, participants will form interdisciplinary teams, which will come up with prototypes as the basis for their start-up businesses. Throughout the programme, the participants will be in touch with entrepreneurs and business institutions. The third stage is incubating the best ideas.

INCUBATION ZONE

The most daring ventures can count on an additional incubation backup in a special Zone of Lodz University of Technology based in Lodz Technopark. A special agreement to create favourable start-up conditions for spin-offs was signed by Lodz University of Technology, Technology Transfer Centre at Lodz University of Technology LLC and Lodz Technopark.

Thanks to the agreement, entrepreneurs starting up their business have an easy access to top quality office infrastructure and (courtesy of Technology Incubator at Lodz Technopark) receive information about offers dedicated to spin-offs. All these efforts are expected to lead not only to transferring science into commerce but also help diagnose Polish economy and its concerns, and make it more competitive.

SCIENCE



by Jarosław Zaradkiewicz

Regulated transfer

Academic world pays more and more attention to the transfer of its achievements to business. In other words: for the purpose of commercialisation of research. Almost every academic institution creates technology transfer centres. In the voivodeship of Lodz, only the Lodz Technical University has founded an external company that operates on the basis of the Higher Education Law.

cientific minds have decided to approach the issue of commercialisation of research with due seriousness and under existing procedures. While other academic institutions form the interior units for the promotion of cooperation of scientists with enterprises, the technical university – to meet the expectations of entrepreneurs – has set up a special purpose entity called Technology Transfer Centre of Lodz University of Technology LLC (CTT).

CTT has already existed for five years and can boast of significant achievements.

TARGETED ACTIONS

The commercialisation of research results at the Lodz Technical University and all forms of cooperation with business take place exclusively through the centre. The adaptation of such an assumption has clarified the principles of cooperation of scientists with business.

The aim of CTT is to enable the transfer of intellectual knowledge to business in the form of a license to facilitate the use of inventions or know-how, as well as to sell the rights to technology. The purpose of the centre is also the creation of spin-off companies. At the academic institution company, both scientists and entrepreneurs can get advice on the effective establishment of cooperation and its funding.

The strong point of the Technology Transfer Centre is close cooperation with the Lodz Technical University. The support of academic institution is based on the knowledge of experts, timeless reputation of services and a huge pool of knowledge, innovative technologies and capabilities.



Paulina Kosmowska, the President of CTT

Daily work of the centre comes down to cooperation with scientists for the purpose of preparation of technological offer and assistance in search of the recipients of developed technologies. - In practice, it looks that we follow the research and projects carried out by scientists from the technical university, and the university staff report to us their projects and results - explains Paulina Kosmowska, the President of CTT. She also emphasizes that, despite the passage of years and the work of many people, there are still barriers in relations with science and business. Academics are not always interested in the commercialisation of research results, thus often ending them on the laboratory stage. This, in turn, disturbs entrepreneurs who complain that the projects are not ready for immediate implementation in their business activities, and the process of their testing and implementation requires considerable funding.

The scientists reporting to the centre can count on support in the negotiations on the commercialisation of research and help in legal and financial services. In turn, the entrepreneurs seeking solutions for their companies will meet with understanding and efficient cooperation. The most common form of cooperation of the technical university staff with entrepreneurs is license agreements. Owing to them, companies can commercially exploit research carried out at the academic institution, and academics can reap financial benefits. There are dozens of such contracts concluded through CTT on an annual basis. The time of their negotiation and implementation depends on the complexity of research.

However, the center is most interested in creating spinoff companies. So far, two such companies have been established. Currently, the advanced works are carried out to establish a third company.

SERIOUS SUCCESSES

The phenomenon of the commercialisation of technology and scientific knowledge through spin-off companies have only recently arisen more interest in Poland. A typical spinoff company is the one whose products have been created on the basis of innovative and mostly protected technology.

Academic entrepreneurship is a very important part of the market. Especially, in the era of the development of the idea of knowledge economy, academic centres attach the increasing importance to building broad relationships with business world, the development of modern technology and the search for effective paths of knowledge transfer to the industry.

Spin-off companies are one of the most beneficial forms of commercialisation of research. Scientists themselves are involved in such projects, and the results are contributed in kind to emerging companies. Spin-off companies are part of the academic enterprise. They give the opportunity to act independently through own business activity. They reap benefits from the support of the academic institution through infrastructure and experts, as well as provide the development of scientific interests. Such companies operate close to the scientific community, which gives them advantageous position on the market in terms of innovation and market attractiveness.

STATE SUPPORT

CTT of the Lodz Technical University treats its mission seriously. This attitude was recognised by the National Centre for Research and Development. The SPINTENSE project called 'Intensification of Commercialisation of Science and Technology' of Technology Transfer Centre is on the list of proposals recommended for funding in the 1st Competition of SPIN-TECH Programme, organised by the National Centre for Research and Development. The aim of the programme is to yield support to the operations of the Special Purpose Entitites, created by state research units, in particular those set up by academic institutions to commercialise the results of research and development works, i.e. such as CTT.

The design of the centre, the only one in the Lodz Voivodeship, has been evaluated positively by the team of experts.

The development of the project will allow to collect and catalogue information about the potential and technological offer of the Lodz Technical University in a form friendly for entrepreneurs. As a result, it will be possible to fully extend the professional offer beyond the academic institutions, i.e. to business, and successfully commercialise university technologies. The activities planned under the three-year project will contribute to the development of the company, but, above all, will provide added value to the cooperation of the Lodz Technical University with economic environment.

SPINTENSE programme is one of the components of a coherent innovation policy of the Lodz Technical University.

SCIENCE

by Jarosław Zaradkiewicz

Medical patent



Academics can benefit from their research in two ways – by establishing spin-off companies or granting a licence for using the results of their research. The second solution was applied to innovative technology in the field of biomedicine, used by Medical Magnus Clinic.

edical Magnus Clinic is a modern, multidisciplinary medical centre operating in the Lodz market since 1987. The clinic specialises in the field of orthopaedics, rehabilitation and sports traumatology. The institution also renders services in neurosurgery, cardiology, plastic surgery and occupational medicine. The specialists working there use the most modern methods of treatment and rehabilitation, as well as have access to world-class medical and rehabilitation equipment.

THEY TAKE CARE OF JOINTS

In 2004, on the premises of the institution, a Hospital Branch as well as Orthopaedic and Trauma Surgery Outpatient Clinic were established. There, the specialists perform arthroscopy of knee, ankle, elbow and shoulder joints as well as operations in case of locomotor injuries (tendons, cruciate ligaments, bones, joints), so-called knee prosthesis as well as repair and corrective operations. At Medical Magnus, a full range of physiotherapy, kinesis and massage treatments are available. The institution has its own biomechanics laboratory, where, with extreme precision, the condition of muscular strength and balance of the body can be determined. This greatly facilitates the targeted rehabilitation after injury or surgical treatment. The Centre also has one of the few in Poland apparatus, which quickly helps to restore physical fitness.

Knowledge and skills of Medical Magnus staff are appreciated by athletes. The Clinic works with many associations and sports clubs (including the Polish Association of Athletics Federation), with the Polish Olympic Committee as well as the Olympic and Paralympic representations. A team of specialists of the Clinic can boast of numerous successes in recovering the famous masters of sport to their best form. The crowning achievement of these activities is winning the fourth edition of 'Lodz Proposes – Innovative and Creative' competition in the category of Innovative service.

INNOVATIVE CELLS

The Clinic multiplies stem cells with the support of research conducted at the Lodz University of Technology. The cells have a special ability to 'fix' damage occurring in different tissues on an ongoing basis. Stem cells are mostly found in a bone marrow and peripheral blood, and their production is increased further after injuries. They are the only healthy body cells able to divide in a limitless number. Therefore, the cells are immortal and self-renewable. On the other hand, they have the capacity to differentiate into other cell types. Stem cells are used, among others, in the treatment of orthopaedic diseases, including injuries to bones, cartilages, muscles or ligaments as well as knee, hip, shoulder, ankle and feet joints disorders. In Poland, the first person who used this unique method of treatment was orthopaedic traumatologist, Doctor Marek Krochmalski of Medical Magnus. - This is not a miraculous method. Medicine has just decided to exploit the potential of medicine to treat own body damage - the doctor who has already conducted about 300 such operations explains.

Owing to the research conducted at the University of Technology, Medical Magnus has proved that there is a possibility to transfer knowledge to business and to cooperate in such distant fields of science as engineering and medicine.

COLUMN

BY EWA KLEPACKA, JACEK SOBOL



t is impossible to eliminate stress out of our everyday life. We do have, however, influence on how we evaluate stressful events and how we experience emotions caused by them.

Somebody once said that the only certain thing in life is change. It is indeed constant change and hard work that underpin success, not least when you are starting up your own business from scratch. You are conscious of this, you accept it and yet... an alarm clock in the morning, a piercing thought about the day's work and... you would rather stay in bed and have a long lie-in. Life calls you, so you get up. Your brain moves into top gear. As in the most advanced lab, chemical processes start off ensuring maximum effectiveness. Your heart starts to beat stronger, your breath accelerates, muscles tense, concentration increases and your sight and hearing sharpen. It is either fight or flight - your body tells you. But exactly which of the two depends on you... on how you rate your chances. Let us add to this: difficulties at work and in your relationship, financial problems and other trying moments familiar to all of us. The result is that our stress warning system is constantly on the watch.

According to Achim Peters, the author of 'The Selfish Brain' (original: 'Das egoistische Gehirn'), the brain is the hatching place of stress. Our body is governed by simple rules: seek pleasure and avoid pain/sorrow. The brain makes everything complicated: it analyses, evaluates, attributes meaning, remembers, predicts and... consumes a lot of energy while doing that. When it runs out of energy, however, it turns on the internal stress system. In the evolution of vertebrates, the mechanism served survival purposes, but once the danger passed, it became dormant again. Today, it works nearly always at full steam. And that is precisely the

Do not fight stress, but manage it – using your heart and not the brain

reason why the contemporary world seems so stressful. The brain decides what is a threat and the body reacts by giving unpleasant sensations. What do you do with it? You downplay your body's signals, freeze emotions or anaesthetize yourself with sedatives. You diminish or exaggerate stressful events, relocate aggression or inflict it on yourself. You close your heart while your body 'writes down' all disregarded emotions and unfelt feelings as tensions. Too many of them and you become ill.

Discover the stress biography of your life. This is your personal book, where all trying events and your stress system's coping ability are all written down. The most distressing of these moments is your Achilles' heel. It is a wound received in childhood fuelling, e.g. the fear of rejection or the fear of being unimportant. Make a list of the things that upset you most and choose one that makes your heart rate increase. Discover the emotions that accompany it. Feel instead of think. Experience these emotions in their entirety. Do not be ashamed and do not try to find a solution until your breath becomes once again even. Obey your body: cry, if you want, shout, stamp your feet, go for a walk or jogging if this will help reduce your tension. Release the energy inside your body. Do not resort to the 'head', but trust your body - it knows what is best for you. Do not try to change people or the world. Instead, attenuate the significance of stressful events. Things that happen to you are neither good nor bad. It is the meaning that you attribute to them that causes stress. Do not fight stress, but manage it - using your heart and not the brain.

ECONOMY

BY JAROSŁAW ZARADKIEWICZ Pioneers of commercialisation

If doctors, doctoral candidates, students work on solving real technical problems and witness effective cooperation with business partners, it is not difficult to persuade them later to take up a business challenge – Professor Engineer Piotr Kula, vice-rector for innovation at the Lodz Technical University, one of the founders of innovative HART-TECH company, says.

he company was founded three years ago. – We worked with students, dealt with the development of technology. We came to the conclusion that, if we teach students how to get into business, we can enter the market alone – this is how Doctor of Science, Robert Pietrasik, the President of the company's management board, recollects the

company's beginnings. Originally, it was founded by three lecturers at the Lodz University of Technology. Later, the company was joined by the Technology Transfer Centre (CTT) as a shareholder and several other individuals. CTT made a contribution in kind to the company in the form of technical ideas and patents developed at the Lodz University of Technology.



Modern vacuum furnace performing complex processes of surface treatment with the use of innovative technologies



Sylwester Pawęta, the Operations Director of HART-TECH

he classes for students are conducted at the company's headquarters. They enjoy great popularity, as evidenced by one hundred percent attendance. The students have the opportunity – as part of heat treatment lab – to see a heat treatment plant functioning on the market, in terms of available modern

technology as well as organisation and management. The participants select technological solutions, depending on the requirements specified above, use the latest achievements in the field of computer simulation to the design of processes, and then check the results of their work in a research lab.

HARDENING SKILL

HART-TECH is a modern company operating in the sphere of advanced heat treatment technology and thermochemical treatment. It has the facilities allowing the implementation of processes using latest technologies (conventional and vacuum). The services offered by the company are focused on the changes of surface properties of metals. The company deals with, among others, hardening, carburising, nitriding, sulfonitriding, steel tempering, supersaturation and aging, steel annealing and vacuum brazing. The company's portfolio also includes the production of hardened surface layers on machine parts and tools with the use of innovative material and technological solutions.

The company is developing very dynamically. It has been accredited with ISO 9001 and is preparing for other accreditations, which will allow the delivery of components to the automotive and aerospace industries. Currently, HART-TECH employs 14 people, some of whom are workers and graduates of the Lodz University of Technology.

MODERN TECHNOLOGIES

All the services rendered by the company are based on the technology developed by its shareholders. – I am glad that, in addition to developing information technologies, as part of reindustrialisation, manufacturing processes at the highest world level return to Poland, to Lodz. This process follows our own, original technical thought – Professor Kula says.

The basis for the operation of the company is FineCarb and PreNitLPC technologies, protected by Polish and foreign patents. Their co-creators are scientists working at the Institute of Materials Science and Engineering at the Lodz University of Technology. They are also the company's shareholders. The technologies used by HART-TECH have several advantages over currently most widely used technical knowledge in the industry: they allow to obtain better strength properties of the products, while maintaining competitive pricing, and are more ecological as compared to other technologies.

SIGNIFICANT CUSTOMERS

As emphasized by the directors of the company, the process of clients' acquisition from scratch is tedious. However, the company already boasts of a huge range of recipients of services. They include: the company producing drives for lifting equipment and the company that makes springs – from those used for winding wire in vacuum cleaners to those used for tensioning catenary wires. The company also executes the orders for the enterprise producing forgings for home appliances and for many companies from Silesia, providing accessories for railway industry or tools for recycling. – For us, every customer is important – the ones who bring 10 kg of steel to harden and the ones who send 6 tons of steel by TIR lorries – Robert Pietrasik underlines.

Photo: Paweł Ławreszuk



BY JAROSŁAW ZARADKIEWICZ

They rely on optical fibers

The strength of our company is people and innovation – emphasize Technitel partners. The company focuses on new technologies that provide customers with more interesting and more economical solutions, offering better opportunities and a greater range of services than those used previously.

itnessing the potential of the telecommunications market in Poland and Europe, nine years ago, Tomasz Klimkiewicz and Rafał Rodziewicz decided to establish a company specialising in the construction of optical fiber networks and offering services in the field of technology and telecommunications. The combination of these two industries gave rise to Technitel name. The crowning achievement of these activities is winning the fourth edition of 'Lodz Proposes – Innovative and Creative' competition in the category of Innovative service.

IT services market is highly developed in Lodz, where dozens of companies in this industry operate, and the most serious of them – including Technitel – are concentrated in the ICT Central Poland Cluster. The presence of so many companies causes that they represent serious force. Some – such as Technitel – were created on the basis of personal experiences and passions of their creators, others are the subsidiaries of global brands. Finally, the city that was not associated with the potential growth of information technology has become a powerful player in the IT industry.

OUT OF OWN POCKET

In 2005, assistance programmes for Polish enterprises were not as developed as they are now. The company owes its establishment to private money of its founders, who could count only on themselves, and the support of their families. – We were strongly supported by our families, who forgave us our absence at homes and private funds were involved in the project – recollects after years Rafał Rodziewicz, the Vice-President of the company.

The directors of Technitel mention that the only challenge faced when setting up the company was a rapidly growing market which made it difficult to keep pace with the changes. The company was formed as a result of meetings and exchange of experiences on the directions of development of the telecommunications market. The shareholders decided to tie their future just with this area by observing the dynamics. Today, the company is implementing innovative and modern technologies, and the biggest success considered is the creation of dynamically growing groups of companies operating in the ICT market.

Currently, Technitel tries to actively participate in obtaining EU funds and promote awareness about their acquisition. It co-organises a number of training



Rafał Rodziewicz, Vice-President

courses and conferences devoted to the subject, among others, with the Institute of New Technologies and Lodz International Fairs. The company implemented the project called 'Implementation of modern ICT tools in the Technitel company in order to introduce on-line sales' under the Regional Operational Programme of the Lodz Voivodeship for 2007–2013, co-financed by the European Regional Development Fund. Now it participates in the project called 'Passport to Export', organised under the Innovative Economy Operational Programme.

FROM LODZ TO THE WORLD

From the outset, the aim of the company has been to provide comprehensive customer support during the implementation of investment and operation, including technical, telecommunications, ICT and electricity infrastructure. The company offers integration services in ICT solutions – from concept development, through full service design and construction to the maintenance of data networks. It specialises in optical fibers, but it can build networks in all available technologies, including the supply of materials,



equipment, services and Data Center construction. Technitel operates all over Poland, as well as outside its borders.

The company primarily associates its business with the telecommunications, energy and utilities market. Quite a large part of the offer is also directed to local governments and public administration. Recently, the company has also been promoting outsourcing services for the enterprise sector and office market.

Recently, Technitel has made many key investments, among others, for the companies and institutions like: PGE, Energa, PGNiG, Orlen, Exatel, the Municipal Office of Lodz, the Municipal Office of Pulawy, Voivodeship and the Marshal's Office in Lodz, Municipal Water and Sewage Enterprises in Krakow and Warsaw.

Technitel is known for innovative solutions, implemented to meet the customers' needs. These include the technologies like: broadband suspended networks based on the energy and lighting foundation, construction of broadband networks in sanitary and storm sewage system with the support of an automated robot, the construction of optical fiber microducts and passive broadband networks.

HUMAN POTENTIAL

Although the company is dynamically developing on the market and minimizes our role, it would not exist without us. Currently, Technitel provides employment opportunities for approximately 100 people.

The company recruits employees through advertisements and performs a continuous recruitment of students for placements and internships. Since 2009, the company has had its own programme of internships and the agreements signed, among others, with the Faculty of Technical Physics and Applied Mathematics of the University of Lodz.

All the time the work is supervised by partners: Tomasz Klimkiewicz and Rafal Rodziewicz. The President of the board of the company is Klimkiewicz. He is an expert in the field of optical fibers, has years of experience in the design, construction and maintenance of networks. The President of the Board has a soul of an innovator and originator of many of the technologies applied in the company. Rodziewicz is the Vice-President of the Board. For many years, he has led procurement processes, sales, trade and marketing. He actively participates in the operations of the Ministry of Administration and Digitization and the Office of Electronic Communications.

Partners want to continue to develop the company and introduce to its offer the products and solutions that are unique to customers. When asked how Technitel will look like in the future, they answer: 'We will be the leading provider of broadband solutions for major sectors of the economy in the country and Europe'.



Self-driving cars, fuel-saving engines of trucks and driver assistance systems. Lodz engineers work on such future technologies in the TomTom R&D centre.

he company's Polish office was opened in 2008, although its navigations were already available on the market. The first device officially presented was the GO 630 navigation. Since then, the company has produced more than 30 new devices and modifications to the existing models. Currently, in Poland, TomTom has six official GO navigation series, two devices of the Via series, three navigations of the Start series, navigation applications for smartphones, built-in navigations for Fiat, Renault, Mazda, Lexus, Toyota and Opel, as well as portable navigation systems tailored to the needs of truck drivers, motor caravans and motorcyclists. The company offers special sport watches – TomTom Runner and Multi-Sport for runners and sports enthusiasts.

FAVOURABLE ENVIRONMENT

In Lodz, TomTom has its own R&D centre. For 12 years, a team of engineers has been developing MoMa (mobile mapping) technology and acquisition of navigational data from visual and laser messages. The company uses the most modern techniques of artificial intelligence and applies the advanced methods of signal processing. The solutions developed by Lodz team of TomTom are protected by 20 patents and over 100 patent applications. The decision to locate and develop the company branch in this city is associated primarily with TomTom's takeover in 2008 of the Belgian company providing TeleAtlas digital maps. The company also operated in Lodz. – For a long time, the IT sector has been rapidly developing in Lodz. Many technology companies have brought their centres and offices to this city. As a result, the technological centre has been established. The companies cooperate among themselves and can exchange their own ideas and experiences. All this is conducive to the further development of the IT sector and TomTom company. Lodz offers very good conditions, also for the creation of favourable business area. In addition, we have a lot of capable candidates for the job – Krzysztof Miksa, Director Engineering Content Production TomTom, explains.

THE POWER OF ENERGY

TomTom Centre in Lodz employs 430 employees and contractors, including programmers, analysts and testers. The company employs more than 150 engineers engaged in software development, testing, processing of signals and images. It is one of the most innovative workplaces in Poland, where clients can come into contact with future technologies, e.g.: production of data for autonomous vehicles, data for motor control systems allowing to save fuel (gradient), data for systems that support drivers in driving their vehicles. TomTom, as a technology company, needs primarily the engineers with experience and open to new technologies – at the beginning of their career in IT. TomTom branch in Lodz also produces digital maps. Therefore, it willing employs graduates of such fields of studies as spatial development (working with GIS software), geography and geoinformation.

– In Lodz, we have excellent graduates of technical fields of studies, who often gather experience already during their studies. Students with professional experience in commercial projects no longer arouse astonishment. They look for jobs that allow to pursue their passions and interests. They rely on flexibility and opportunity to interact with the latest technologies. Lodz, being the center of IT, also attracts candidates from other locations. Such changes show how the city develops. Our employees are creative, full of energy and enthusiastic about their work. Some of them were ready to change their place of residence in favour of Lodz – Krzysztof Miksa says.

BELIEF IN YOUNG PEOPLE

Since this year, the company has begun working with the Municipal Office of Lodz and has been engaged in an internship programme called 'Youth in Lodz'. – We believe that the promotion of Lodz initiatives is very important. We conduct, among others, technical trainings for students under the programme called 'Youth in Lodz'. Every year, we are also present at the Academic Job Fair, organised by the Lodz Technical University. This year, we ran three training sessions for students, among others, 'cloud' technology and management of IT projects. We believe in young people

TomTom in numbers:

- TomTom maps cover 116 countries
- current information about the traffic (Traffic Service) is available in 36 countries
- the company employs 3.6 thousand employees in 52 offices in 35 countries around the world
- since 2004, TomTom has sold more than 75 million navigation devices
- since 2009, the company has sold over 3 million built-in navigations to automobile corporations
- more than 350 thousand professional drivers use the services of Webfleet management.

The beginnings of the company

TomTom is one of the largest manufacturers of navigation solutions, including car navigations, mobile applications and solutions for managing fleets of vehicles. The company was founded in Denmark in 1991 as a small start-up entity, the aim of which was to create software for mobile devices. The founders of the company were: Peter--Frans Pauwels, Pieter Geelen, Harold Goddijn and Corinne Vigreux, who continue to work for TomTom. Currently, the company's head office is located in Amsterdam.

In the initial period of its business activity, the company focused on creating mobile applications targeted to the business sector, e.g. applications allowing to read-out bar codes, telemetry applications allowing for remote reading and downloading data from measuring devices (e.g. water meters, gas meters) and registration systems of orders. Already in the late 90s, the company achieved a good position in the navigation software by introducing several applications, among others, Enroute (later renamed Routeplanner) and urban navigation applications.

and their skills. Therefore, we willingly support them to acquire such qualities – Krzysztof Miksa adds.

This year, TomTom is also launching its own project of holiday internships - TomTom Interns on Track Program. These will be three-month internships for students who want to broaden their competence in programming, testing, IT support, technology support or working with GIS software. During the internship, the programme participants will establish their goals with their managers, undergo training, will be involved in a big project or get the opportunity to lead an independent project. - We want the programme to be valuable and hope the students will learn from us as much as possible. In addition to gaining technical skills, trainees will have the opportunity to familiarise with the work in a large international company. We want the students to be aware that they have a real influence on the performance of their teams and that their views are taken into account. We believe young people and focus on their development - Krzysztof Miksa says. - We always try to keep a balance and be happy with our work. We believe that people form the most important part of the company. Therefore, we invite all candidates. With us, you will not only brew coffee! -Krzysztof Miksa points out.

ECONOMY

by Jacek Brylski

Finances under control



Is it possible to be in the vicinity of Wall Street or the City of London when working in Lodz? Why not? The programmers working at Rule Financial design and deliver solutions for global financial customers, trading, among others, on the major stock exchanges of the world.

arcus Rule founded the company in London in 1997. Ten years later, he opened his first branch in Poland. The choice fell on Lodz. – We chose this city mainly due to the availability of skilled IT staff, as well as renowned academic institutions, to which we owe well-prepared candidates for jobs – Dorota Sadowska, responsible for the company's PR, says.

Today, throughout the world, the company employs about 800 people in the offices scattered from New York to Costa Rica. Nearly half of them work on a permanent basis just in Lodz.

START WITH AN INTERNSHIP

Rule Financial is an international IT company that develops software for the clients of investment banking sector: banks and investment funds as well as brokerage houses. The company employs mainly programmers who participate in the leading IT projects as well as software development, analytical and application support teams, with wide experience in technology and mechanisms of capital markets.

Rule Financial employs many graduates of the Lodz's higher education institutions. It also runs its own training programme. – Higher education institutions provide students with the most important academic backgrounds. On the other hand, there are not enough practical elements of science in the curriculum. And here is the moment where we appear, i.e. employers. Recruitment talks are a kind of confrontation with the world of business – Dorota Sadowska stresses out. A large proportion of students is doing well with this skill test.

The company provides training, technical courses, internships and apprenticeship programmes. Rule



Financial Apprenticeship Programme lasts three months and consists of 60 technical, soft and business trainings. All the trainings are conducted in English. In addition, the participants of the programme form together a project under the supervision of specialists. The programme is designed to teach students to work in groups, transfer good practices in software development and show what the design work looks like in a real business environment.



Many trainees consider staying with the company in the future. – I have wanted to become a developer. During the trainings I took as part of the internship programme, I decided that my more interesting path of development would be Quality Assurance and tests automation. After completion of the internship and joining Rule as an employee, I joined the test group working on the project carried out for one of the largest investment banks in the world – the company's employee says.

THE COURSE TOWARDS LODZ

Rule has settled in Lodz for good and has seriously treated its presence there. It organised Lodz IT specialists' test together with other IT companies and the Technical University of Lodz. The idea behind the test is to meet students' expectations about employment in large IT companies and participation in recruitment process. Participation in the test gives students the opportunity to test their knowledge in terms of realistic expectations of employers. From year to year, the test has been taken by more and more students, and its results satisfy employers increasingly.

Rule's involvement in Lodz reality is also evidenced by participation in the ICT Central Poland Cluster. It brings together representatives of business and telecommunications sectors, higher academic institutions

ECONOMY



and business environment units. As part of the ICT cluster, there are working groups, e.g. education teams, whose tasks are to cooperate with information technology faculties of the Lodz Technical University and recommend changes in the curricula. – What inspires us to engage in such cooperation is our recruitment experience. This proves that, as a business entity, we are able to enrich the curriculum with practical elements – Dorota Sadowska says.

NOT ONLY A JOB

Rule Financial is a prestigious combination of IT and high finance world. Working on such projects allows to 'look' into the world of capital markets. The company's software is delivered to Wall Street and to the customers in the City of London. Rule emphasizes the technical and business development of employees – We offer them a copyright programme for the development of Career Management System competence. Each of them has an assigned career manager, who sets up individual career goals. We finance technical, soft and business trainings, technical certification exams and participation in prestigious industry conferences. The company co-finances postgraduate studies – Dorota Sadowska says.

However, it is not only work that matters in the company. In addition to integration trips or holiday events, joint business lunches are held every month. Every third Thursday of the month, beer drinkers are invited by Rule Financial for happy hours. Once a month, the evening entertainment with cards and board games is organised. The company also supports sporting activities of employees: football team, sections for squash, volleyball, billiards and Rule Runners group. Such benefits encourage the programmers to change their place of residence. At Rule, every tenth employee has moved to Lodz after having accepted a new job offer.

The recruitment process at Rule Financial

The recruitment process is transparent and consists of several steps:

- Analysis of the application. Verification of a candidate's professional profile to check whether an applicant's details correspond to the requirements related to a given position.
- Telephone interview. Approximately a 25–30 minute conversation on professional experience and expectations of working at Rule Financial. The conversation is conducted partly in English.
- Technical test. Positive feedback means participation in the next stage of recruitment – technical test that should be completed in a maximum of 45 minutes. The test includes technical issues listed in a job description and is checked immediately after completion of the task.
- 4. Interview with experts. If test results are satisfactory, a candidate is invited to the final stage of recruitment process. Technical interview is conducted by two experts. Knowledge of programming languages, software architecture, technology, etc. listed in a job description are checked. The conversation is conducted in English entirely and can take up to 90 minutes. An applicant receives a reply within two weeks.

Some, however, have followed their heart. – For four years, I have lived in Lodz, and, although I moved here for family reasons, I believe that fate could not make a better choice for me. Lodz is a very modern and creative city. I think that this openness and adaptability have caused that, among others, the IT industry I work for, has expanded rapidly, allowing me to find a job that I like and develop in the direction that I have set myself – one of the workers of Rule says.

They design globally

Bosch has been successfully investing in new ventures in Lodz for years. The first factory was established in Lodz in 1998, another one – five years later. However, the key project for the development of the company's products is Research and Development Centre of Dryers.

SH Bosch und Siemens Hausgeräte is the largest manufacturer of household appliances in Europe and one of the leading companies in this sector in the world. The company was founded in 1967. Currently, the company has 40 factories in 13 countries in Europe, USA, Latin America and Asia.

FACTORIES WITH TRADITIONS

The first BSH factory of washing machines was officially opened in 1998. The plant was expanded by modern factory for dishwashers in 2002. The warehouses in Lodz supply European markets, while the new Logistics Centre in Bukowiec serves as a trans-shipment of products intended for the Polish market. In 2005, there was another BSH investment in Lodz – the factory of clothes dryers was opened in the Lodz Special Economic Zone. In Lodz, the dryers of latest generation with new and interesting design are manufactured.

In 2007, there was the grand opening of new, extremely important and prestigious projects of the BSH company in Poland – the Centre for Research and Development of Dryers as well as IT Service Centre. They represent a new quality, primarily because they invest in technical thought. Education and skills of





Lodz specialists are used in the design and production of technologically advanced equipment in Poland, exported all over the world. Entrusting this task to the Polish engineers signifies the trust in the BSH company and is an extraordinary honour for the city and the whole country.

PRESTIGIOUS CENTRE

The Research and Development Centre of Dryers was established as one of the three centres of development

BSH Group's product range covers a full scope of modern appliances – from cookers and hoods to dishwashers, washing machines, dryers and refrigerators, and to small appliances, such as vacuum cleaners and electric kettles.

Unambiguous company's strategic objectives are oriented to quality and innovation. These values determine actions and further development of the company. BSH relies on exceptional products and values to consumers, including: efficiency, convenience and ease of use. The group's objective is a long-term customer satisfaction and building confidence in their brands. An integral part of the BSH strategy is to protect the environment and climate. Household appliances of the group save energy and water, thus helping to preserve the world's natural resources. of the product in the network at BSH. Currently, in the Lodz centre, over 50 engineers are employed. They create a relatively young team, as the average age of the members of the group is less than 36. Although the title of engineer is usually associated with men, almost every fifth worker of the centre is a woman.

The centre has its own laboratory, where newly designed components are tested, separate laboratory for testing processes, laboratory for noise measurement and transport laboratory. The Lodz branch focuses, among others, on the implementation of projects related to the life cycle of the product and the qualitative and innovative projects.

In Lodz laboratories, research that affects product safety is carried out. The company gives nonflammability testing of clothes dryers as examples of such research – initiated and conducted in Lodz. Such a project is of great importance to the safety of users. In addition, some markets (e.g. the U.S. market) do not permit the sale of products that have not undergone such a testing.

In the center, the solutions making our daily lives easier are developed and studied. It was in Lodz where the 'refresher' function, consisting in clothes refreshment by steam, has been developed and introduced into the dryers leaving the production line. This feature is ideal for the care of the clothes that cannot be washed in a washing machine or by hand. Delicate blouse, sweater or elegant trousers may be prone to damage when in contact with water. However, gentle steam helps to maintain their good condition. Invisible to the naked eye, water droplets remove from fibers dust particles and odors without machine washing. As a result, clothes are clean and wrinkle-free, which further reduces the time spent on ironing. All this was invented in Lodz!

CONTINUOUS DEVELOPMENT

The engineers working in Lodz devote their time to the development of drying technology, product safety and

Andrzej Maślak, a spokesman for BSH Home Appliances



The presence of BSH Home Appliances in Lodz is not accidental. When deciding on the location of our plants, we took into account many factors. One of them was central location in relation to the largest Polish cities and capital cities of Central Europe. Without a doubt, of crucial importance is the functioning of the Lodz Special Economic Zone and the availability of greenfield for the construction of manufacturing plants. Also, cooperation with local authorities, both in the course of implementation of the investment project, as well as after its completion, is noticeable.

Cooperation with academic institutions is of no little importance. In Lodz, there are more than 20 higher education institutions. Therefore, it is an important scientific centre. I believe that the scientific community and the business world must work closely together. As part of its strategy, BSH Home Appliances implements the programme called 'Young people in Lodz'. In cooperation with higher education institutions, student and diploma internships are organised. The students interested in improving qualifications and work experience have the opportunity to complete paid internships. We conduct the programme called 'Internships for Young People', coordinated by the Lodz Special Economic Zone. The best interns have the opportunity to join the ranks of our employees. We are also very proud of the studies we conduct in cooperation with Duale Hochschule in Germany. This is a pioneering project in Poland. Every year, we recruit people interested in completing 3-year studies at higher education institutions in Germany in the following fields of studies: mechanical engineering and economics. These programs are coordinated through our headquarters in Munich, and students do internship in various branches of BSH in Europe during their education. Through our actions, we try to build partnerships and pathways for cooperation between business and scientific community in Lodz. Due to the presence of BSH Home Appliances in Lodz, we are able to cooperate with the regional economic, scientific and cultural environment. I rate this cooperation at a very high level.

design. The changes of drying process – conventional, steam and using heat pumps, are introduced. The parts used in the production of dryers are designed and adapted.

The task of the designers and testers is also introducing changes to the design of dryers. They must, however, remember that they operate in the reality of a global company. Therefore, the engineers working on a variety of products must use the same and intuitive solutions for the customer. In each R&D centre, much attention is placed on the device control panels. In the whole group, solutions and determinations of individual functions must be similar.

Every part, every new product passes a series of endurance tests before starting their production.

One of the last stages of research is transport tests. In addition to checking whether the proposed device is functional and safe, it is also necessary to check if the device can be transported before it reaches the customer. For this purpose, the stability of various combinations of devices (both welded and mechanical) is tested on special shakers, simulating transport overload. Before their production, the dryers are subjected to acoustic tests, and the volume of the devices is checked.

The projects accepted for the development are implemented to the prototypes built and tested. All the tests conducted at the Center for Research and Development are carried out according to international standards, and laboratories operate in accordance with applicable standards.



Green energy

In the sectors of the industries using the latest technologies, such as energy or heating, innovative solutions are relatively common. It is extremely interesting to look at the ways of obtaining fuel. At the EC-4 power plant, belonging to Dalkia, coal is replaced by biomass during the production of energy.

alkia Lodz is one of the largest energy companies in Poland. It has been manufacturing system heat and electricity in cogeneration. It means that electricity and heat arise in a single technological process. The use of cogeneration provides tangible economic benefits and is good for environmental reasons.

INSTEAD OF CARBON

The residents of Lodz agglomeration associate Dalkia, among others, with the EC-4 chimneys. The largest of them is 250 metres tall and is the highest building in the city. The solutions that fit into the eco-friendly company policy were applied in the plant at Andrzejewska Street. As part of its core business, Dalkia invests in renewable energy sources as well as works towards the rational use of heat and sustainable development.

Environmental measures carried out by Dalkia to reduce the negative impact on the environment have yielded specific results so far. In 2011, in the Lodz EC-4, the largest and one of the most important power plants in Poland, a fluidized bed boiler (see box) was launched. The equipment is suitable for burning one hundred percent biomass instead of coal.

Thanks to the use of EU money, a coal-fired stove could be modernised and converted to biomass power.

ECONOMY

What is biomass? These are substances of vegetable or animal origin which deteriorate. For the production of energy in the EC-4, the following elements are used: wood processing residue, plants originating from energy crops and organic waste from agriculture. It is assumed that biomass as fuel is harmless to the environment. The amount of CO_2 emitted into the atmosphere during the combustion is balanced by the amount of CO_2 , absorbed by the plants producing biomass through photosynthesis.

At full capacity of the Lodz boiler, more than 1.4 thousand of tons of biomass are burned per day. In 2013, about 320 thousand tons of biomass were burned at the EC-4. As part of the project, a complete installation of a biomass economy, i.e. the line for unloading, storage and feeding of biomass to the furnace, in the form of wood chips, pellets and straw, was built.

ENVIRONMENTAL BENEFITS

Owing to investment in the eco-friendly boiler, green energy in excess of 250 GWh was produced in 2013. It accounted for 32% of the energy produced in the EC-4. CO_2 emissions were reduced by more than 320 thousand tons. This corresponds to CO_2 assimilation by more than 20 million trees, which would occupy the area of about 50 thousand ha!

The activity of Dalkia Lodz, in the scope of production of green energy, is part of the climate and energy policy of the European Union, including the reduction of CO₂ and greenhouse gas emissions as

FLUIDIZED BED TECHNOLOGY (bubbling fluidized bed – BFB)

Biomass is fed into a hot bed filled with sand. The heated air causes liquefaction of deposits and creates the conditions for total gasification and combustion of fuel. This method has long been successfully used in boilers fired with wood and in coal boilers. It has many advantages, in particular, high efficiency, flexibility and availability. High heat transfer and high thermal inertia allow to burn damp wood and sediments without the use of fossil fuels. The combustion temperature in a fluidized bed fluctuates typically around 800°C.

What a boiler...

Key details of the 'Conversion of the boiler OP230 No. 2 to biomass-fired boiler at Power Plant No. 4 Dalkia Łódź SA' project. Boiler capacity: 180 t/h Capacity of the unit: 46/85 MWe/MWt Efficiency: 88.6% Steam temperature: 535°C Water vapour pressure: 13.6 MPa Reduction of CO_2 emissions: 261 kt per year Consumption of biomass: 365 kt per year

well as increase of the participation of energy from renewable energy sources. The company already complies with the limit of use of renewable energy sources designated for 2020 in the 'Polish Energy Policy until 2030' document.

Apart from Lodz, the company carried out a similar upgrade in Poznan. As a result, Dalkia has become one of the main entities applying renewable energy in the energy production process. Poznan and Lodz power stations co-incinerate biomass and coal. On a national scale, biomass share of 10% generates 3% of green electricity in this process.

DALKIA IN LODZ

Lodz is one of the most industrialised cities in Poland. It is also the second largest producer of electricity in the country. 20% of the energy produced in Poland comes from the Lodz region. This, unfortunately, translates into a high level of air pollution in the region. Therefore, the change in the supply of EC-4 has a positive impact on the standard of living in Lodz agglomeration.

Improvement of the quality of life in the city is also important. Regardless of the projects implemented on Dalkia installations and equipment, the company collaborates extensively with the city authorities in systematic reduction of the so called low emissions, which is important especially in urban areas.

The company takes part in the 'Mia100 Townhouses' project. As part of the project, the revitalized facilities are connected to the heat system from network. This gives the opportunity to reduce emissions from domestic boilers, as well as to optimally utilise the Lodz heating network, one of the longest in Europe. It has 750 km in Poland and the length of the network is second only to the capital city of Poland.

ECONOMY

by Jarosław Zaradkiewicz

They optimize not only the heat



Jacek Karczewski standing by torches for burning biogas

In the energy and heat industry, each device can work more efficiently, quieter and more economically. Many solutions have not yet been discovered. Such assumptions are held by the engineers working in the Lodz Department of Thermal Engineering of the ITC Energy Institute.

he branch continues the tradition of the Institute of Thermal Technology, existing in Lodz since 1948. In 2008, it was incorporated into the structure of the Energy Institute. Previously, for 60 years of independent existence, the ITC conducted numerous innovative scientific works for the energy sector. There, already in the 50s of the last century, Poland's first experimental gas turbine of 1000 kW was constructed and launched. The vast majority of the work conducted at the research institute was performed on industrial facilities. The scope of works was very wide: from the 'big' energy (boiler and turbine solutions, adjustment of the power system) through auxiliary devices (fans, squeegees and burners) to the issues in related fields, such as environmental protection (fight against noise and reduction of dust emissions).

Lodz unit does not only lead research on energy. The ITC was one of the largest research centres in Poland involved in fight against noise. There the first anechoic chamber was built in Poland. In the chamber, a standardised measurement of noise of different devices can be applied. The Institute produces noise dampening devices whose application is very wide: from acoustical panels, e.g. in the server rooms or loud operating machinery, such as a turbine in the EC III Lodz, to great exhaust silencers installed on the roofs of the power plant.

OPTIMIZATION OF TURBINE OPERATION

One of the leading solutions conceived at the ITC is electrohydraulic controller of the turbine MREH. The name sounds very seriously. This solution participates in the regulation of national energy system. The regulator uses a number of innovative solutions. Therefore, it is as good as similar devices offered by global corporations. For many years, it has been used in numerous power plants. It has passed its 'practical exam'. Owing to this, power plants may participate in the regulation of the system as part of the so-called primary, secondary and tertiary regulation. It consists in the fact that a block working in the power plant connected to the National Power System responds to changes in power consumption by increasing or decreasing the power produced, as well as participates in the economic division of loads of individual power plants. The installment of this regulator has brought tangible benefits to power plants. The regulator and its creators have been repeatedly rewarded.

HEAT MEASUREMENT

The pride of the institute is also heat meters in steam. The centre has designed them for several years, constantly modernizing and adjusting them to current needs. These devices process the heat in technological devices, where steam is a heat carrier. Such heat meters are installed in many facilities in Lodz. The Department of Thermal Engineering has, inter alia, a contract concluded with Dalkia for the operation, check and service of heat meters.

Heat meters have been manufactured at the ITC since 1990. The unit constantly improves them, and now the third generation of the meters is in use. In the region of Lodz, most recipients of steam have installed heat meters produced by the ITC (over 250 pieces). Heat meters are highly evaluated by the users and are rewarded on numerous trade shows. During the Third HEAT Energy Efficient and Ecological Heating Fair, the centre was honoured for 'its own original solution related to modern microprocessor heat meter for overheated steam with MEC type converter'.

Owing to the application of heat, heat recipients have the opportunity to register consumed power and exceeding of the rated power. This process allows to adjust the ordered power to actual needs. In turn, registration of a failure to observe the steam parameters makes it possible to force the supplier to provide required parameters or adjust the price for the collected energy. Latest universal conversion software (MEC-09 model) allows to adjust the heat meter to the requirements and conditions imposed by the user.

COMMERCIALISATION OF INNOVATIONS

Lodz ITC houses the Department of Innovation and Implementation, where innovative machines and devices are produced. The engineers currently working in the Department design, execute and implement equipment for enrichment and energy use of biogas, e.g. on landfills. These installations are used for acquisition and use of biogas from landfills. They also combine the economic effect with environmental protection. It is now the field that develops very quickly, and the conducted research works have great future. The centre can boast of significant achievements. In the plant, the works on the use of waste heat on the landfill for the evaporation of harmful effluents are carried out.

A characteristic feature of all these undertakings is forging scientific ideas into practical applications. Such biogas installations are carried out 'in metal' at the centre and function on different sites in the country and abroad.



System for using waste heat from landfill to vaporise leachates



Ryszard Jaworski in an anechoic chamber

The director of the Department of ITC Thermal Engineering, Jacek Karczewski, has a positive attitude to the commercialisation of research and collaboration with business. - The effects of R&D works should be shown and praised. We do not realize often what potential we have and how this potential can be used to solve economic problems. Sometimes, we need others to make us aware of what we have. We had the opportunity to experience this when implementing, at the Institute for Energy, the 'Programme to support small and medium-sized enterprises from Ukraine in the field of development of energy efficiency and implementation of innovative technologies of biomass and waste usage'. We trained representatives of the SME sector from Ukraine, who, after what they have heard from us, were eager to cooperate in the promotion of innovation - the director Karczewski says.

CREATIVE INDUSTRIES

by Anna Krawczyk

Sublime flavours

Aneta and Przemek come from Lodz, Dominik from Gdynia and Patryk from Poznan. They met in Warsaw. They had been already working for the creative industries. In Lodz, they were captivated by OFF Piotrkowska space. They decided to create a place that had not existed before – MITMI restobar, recognised as the best restaurant opened in Lodz in 2013 in the ranking of the readers of 'Jemy w Łodzi' portal.

meet Dominik and Patryk in one of the boutiques on OFF Piotrkowska when we are taking pictures for the article. The other two owners are travelling at this time. We immediately start a conversation, and it seems that we have known each other for a hundred years. We are talking about Lodz, which has captivated them. They see the potential in the city and watch as it comes to live every day.

In this way, MITMI is a way of starting a new life for them. Dominik Łabuzek was a copywriter cooperating for many years with the largest and most well-known advertising agencies in Poland. Patryk



Dominik Łabuzek, Patryk Czaplicki

Czaplicki is a trained theatrologist and theatre critic. He has worked, among others, as a copywriter, culture journalist, cultural, dancer, translator and logistician. Although the concepts for running the premises were different, the owners accepted the idea and decided how to fit it in the OFF Piotrkowska space. – We share the magic of this place – Patryk Czaplicki mentions.

Acquiring the premises in the most popular place in Lodz today is not at all easy. We had to take part in the competition. The project was implemented successfully after one year.

NOT JUST A RESTAURANT

The founders of MITMI offered unprecedented formula unknown in Lodz. They combined their restaurant with a bar. Owing to the arrangement of the space, the premises, functioning as a restaurant during a day, can be easily converted into a bar in the evening. – MITMI has two faces during day and night. These spaces interpenetrate – Dominik Łabuzek adds.

The space of the premises is small and compact. Guests are close to each other. This type of place necessitates rapid and spontaneous response to their moods. The owners follow the needs and ideas of people visiting MITMI. In the evening, dancing parties are organised. Events are held as needs arise.

- We have wanted to create a place where people meet and where they create interesting initiatives. It happens that someone comes in and says, 'I would like to sing' or 'I would play the violin' – and we follow this – Patryk says.

Last restaurateurs asked a travel-weary visitor to give a concert. Later, they found out that he was a special guest of the Philharmonic. He came to Lodz to give his performance.

Each event is connected with the philosophy of commenting on reality in a surprising way. This is part of, e.g., the opening of Artificial Violets. The owners are already thinking about new events. Everything is done to encourage guests to participate in a dialogue.

CONCEPTUAL CUISINE

By assumption, MITMI had to offer a simple and accessible cuisine for all. The result has surpassed all expectations. Thanks to head chef Szymon Stach, guests have loved the food offered. It has turned out that MITMI has become a very desirable restaurant. – Each dish is a precise composition of flavours and contains ingredients of the highest quality – Patryk proudly adds.

The cuisine has become a sublime and sensational, yet still accessible and not creating barriers to customers. The menu is very short, because



introduction of new products is a great event. It happens, however, that when a dish disappears from the menu, arguments may arise. Any changes to the menu meet with a great response.

Interestingly, at MITMI, there is no freezer. All dishes are prepared on a regular basis, from fresh products for specific dishes. There are no semi-finished products.

The cuisine is based on modern technologies. The basis of the menu is meats. They are baked for 12 hours at low temperatures or prepared by *sous vide*. It involves cooking vacuum-packed meat with spices in a water bath at low temperatures for several hours. Chickens or ducks do not lose their properties. On the contrary, they are juicy, soft and penetrated by spices. Thanks to this, unique flavours are formed. Meats are served as a main course or as a component of sandwiches. MITMI is famous for its desserts although they were supposed to be only a supplement to the main dishes. New York cheesecake has turned out to be a cult dish.

The owners have prepared for the summer special attractions. – We have good news for people who could not try our dishes due to the fact that all the seats were often busy – now MITMI has two cozy gardens in the OFF centre. Therefore, there are more places for our guests – Dominik adds.

There are also next culinary news, based on seasonal ingredients, waiting for visitors.

TOURISM

A film weekend

Reymont's Lodz is now long gone. The Promised Land of the textile industry has become the Promised Land of the creative industry. This, however, does not mean the end of factories. On the contrary, old textile superpowers are back in vogue attracting the attention of such high-profile personalities as David Lynch and Frank Gehry.

o feel the spirit of Polish Manchester, start your weekend from the Central Museum of Textiles – one of its kind in the whole Poland. Its setting is ideal. A 19th century factory built by a Saxon immigrant, Ludwik Geyer.

Visiting the Museum on the first two Saturdays of each month, you'll be surrounded by the smell of heated grease and the noise of looms – as if you were in the middle of Andrzej Wajda's film 'The Promised Land'. How were your great-grandmother's clothes made? And how are yours? The visitors will know it, by the time they leave. You'll be also given a brief training course on the history of fashion in the 20th century.

The Museum is globally recognised for its International Triennial of Tapestry. It is there that Magdalena Abakanowicz presented her works.

GOTHIC À LA LODZ

The atmosphere of Wajda's film will not leave you when you visit Księży Młyn. It was built as an industrial city within city and had its very own fire station and hospital. Brick town houses for working classes are enshrouded by surrounding trees and juxtaposed with an enormous eclectic red brick factory. Its towers are described as examples of Gothic à la Lodz – and for a reason too. In the vicinity, you'll find a castle built by Karol Scheibler, which today is the site of Museum of Art housing a collection of old paintings (e.g. the works of Boznańska, Malczewski, Ajwazowski and Signac). In the Central Museum of Textiles you can feel as a 19th century labourer, whereas here – strolling around the hall of mirrors and bourgeois style rooms and boudoirs – it's easy to imagine yourself as an industrial tycoon.



Fatigued? There is Park Źródliska nearby. You'll find here an assortment of specimen trees brought in by the Scheiblers. Even in winter, you can come to the park and enjoy the greenery in the local Palm House. There are about 2400 different plant species occupying the area of 1100 m², among them are orchids, date palms, citrus and banana trees.

INSIDE A FILM, INSIDE A FAIRYTALE

Close to the park, you will find the famous Lodz Film School and the Film Museum, the only one of its kind in Poland. It is this Museum's interiors that provided a setting for Karol Borowiecki's palace in Wajda's 'The Promised Land'. The rooms will also take you behind the scenes of Kawalerowicz's 'Quo Vadis' (you can see a part of a chamber featuring in the film) and animations made by, e.g. Tadeusz Wilkosz, Marek Skrobecki, Marian Kiełbaszczak and Zbigniew Kotecki.

You can have a close look at an authentic Oscar, admire puppets, drawings, film stills and film set memorabilia. Visitors will have a chance to see photos in the Kaiser Panorama, which featured in, e.g. 'Vabank' by Juliusz Machulski.

Lodz was the birthplace of such iconic animations as, e.g. 'Miś Uszatek' and 'Coralgol'. The secrets of these films and many others will be revealed to you in the Se-ma-for Museum of Animation. Puppets, stage design and memorabilia from 'Ichthys', 'Danny Boy' and Oscar winning 'Peter and the Wolf' are only a sample of what you can discover in this unique museum.

A NIGHT SHIFT

When most other museums are closed, there is one 'factory' working at full steam. In Franciszek Ramisch's former weaving and spinning mills on Piotrkowska Street 138/140, young artists found their own Promised Land. This address houses a well known brand Pan Tu Nie Stał. You must also visit Mebloteka Yellow and not just for a coffee or supper. It is a fashion studio as well, where people interested in design, fashion and... cuisine meet. Skład Wina & Chleba restaurant is a popular destination among the inhabitants of Lodz. There is homemade wine and on the spot baked bread to go with your dish. Another 'must' is Eko Targ, which takes place each Saturday. It is a fair where one can buy healthy and natural food as well as taste uncommon dishes.

Off Piotrkowska serves as an example of factories' second life. Apart from restaurants and cafés, the old halls provide space for artists and their workshops. The true Promised Land of the creative industry.

CALENDAR

13TH INTERNATIONAL FESTIVAL OF PHOTOGRAPHY IN LODZ

5—15 JUNE Art_inkubator, Art Factory, UL. Tymienieckiego 3 WWW.Artinkubator.com

LODZ OF FOUR CULTURES FESTIVAL 2014 6-15 JUNE WWW.4KULTURY.PL

IMPACT FESTIVAL 2014

11—12 JUNE Atlas Arena in Lodz, Al. Bandurskiego 7 WWW.Atlasarena.pl

CONFERENCE 'LODZ INNOVATIONS AND CREATIONS'

13 JUNE, FROM 10:00 AM TO 4:00 PM Hotel Novotel, AL. Piłsudskiego 11A WWW.Miastoinnowacji.lodz.pl/konferencja

PAT ARTISTIC WORKSHOPS

21 JUNE, 11:00 AM Piccolo Theatre, UL. Tuwima 34 WWW.Teatrpiccolo.Pl

A MIDSUMMER NIGHT'S DREAM — WE READ Shakespeare's works

22 JUNE, 8:00 PM Small theatre in Manufaktura, UL. Drewnowska 58 WWW.teatr-Maly.PL

MIDSUMMER NIGHT IN THE BOTANICAL GARDEN 23 JUNE

BOTANICAL GARDEN, UL. RETKIŃSKA 39/65 WWW.BOTANICZNY.LODZ.PL

LECTURE 'IN THE WORLD OF SUPERCONDUCTORS AND ULTRA-LOW TEMPERATURES'

26 JUNE, 6:00 PM Planetarium and astronomical observatory, Ul.Pomorska 16 WWW.Planetarium.org.Pl

1ST INTERNATIONAL CONGRESS 'ENERGY LODZ 2014' 25–27 June

WWW.PROAKADEMIA.EU/PL/KONGRES-2014

LODZ ENERGY FAIR

27-28 JUNE

EXPO-ŁÓDŹ, AL. POLITECHNIKI 4 WWW.EXPO-LODZ.PL

11. FESTIVAL OF GOOD TASTE IN LODZ

26 JUNE, 2:00 PM Lodz Manufaktura, UL. Drewnowska 58 WWW.Festiwaldobregosmaku.eu

4TH LODZ COFFEE FESTIVAL

27—29 JUNE, 10:00 AM Club Wytwórnia, ul. Łąkowa 29 WWW.Wytwornia.Pl

7. SUMMER JAZZ ACADEMY

JULY-SEPTEMBER WWW.LETNIAAKADEMIAJAZZU.PL

25. 'SOLIDARITY' AND THE OLYMPIANS INTERNATIONAL CYCLING RACE 2-5 JULY

WWW.WYSCIG.COM.PL

THE CONCERT OF MILIAN - KURYLEWICZ

3 JULY, 7:00 PM Club Wytwórnia, Ul. Łąkowa 29 Www.wytwornia.pl

THE ANNIVERSARY OF CONFERMENT OF CITY RIGHTS TO LODZ 29 JULY WWW.LODZ.PL

WWW.LODZ.IL

3RD INTERNATIONAL THEATRE FESTIVAL 'RETROPERSPEKTYWY'

21-25 AUGUST

ART FACTORY, UL. TYMIENIECKIEGO 3 WWW.CHOREA.COM.PL

18TH MEN'S VOLLEYBAL FIVB WORLD Championships

10–14 SEPTEMBER

ATLAS ARENA IN LODZ, AL. BANDURSKIEGO 7 WWW.ATLASARENA.PL