WP T1

DELIVERABLE T1.4.1

Urban Innovation Action Plans (UIAPs)	05 2019
VAS COUNTY	Final

Project information		
Project Index Number:	CE677	
Project Acronym:	URBAN INNO	
Project Title:	Utilizing innovation potential of urban ecosystems	
Website:	http://www.interreg-central.eu/Content.Node/URBAN-INNO.html	
Start Date of the Projec	1st June 2016	
Duration:	36 Months	
Document Control page		
Deliverable Title:	D.T1.4.1 – Urban Innovation Action Plan (UIAPs) _ VAS COUNTY	
Lead Contractor of the Deliverable:	bwcon GmbH (subcontractor of PP9 PBN)	
Authors:	bwcon GmbH	
Contributors:	PP9 – Pannon Business Network PP3 – inno AG	Mátyás Lazáry, Zoltán Molnár Luc Schmerber, Kirsten Petersen
Contractual Delivery Date:	05.2019	
Actual Delivery Date:	05.2019	

Content

EXECUTIVE SUMMARY

First of all, multiple encouraging signs confirm that PBN's initiative to start acting on the digitalization field applying Industry4.0 based technologies was the right step to take:

- The location of Vas County facilitates any transportation activity around EU countries and also offering chances to test logistical solutions.
- The national and regional policies both support strongly R&D related activities and would like to combine them with innovative approach towards higher number of useful solutions. Vas County has the potential and the education level and it has to be exploited better per the 'National Development 2020 - National Development and Regional Development Concept' document.
- Not only the policies, but the allocated funds are reflecting to the strong support of advancing in the digitalization field, which is one of the most important industries in Hungary and also for the Vas County region hand-in-hand with the car industry, which is a connected section anyway.
- The open-minded approach experienced from the side of the inhabitants and key actors of Vas County that attended am-LAB also could give us confidence heading into the right direction, but further testing is needed with the devices and own licensed product or service from the side of am-LAB would be useful to make the organization more authentic.
- Help the development of the Digital Innovation Hubs like am-LAB became a highly prioritised area from the side of the EU too allocating larger amount of available funds to support their operation all around the Union, also appreciating initiatives between them. Often the best way to realize this purpose is to fund projects where knowledge transfer can happen between DIHs operating in different geographical areas.

The main challenge that PBN and am-LAB faced with along the way is that innovation is very well supported from the side of R&D motivating organizations to get to know and create modern technologies supporting manufacturing systems and making our life more comfortable, but most of the SMEs are not technically equipped and ready enough to apply the developed solutions. Also, it is a matter of fact in Hungary that the SME sector is quite 'empty' and the market is crowded with multinational companies and small enterprises instead. That is a thing that PBN counted with in advance having experience in the field operating in more than 10 years long for now and that is why HGC (High Growth Companies) national programme is started with the lead of PBN. This sector's players could be the leaders of an innovative era with treating them right focusing on supporting the ones with most potential

Regarding to URBAN INNO's focus of user driven innovation processes in smart city fields, as it was mentioned earlier in this summary, the receiving side witnessed positive approach and liked to be the part of innovative participatory method processes per the feedbacks. Satisfactory surveys were used after events to measure user satisfaction rate and improve the level of given element if it is needed, but fine rates came back from them, over 85 % of them were satisfied in general.

A good combination of invited participants clustered together along the participatory events to discuss about the future of Vas County in the field of digitalization implemented with Industry4.0 elements. The order of the application of participatory events seems to be selected fine by the Urban Innovation Network lead by PBN to engage end-users and key stakeholders:

- Vision factory in order to create a future vision with multiple target groups involved first;
- Then the Motivational video pitch to engage further participants and partners referring to the aforementioned future vision;
- Finally, the Project-in-a-day method with having prototyping of new products and services in its focus based on the earlier findings and having partners to brainstorm with about the possibilities.

One of the most important questions arose is that which option is better taking into account future workshops with participatory intentions:

a. Invite again the end-users that already participated and have a stable knowledge gathered along earlier events

or

b. try to engage new end-users in order to have more and more feedback from a wider area representing better the opinion of the 'whole' affected community?

Taking into account the specific nature of the digitalization field, first one is going to be considered as the preferred option it seems like now, but this topic depends on the capacities that PBN and am-LAB will have in the future, best would be live with both chances, of course.

Nevertheless, the basic directions of future developments were agreed along meetings that were facilitated by external experts to guarantee objectivity, but co—workers took part in the events and leaders of PBN and am-LAB monitored the whole processes providing help in need.

After an overview and evaluation of the regional situation in Vas County, please find the action plan with the initiatives and other aspect connecting to the next 2-3 years of Industry4.0 implementation in the region. As it can be seen, development projects concentrating on Digital Innovation Hubs' activities positioned themselves as part of the most important priorities and PBN would like to be a strong competitor with having am-LAB to further expand know-how and produce marketable results.

BACKGROUND – OVERVIEW OF THE URBAN ECOSYSTEM

Pannon Business Network is located in Vas County, Hungary and its profile is to make the local/Hungarian SME sector more competitive and innovative to be able to make them find the right answers to nowadays challenges. The region's biggest and most actual problem is the lack of appropriate workforce in multiple areas of manufacturing.

Responding to that challenge, the organization turned to the direction of the Industry4.0 program's achievements to implement them in the region.

In the following subsections, the urban ecosystem of the County is presented with a SWOT analysis attached, and also the major challenges are highlighted.

1 Characteristics of the urban innovation ecosystems – regional background

Vas County, located in the Western part of Hungary, in the West-Transdanubian region, is considered to be Hungary's western gate and it plays a decisive role in the development of the local society and economy. Benefiting from its positional advantages, Vas County has become the pioneer of economic transition. Therefore, the county has turned into one of the most important centers of economic and social modernization in Hungary. The county is situated in one of the most attractive investment regions in Hungary. It has favorable geographic conditions, a developed economy, cultural values, as well as high quality human resources - although their number is limited.

Vas County is the third smallest county in Hungary with an area size of 3.336 km^2, it only takes about 3,58 % of the whole country, but the region compensates this fact with the aforementioned positional advantages it possesses. One of the specifics of Vas County is the 'village nature' of the area, which is still present, but thanks to the urbanization process and the traditional basis to build on, cities like Szombathely, Sárvár, Celldömölk, Kőszeg and Szenttgothárd leads the realization of urban innovation activities.

The administrative center of Vas County is Szombathely which is the 10th largest city in Hungary. As it can be seen on the map above, the city is located very close to the Austrian border.

Szombathely is one of the oldest cities in Hungary; it was founded by the Roman Caesar Claudius in the middle of the first century. Szombathely was the capital of the Pannonia Superior Province of the Roman Empire, and back then the city was called Savaria.

That is the city, where PBN is functioning and the centre of targeted improvement via Industry4.0 implementation. The level of infrastructure needed is already on the rise because of the aforementioned favorable position in the country, but the region lacked in Industry4.0 based initiatives before.

As regards the companies' sizes, according to the statistics of the year 2015, in Vas County the micro enterprises were in majority. These companies compose almost 97 % of the all, which equals the international average. In Vas county 71 large enterprises can be found, that is a considerable number knowing the size of the county. The rest are small companies between 10 and 49 employees (2 %) and medium size companies (0.4 %).

Having that basis to build on, PBN is concentrating on improving the chances of mainly the local SMEs on the market, and Industry4.0 implementation is a real tool to make this happen. However, open-minded attitude and infrastructure changes inside in the producing areas of the companies are needed elements to achieve notable improvement and further investments could be needed from their sides. As we will see in the SWOT analysis of the region later in the 2.3 paragraph, funds are well available and used for this kind of purposes, but since innovative attitude is not one of the honors that local management possesses and supports enough, business support organizations' activities and other ways of providing a helping hand to allocate the funds properly are useful. Based on experiences and building on good practices that were introduced to PBN when attending other European regions could lead to a more self-conscious approach to use the given ecosystem's capabilities better.

Higher Education and Research organizations

Back to 2017, the following number of higher education and research organizations were present in the region:

Type	Number
Universities	5
Non-university basic/fundamental research institutes	4
Non-university applied R&D institutes	22
Non-university education providers	35
Others	-
Total	66

1.1 Research organizations located in the county

The ELTE Gothard Astrophysical Observatory (GAO), located in Szombathely, has been the most determining academic center in the county for decades. The aim of the observatory is to become one of the most significant centers of the research based on Big Data, and the ESA and NASA space research in Europe.

GAO has been a significant institution of astronomy, astrophysics and related multidisciplinary science in the Hungarian community. From 1978, the Observatory belongs to the Eötvös Loránd University.

Since 1991, in cooperation with German institutions, the main direction of scientific activity was stellar astrophysics. In the recent years, the GAO included data analysis from space observatories (Kepler) and development activities of new space observatories (CHEOPS, PLATO).

The scientific activity of GAO focused on stellar and galactic astronomy, with wide applications of space observations. In the past 5 years, the Observatory published 120 peer-reviewed scientific papers, which got more than 1.000 citations.

Scientists of GAO are Core Scientists in the CHEOPS space telescope project, Management Committee members of the "Big Data in Earth and Sky Observation" EU-COST Action, External Participants in the Sloan Digital Sky Survey 4 and the APOGEE spectroscopic survey, and work group leaders in the PLATO 2.0 project.

Special expertise covers Big Data handling and analysis, and massive numerical modelling. Besides the projects in which GAO plays a leading role, they have many collaborations worldwide, e.g. the Harvard, Indiana, Texas and Washington universities, the Sydney University, the University of Aarhus, the Diderot University, the Adam Miczkiewicz University and the Max Planck Institute for Astronomy.

1.2 Educational institutions in the county

In Szombathely all together five university campuses can be found. One campus of Szombathely until 1st February 2017 belonged to the University of Western Hungary, but the number of students constantly decreased, so there was a social and political pressure to stop this progress and increase the number of students. As a result, the campus has seceeded from the University of Western Hungary and on 1st February 2017 integrated to **Eötvös Lóránd University (ELTE)** of Budapest which is the biggest, and the most prestigious university in Hungary.

1 ELTE SEK offers 16 different Ba/BSc and 2 Ma/MSc studies

The main educational areas in the campus of the Eötvös Lóránd University are teacher training and recreation, but since 2015 students have had an opportunity to apply for mechanical engineering both in normal education system, and dual system as well, where students have the possibility to work during their school years at one of the members of the above already mentioned West Pannon Automotive and Mechatronics Center. More than 1.500 students study at this campus and due to the integration, this number could even further increase. In 2018, more than 650 students started their studies in the campus. The University has always put big emphasis on teacher training, and recreation manager and health promoter training. From the appearance of engineering, the technical part plays an important role too, and this area will be expanded with other departments in the future. For example Commerce and marketing, Software Information Technologist as well as Business administration and management departments will start from the next academic year.

The **Savaria Campus** awaits its prospective students with three types of courses: Bachelor, Masters and Tertiary Vocational Programs, and strives towards providing their students a marketable diploma. When looking at the relevant higher education statistics and rankings it can be safely stated that, in comparison with other universities, the courses offered in Szombathely are of the (as) highest quality (as elsewhere) and can be labeled as competitive both in terms of professional work and financing. Its two faculties, the Dániel Berzsenyi Teacher Training Faculty and the Faculty of Natural Sciences include ten institutes. The former is ranked within the best 36 %, whereas the latter is in the best 22 % in the country. The modern infrastructure available at the faculties provides excellent conditions for the learning process. Satisfying every demand a student may have, the library of the University was awarded the “Library of the Year” title in 2007.

The other campus located in Szombathely belongs to **the University of Pécs**, which is the oldest university in Hungary founded in 1367. As regards the campus of the University of Pécs, it is oriented to Health Science. This institution is smaller than the previous mentioned one, so here the number of the students is lower as well.

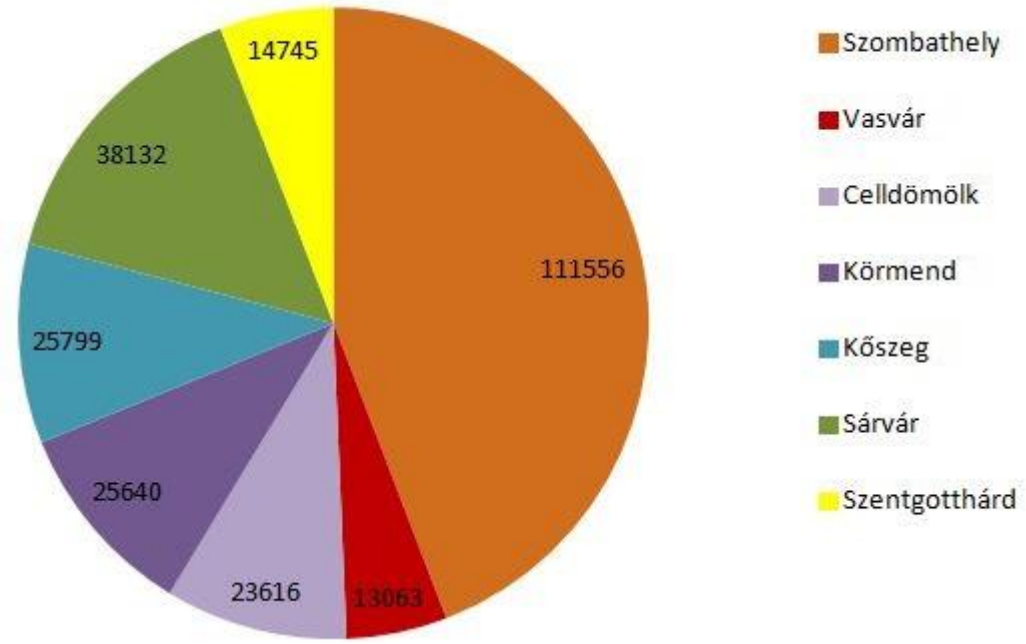
The two institutions above are the most important ones, but besides these there are other institutions like the department of the Dénes Gábor College, the Theological College of Győr in Szombathely, and the already mentioned ELTE Gothard Astrophysical Observatory.

As far as the secondary and primary education are concerned, there are 14 secondary and 17 primary schools in the city.

2 Socio-economic and SWOT analysis of the urban innovation ecosystem

2.1 Socioeconomic analysis

The population of the county is around 252.000 referring to a research from 2018, 59,6 % of them live in cities, which is a bit lower rate than the average in the country. It is an important aspect to highlight that a notable decline of population is observable in the region in the past 2-3 decades, for example between 1990 and 2000 there was a 9,5 thousand decrease and in the next decade, 12.000 less inhabitants were reported. One of the main reasons behind this phenomenon could be the better opportunities to move to Western-Europe in the hope of a higher standard of living. Because of the closeness of the border, a lot of people still stay and live in the county while working abroad (mainly in Austria, as later mentioned in this paragraph), but according to the trend the whole country follows, a good amount of them leaves towards the more advanced areas of Europe. That trend also contributes to the lack of appropriate and professional labor force in the Vas County region, which could be slowed down and later hopefully stopped with offering higher quality positions to employees in the field of digitization in the frame of Industry4.0 program.



2 Number of inhabitants per districts in Vas County (separated by the name of centers)

Speaking about Szombathely, nowadays almost 80.000 people live in the city. After the regime change, (1989) dramatic changes took place and due to this, enormous industrial reshaping characterized the 1990s. These changes had an effect on Vas County, and the whole country as well. As a result, the significance of the automotive industry increased in a large extent in this period, and car industry became the decisive employer of the labor market.

As far as the unemployment rate is concerned, it shows favourable market conditions, which is well reflected by the less than 3 % indicators both at county and city level. According to the statistics, the national unemployment rate is approximately 4,9 %, so Vas county's and Szombathely's data can be considered relatively beneficial.

In 2012 large multinationals of the automotive industry are clustered in and around Szombathely. The magnitude of their investment can be measured by 100s million € in total, having put Szombathely on the map of the mechatronic industry. This cluster is called West Pannon Automotive and Mechatronics Centre, and the big multinational companies, located in Szombathely, like Delphi Hungary, Epcos, Schaeffler Savaria (it was LUK Savaria earleir), iQor, BPW Hungária, are all involved in this project.

In 2016 a highway was handed over that connects Szombathely with Győr, which is the centre of the region, and with Budapest, the capital city of Hungary. Due to this new road, Budapest is accessible within two and a half hours by car.

As it has been mentioned above, Szombathely is very close to the Austrian border, the closest border crossing is only 15 km far from the city. Due to its favourable location next to the Austrian border, cross-border employment and business opportunities are available for the citizens of Szombathely. Peddling through the border on a daily business is widely accepted, thousands of people make their living this way. As far as the whole region is concerned, some famous spas can be found (Bük, Sárvár, Celldömölk) here which are very popular among Hungarians and foreign people as well, thanks to their medicinal water.

2.2 Short descriptions about the abovementioned enterprises

BPW-Hungária LTD., the subsidiary of the German company, BPW-Bergische Achsen KG in Szombathely is an important player in the field of vehicle industry in the West Transdanubian Region.

As far as **Delphi** is concerned, it is one of the largest automotive suppliers delivering advanced electrical and electronic, powertrain and safety technologies to vehicle manufacturers around the world.

Iqor provides product support services in the area of high-tech electronics. About 1.000 people are employed in this company.

Falco, the local subsidiary of Kronospan, also employs more than 1.000 people. This enterprise is leading the Central European plate manufacture industry in the furniture and building sectors. Additionally, Kronospan has the ambition to set up physically its own supplier cluster around its production site.

The Schaeffler Savaria has been dealing with the production of clutches for 20 years in Szombathely. This company has become the biggest employer in Szombathely, giving jobs to approximately 2.400 people.

3 Schaeffler Savaria in Szombathely

Besides Schaeffler Savaria, **Epcos** also plays a significant role in Szombathely's employment because the number of employees reaches 2.000 here as well. The company in Szombathely has more than twenty years' experience of production and development of passive electronic products. The Western- Hungarian enterprise is an indispensable player of vehicle and renewable energy industry on the world market. In the knowledge of these statistics, it can be claimed that these big international corporations determine the economic performance of the city and the county.

2.3 SWOT analysis

Economy	
Strength	*Weakness*
▪ *Increasing number of companies*	▪ *SME sector is weak*
▪ *Governmental support of start-ups*	▪ *Outflow of human resources into Western-Europe*
▪ *Participation in EU funded projects*	▪
▪ *Strong multinational company sector*	▪

Innovation / R&D	
Strength	*Weakness*
▪ *EU funds for R&D projects*	▪ *Lack of Human Resources*
▪ *Possibility of further developments with the participation of younger generation, who can get the right knowledge via Multidisciplinary Science Centre and extend it*	▪ *Management attitude is not supporting Innovative Solutions*
▪ *Possibility of further developments with the economic power of possible interested big companies that attend classes*	▪

User involvement	
Strength	*Weakness*
▪ *Citizens are open to learn about innovative technologies*	▪ *Weak NGO sector*

Education / human resources	
Strength	*Weakness*
▪ *Development of local University*	▪ *Low Quality of human resources*
▪ *More courses at the university such as manufacturing technology*	▪ *Management sector is not enough future oriented*
▪ *Introduction of dual training in the program of the local university*	▪

Policy	
Strength	*Weakness*
▪ *SME development programme*	▪
▪ *EU funds for local and regional development*	▪

Cluster organisation & governance	
Strength	*Weakness*
▪ *Easy to contact relevant actors through clusters*	▪ *Less importance of clusters*
▪ *The successful involvement of only one important actor could result in valuable achievements, because the region is not too big*	▪

3 Summary of the current situation and major challenges

3.1 SPOT profile

SPOT		PRESENT (Situation)	FUTURE (Vision)
POSITIVE		**Which strengths do we plan to build on?**	**Which opportunities do we want to seize?**
	1	▪ Development of Eötvös Lóránd University	▪ Strong cooperation between the quadruple helix actors
	2	▪	▪ Based on the plans of PBN's the Multidisciplinary Science Centre economic development will be reached with the involvement of all actors of quadruple helix
NEGATIVE		**Which problems do we want to solve?**	**Which threats do we need to avoid?**
	1	▪ Companies are not active in the local initiatives	▪ Weak NGO sector
	2	▪ Hard to negotiate with university actors – high bureaucracy	▪ Poor involvement of SME sector

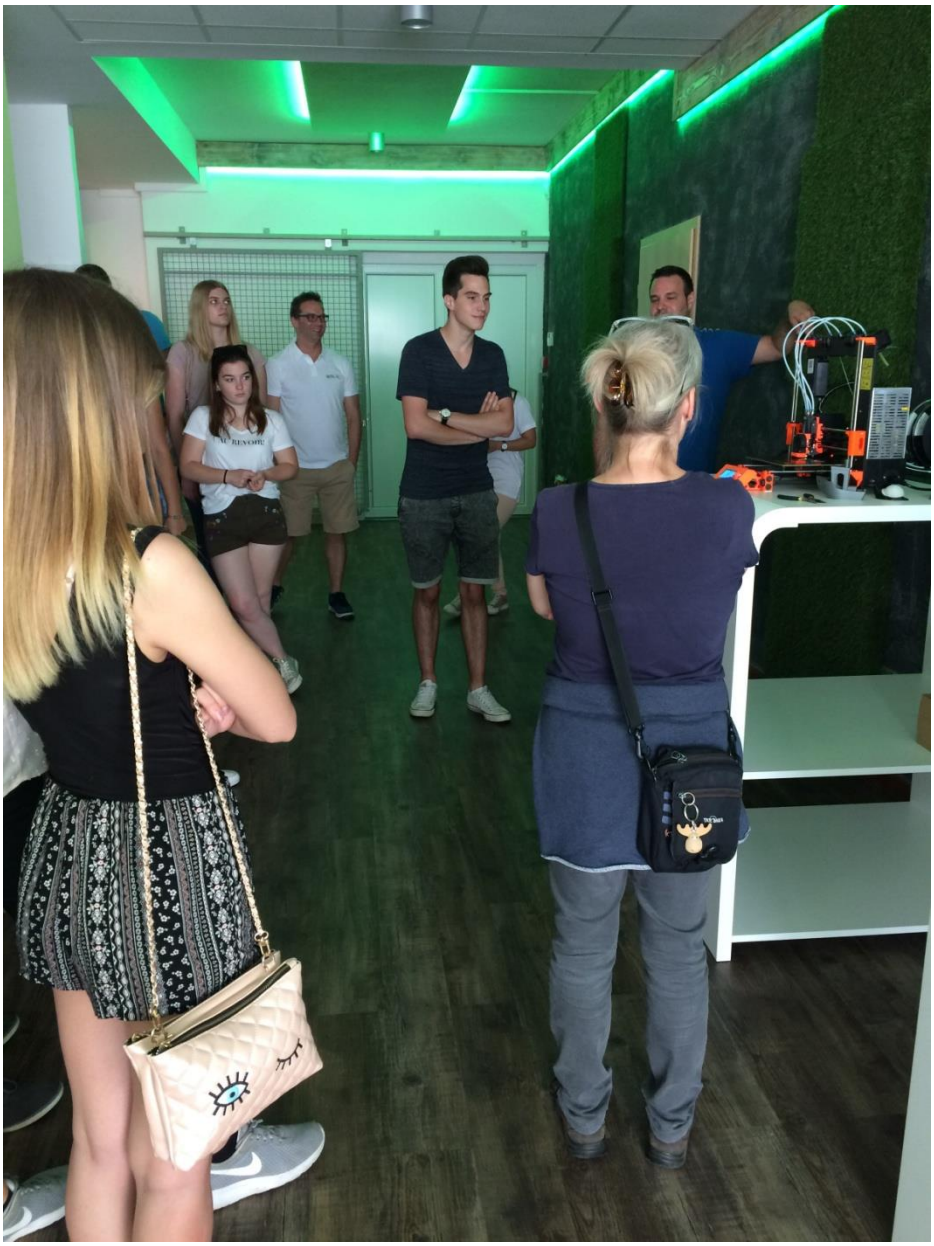
The main risk enroots in the level of open-mindedness shown by relevant actors towards Industry4.0 initiatives in the region. The basis is to understand the opportunities that the elements of Industry4.0 could offer to the region, and if it is there, the members of the quadruple helix network of Vas County could start to build on it and evolve the optimal ecosystem to further boost the possible fields of application.

PBN already achieved an honourable level of implementation of Industry4.0 programme not only in the region, but around the whole country and URBAN INNO helped a lot to in this process with:

- Establishing the Quadruple Helix Network of Vas County engaging actors to provide support in the implementation;
- Offering groups of local students a chance to attend am-LAB and get an insight to modern technologies represented there;
- Inviting local citizens to get to know their opinions and ideas about the Industry4.0 programme and the possibilities it could provide. Another important aspect was to define the trends of prototyping and what kind of connected services could be useful;
- Receiving SME representatives at am-LAB's premises to evaluate together the possible common points and ways of collaboration to improve the productivity of their manufactories. am-LAB has the tools (3D scanner, 3D printers applying multiple technologies, AMR – Autonomous Mobile Robot, Drone, HoloLens and etc.) and the competence and they own the devices and production lines to improve.

As it can be seen, the opportunities are there and PBN is trying hard to involve all actors, who could also help and profit from the process along the way. However, a lot depends on the receiving side:

- Quadruple Helix Network members should have an open eye on any possibilities that could help better implementation, for example if an interested bunch of citizens or companies appear that worth to involve and should be staying motivated in the future.
- Maybe the most influencing key element of the process is to draw attention from the side of the younger generation. They are representing the most important piece in the picture that our future is going to be built on and the successfulness of our initiative too. If they took well the lessons and could imagine a career in the field of digitisation, it is already half success. The other half is to engage them with competitive salaries here and not to let them go and find their luck elsewhere. This could be likely to happen, because of the lack of appropriate professionals in the region. Based on our experiences, a high percent of companies would happily give higher wages and interesting positions to better qualified employees.



4 Students from a local high school attending am-LAB's manufactory

- Local citizens are the best source of real-life needs. High-school and university students were also asked about their needs, ideas and preferences, but the emphasis in their cases lied in career opportunities. However, citizens had the chance to get an insight to producing opportunities offered by the new technologies unified by am-LAB and with them, our team could outline a future plan about which direction to go towards in the field of prototyping and producing.
- Discussions with SME representative gave us an impression about the willingness to implement Industry4.0 based elements to producing processes and also the possibilities to use them at all. As it is expounded later in the action plan, our organization participates in multiple other projects to assess SME's competitiveness and chances to improve. Some basic observations from the program:
    a. In general 9 of 10 SMEs are interested to build in Industry4.0 based technology into their manufacturing processes;
    b. However, only 2 of 10 have the technical background to live with that chance for now,
    c. And only around 4-5 of 100 are fully ready and capable to make this right after planning the system developments.

To summarize this section, the key is the attitude presented by the relevant actors and the amount of time it takes for them to realize the need of Industry4.0 based solutions. All of the affected parties could profit from producing faster with higher quality and the willingness to fund these actions is there from the side of the EU and the Hungarian national agencies. The main challenge is to upgrade SME's production culture and processes in time and to engage students and professionals.

4 Thematic priorities – fields of action

Pannon Business Network - acting in the field of business support and working with hundreds of SMEs - unsurprisingly picked the 'smart economy' as the main topic of interest, just as did so a lot of other project partners of URBAN INNO. However, being interested in different pilots, the subtopics are separated by partners.

Since the priorities of am-LAB in general are closely connected to URBAN INNO future plans, we have to take into account the main directions selected by the Digital innovation HUB we have. However, it is a fortunate situation that global trends and end-user needs are quite covering each other, we just have to further search for points of collaboration.

The following fields of digitalisation will be the preferences of am-LAB's activities:

- sensor technology,
- data analytics and connecting services,
- robotics,
- innovative health care solutions,
- process digitisation for SMEs.

These topics can easily be connected in various ways and PBN is eager to keep the already existing connections with different types of end-users and key actors to better exploit them and also the engagement of further parties is of interest.

The quadruple helix network established in the county is motivated to involve other relevant organizations, companies to extend the application opportunities of Industry4.0 achievements.

The Municipality of Sárvár is already member of the team and the next big step is to get the attention of the Municipality of Szombathely. PBN worked together with multiple departments of the municipality before and to better introduce Industry4.0 to the local actors and citizens it could be a key element to reach the support of them.

Also further local elementary and high schools are the subjects of interest to invite them regularly to attend am-LAB and give them knowledge and know-how, not to mention offering better career expectations. So far, the Paragvári elementary school and the Kereskedelmi és Vendéglátó Szakképző Iskola (Vocational school) were the most active ones, further ones are expected to join.

Also university students are welcome to apply to join am-LAB team, especially the ones whose are attending any faculties that has relevance with digitization. PBN could also consider joining to the list of companies offering positions to dual training students. It is a proven good practice for years now and could have a high added value for all parties involved. Since am-LAB is in the stage of gathering experiences that could be applied in practice later unified in the frame of Industry4.0 techniques, every helping hand and mind contributes to future success and hands on experience is also priceless for the involved students.

The good thing is that every type of end-users could find his own preferred area to contribute in, because PBN and am-LAB together divided their resources to thematic groups to raise the standards of the knowledge in a targeted way. The focuses of these groups can be found above in this paragraph!

With having that organizational structure, end-users, companies and other interested organizations could be directed right to the most relevant group to get professional expertise. Later, if they would be stepping to a higher phase of engagement, they will have the chance to get to know the whole digitization process supported by Industry4.0 solutions. Of course, the permanent learning for our employees is very important, especially acting in this dynamically improving industrial sector, so our colleagues took part in trainings and workshops often, for example to be well prepared before realizing a participatory method like vision factory or project-in-a-day with invited end-users.

5 PBN and am-LAB co-workers participating in a workshop built around Industry4.0 in practice

Based on the appropriate information they could learn along their journey with us, they are going to have clear visions and own ideas, which we could incorporate to either our system or to their systems in the case of actors who has one (like manufacturing companies, etc.).

It is important to mention that despite URBAN INNO partners agreed to develop an action plan for all pilots that covers the next 5 years of intended actions, this field of industry is advancing so rapidly that it is almost impossible to shape up a sharp estimation. Even multinational companies could only plan for 1-2 years nowadays, so all we could do is appointing the fields that matters us the most and tailor our end-user related interactions in the way these fields will be changing in global trends.

Just a simple example here that is connected to 3D printing, but reflects well to the whole digitisation sector:

The average 3D printing speed regardless the used technology (e.g. FDM, SLS, SLA) and the used material (plastic, metal) is moving between 15-50 cm^3 per hour (sometimes this data is given in mm), but the latest technologies arriving to enter the market (yet to be done) offer even like 12.000 cm^3 per hour of speed (https://www.desktopmetal.com/news/press-release-11132018/), so it is needless to say how much effect would a step like this have on the entire market. That makes for example a purchase of a 3D printer a risk and other challenging factors are present in this field as well that PBN with its DIH have to take into account, while planning.

5 Mission statement and objectives

Neither our vision or mission statement changed since they were both defined in the frame of the D.T1.2.4 (Basic urban innovation roadmap of Vas County), the only difference can be found in the level of their implementation. They were explained as such below.

Vision statement

Establishment of a community-oriented digital innovation center that is contributing to the anchoring and diffusion of the digital technologies.

Mission statement

The Multidisciplinary Science Center is the community-oriented digital innovation hub, which is serving as a training and education facility for the local ecosystem, contributing to the improvement of the application of digital achievements targeting business competitiveness.

It is a mission in process, but the main corner stones are put to their places with establishing the digital innovation HUB, called am-LAB on the 1st of November 2017 and starting the interactions with end-users. In fact, this very statement is already accomplished if we would take it into account literally; however, multiple smaller, exact objectives have been defined along the way based on the hands-on experiences gathered. In the next two chapters, they are introduced in more details.

5.1 Overarching mission statement and objective(s) for the UICN

In general, our mission statement is simple and understandable: the establishment of a digital innovation hub that is integrated into the local ecosystem in a sustainable way.

The complicated part came in the picture only later, when technologies intended to be unified by the hub had to be introduced to the actors in the region. It was really one of the biggest additional values that the initiative our pilot was based on was not only just a concept or future imagination, but it opened its gates at the halftime of URBAN INNO project. This way, that our end-users and engaged cluster members could personally attend the center they could better understand every additional bit of the whole concept.

Industry4.0 based technologies were not only explained to them but were also shown them in practice and that eased the process to get even more valuable feedbacks from them.

The following priority areas were named are the follows below per the D.T1.2.4 (Basic urban innovation roadmap of Vas County):

- **Priority area1:** education of digital technology-based know-how for the local student and pupil community;
- **Priority area2:** training of digital technology-based service applications for local businesses;
- **Priority area3:** education of the local public sector and society about the implications, proposed actions due to the disruptive character of digitalization;
- **Priority area4:** demonstration of the hub for external community as a benchmark for the regional excellence;
- **Priority area5:** utilization of technology to provide service for the local business community.

The key here was also to identify connected actions to better describe and fulfil these priorities, but as it was mentioned, in the meantime, other objectives were defined along the way with more exact and practical nature. They were needed in order to further show the way of the Industry4.0 implementation to the members of PBN and am-LAB and also to the network representatives. These newly appointed targets can be found under the next '5.2' paragraph.

5.2 Strategic and operational objectives

Each action is planned according to the priority areas.

Priority area1: education of digital technology-based know-how for the local student and pupil community

- **Action realized:** six youngsters under 25 years old participated in different trainings built around 3D printing technology from 2017 as part of a Vision factory series. Our network happily reports that five of them are now PBN co-workers and are supported by PBN's management to further extend their technological knowledge to attend universities, other trainings and international workshops. Furthermore, around a dozen of groups of local pupils and students arrived to am-LAB so far in order to personally experience Industry4.0 program's impact and have a chance to think about their career expectations in the field of digitisation.
- **Action to take:** additional agreements are in advanced preparation phase with a bunch of local schools to receive even more groups formed by elementary and high school students. The network's internal target is to be able to provide the chance for at least 20 groups in the next year, especially if a co-operation with the Municipality of Vas County successfully can be installed. Based on the earlier experiences while working together with departments of the Municipality, it seems to be a realistic expectation to engage them to the network or at least to maintain a close co-operation.

Priority area2: training of digital technology-based service applications for local businesses

- **Action realized:** the training for local companies were provided mainly for the manufacturing mechatronic SMEs, since they are decisive in the weight in the area. PBN, as leading partner of the Network, has strong ties with the local economic players. The Project-in-a-day participatory method played a big role with organizing the training with SME's to think about possible co-operative prototyping between the parties to modernize their production lines with building in Industry4.0 based tools to them.
- **Action to take:** at least two successful implementation of Industry4.0 tools to manufacturing processes lead by attending SMEs in the next 1-1,5 years. It is important for the future too in order to be able to showcase the two co-operations as good practices to further motivate other companies use and develop these kind of tools co-operating with the network and possibly with end-users.

Priority area3: education of the local public sector and society about the implications, proposed actions due to the disruptive character of digitalization

- **Action realized:** a local conference was held built around Industry4.0 based technologies to inform local social, educational and governmental sector on the 15th of November 2017, where URBAN INNO played a crucial part. Based on international experiences to confront them with the potential impact and the most appropriate way of preparation for the industrial changes. The IT department of the Municipality already attended am-LAB to inform themselves better about the process being realized by the organization. A group of local citizens also had a chance to get an insight to what is happening there.
- **Action to take:** tighten up the connections further the local municipalities concentrating mainly on Szombathely and Sárvár to start, because PBN has already bondings with them from earlier projects. Kőszeg, as another determinative city of the region is also considered worth to be contacted in the coming years, because one of the members' head office is placed there (iASK - Institute of Advanced Studies Kőszeg) and the current major of the city is open-minded towards innovative initiatives per some PBN contacts. However, municipality elections are approaching and that could have an influence on the status quo.

Priority area4: demonstration of the hub for external community as a benchmark for the regional excellence

- **Action realized:** international partnership meetings and study visits were and are going to be organized, but also for the national government representatives, to showcase the strive for industrial excellence and innovativeness in the area.
- **Action to take:** here we have one of the most important action to take, because PBN's plan is to earn another big national project in order to have the opportunity to further invest to am-LAB and improve it for reaching better implementation if Industry4.0. URBAN INNO's results could matter here much, because the satisfaction rate of end-users and co-operating SMEs could very well being the subject of evaluation when controllers will check up the concerning application.

Priority area5: utilization of technology to provide service for the local business community

- **Action realized:** engineers are hired and trained to provide service based on the latest developments of the new digital industrial era technologies. They come from the technology leading business sector.
- **Action to take:** as it was already mentioned in the case of priority area number two, our goal is to successfully implement at least two Industry4.0 tools to manufacturing processes lead by attending SMEs in the next 1-1,5 years. At the same time, another important target defined is to appear on the market with two own developed products and possibly connecting services. A lot of ideas were gathered in the frame of URBAN INNO project while meeting with end-users and engineers along brainstormings, most of them concentrated on how to combine 3D printing with sensor technology. Here we are only facing with one bigger problem, which is the lack of additional professional labor force. For now, am-LAB employs three full time engineers, one engineer students participating in dual training at ELTE SEK and a trainee. At least another full time colleague would be needed it seems like to have a realistic chance to reach these targets in the next 1,5-2 years together.

6 Major initiatives and projects to be implemented

URBAN INNO is just a part of a complex action plan PBN is building around for years now. Slowly, but surely, Industry4.0 has became the focus area of PBN, because of its innovative nature that can contribute to so many valuable solutions all around the world in many different segments of industry. From attending thematic workshops and trying to learn the basics of this field in the very beginning started in 2016, PBN has now arrived to a stage where it has its own Multidisciplinary Science Center (which is officially approved as a Digital Innovation Hub by the EU) with a variety of devices to support developing innovative solutions. The professional workforce is also advancing step by step with six engineers engaged to work for am-LAB so far and more to come! The basis to create am-LAB was a successful application to a Hungarian national funding programme called EDIOP (Electronic Development and Innovation Operational Programme). That lead to the acquisition of the first few 3D printers and 3D scanner and also to the employment of six youngsters learning Industry4.0 related know-how.

The following projects are all meant to support this developing process covering newer and newer aspects of the field of digitisation concentrating on connecting topics/disciplines, like data science, robotics, sensor technology, additive manufacturing and so on. For example, URBAN INNO is the one project to concentrate on end-user needs in the field of digitisation, no matter if the subject is a new product or service.

Please find the introduction of the aforementioned EDIOP project in the follows below and its continuation also under the auspices of the EDIOP that is currently running, just as the description of an Interreg Central Europe project that is going to further extend PBN's and Vas County's Industry4.0 relevance in the future.

PROJECT NAME: Creation of am-LAB 3D service and exhibition centre (EDIOP-5.1.3-16-2017-00013)	
PARTNERSHIP	
Lead Partner	Pannon Business Network
Further regional / national partners	Not relevant, no such partners
DESCRIPTION	
Objectives	Pannon Business Network's main profile is to make the local/ Hungarian SME sector more competitive and innovative to be able to make them find the right answers to nowadays challenges. The region's biggest and most actual problem is the lack of appropriate workforce in multiple areas of manufacturing. Responding to that challenge, the organization turned to the direction of the Industry4.0 program's achievements to implement them in the region. To support this process, PBN decided to make a major step and applies for the establishment of a local Digital Innovation HUB with engaging new members to its team, who could bring innovative solutions to life cooperating together with covering multiple areas of engineering. The following objectives were/are targeted: ▪ Successful establishment of a Multidisciplinary Science Centre with Industry4.0 compatible devices. ▪ Hiring of appropriate workforce, multiple engineers. ▪ Tangible results in the field of Industry4.0 technologies, like: developing software, 3D models, individual 3D printing solutions, advanced 3D scanning experiences in practice, etc. ▪ Train the younger generations to generate professional workforce for the region, which could result in: exciting positions, meaningful roles in companies, higher salary and the elimination of lack of appropriate workforce in multiple areas. ▪ Reduce social inequalities with providing unique training for as much pupil and student as possible.
Activities	The main objective is the main activity in one piece, to establish the Centre and install its infrastructure cost-effectively. The infrastructure to provide is separated to two different sides to be obtained from the funds: 1. Equipments needed directly for daily work (stands, tables, chairs, etc.) 2. Tools needed for product & service expansion and business model introduction (3D printers, 3D scanner, network devices, uninterruptible power supplies, software, etc.) Another important activity is to learn how to use the devices properly. Connecting to the aforementioned point, application of professional workforce is necessary, so employment of engineers was needed. Of course, further support also had to be provided and six persons had to be employed per the application form of the project too, who had to meet (at least) one of the following criteria:

	1. unemployed entrant under 25 2. over 50 3. mothers coming back from child care period to enter the market The following positions were made available for applicants: marketing manager, theoretical and practical trainer, event organizer, customer contact person and administrator. Trainings were organized for the hired colleagues in the field of 3D printing and in other important areas (like communication) in order to perform well in their new jobs. Once the team acquired the required knowledge and know-how, one of the main activities can begin, which is the introduction of Industry 4.0 and connecting upcoming products and services to end-users, SME's and stakeholders. The next step built on the previous point is to further strengthen the links established with the different actors because of different reasons: 1. SMEs: find the parts of their operations, where the application of I4.0 based solutions could spare time or budget and help them to acquire techniques. If possible, provide them service (based on built in sensors, etc.). 2. Students: exhibitions, trainings. 3. Stakeholders/authorities: provide knowledge and know-how, get back further connections and other type of support in exchange.
Timeframe	01.07.2017 – 31.07.2018
Estimated costs & sources of funding	The total budget of the project was about 100.000 €. Around 27.500 € was separated for staff costs, employing six youngsters for 6 months to work in the centre and acquire knowledge and know-how.
Internationalisation linkages	The basis of this initiative was a ton on attendances by PBN colleagues on international markets all around Europe (mainly in Germany) earlier built around Industry4.0 topics and digitalization. Personal experiences with good practices convinced PBN team that this is the direction to turn to that our future will be based on. Techniques are the same all around Europe, but to implement some brand new of them in Hungary is a big challenge, but a lot of partners could help us through our way (e.g. please find some of them in the introduction of the S3HubsinCE project later).
Expected impact	Since the project is already accomplished, we cannot really talk about expected impacts, but about results. Our science centre became an officially approved Digital Innovation Hub for now by the EU following a trend that is going to be a determinative sector in the future all around the EU. Devices are tuned in and the amount of experiences regarding to them is rising from time to time permanently. The knowledge gathered by our colleagues provides us a chance to even further improve existing techniques or invent new ones and opens up a chance to distribute this knowledge to the representatives of various target groups. With having am-LAB, chances to participate in thematic projects rose a lot, not to mention co-operating with interested SMEs.

PROJECT NAME: Further development of am-LAB centre in the fields of logistics and digitalisation (EDIOP-5.1.7-17-2018-00048)	
PARTNERSHIP	
Lead Partner	Pannon Business Network
Further regional / national partners	Not relevant, no such partners
DESCRIPTION	
Objectives	The main aim is to achieve real and tangible results in multiple fields like: social development in Western-Hungary; workplace and value creation, which means interesting and joyful positions; further building of national and international partnerships; strengthening of the local knowledge base while keeping it; solve the lack of appropriate labor force; reduce the equity gap in the society; implementation of training and development processes. The main problem in the region is that the population is getting older and older and its number is decreasing permanently, not to mention that a high percentage of the younger generation leaves the county towards Western-European countries to achieve higher life standards. This process even more affects the smaller villages. The number of youngsters possessing appropriate knowledge to fill in technical positions is critically low and engineers are slowly aging and leave their positions in the meantime. So it is not enough from the side of the labor force to be present in location and time, but their competence matters a lot. To search for a satisfying solution in this is crucial. Also, redefining the way of logistics executed in the case of companies and bring in new technics based on the recent technological revolution is reasonable and is the subject of the project supported by new devices that are going to be mentioned soon in the following sections (indoor drone and AMR – Autonomous Mobile Robot).
Activities	Thanks to the aforementioned successful application to establish am-LAB as a DIH and build up a basis in the past, PBN and am-LAB took important steps towards success in the field of process digitization, mainly with promoting 3D printing technology related education and application. Completing the modernization of production lines, storage automation technology came into the view to update its techniques and spare human workforce in the field. Two main components are going to serve as the basis of the developments: a. an indoor drone, which will automate the process of the warehouse stock survey, which is usually done by people working on weekends in overtime; b. an AMR, which is available to use it as a robotic self-propelled forklift and could be a significant element of moving goods automatically inside factory plants. The drone-driven inventory system will enter the market too as a business-based service for interested actors. The AMR called MIR100 is going to be tested by am-LAB co-workers and then tests of moving goods in multiple companies' premises will be organized to measure its usefulness and usability.

	Also, a HoloLens by Microsoft is to be bought. It is going to be applicated in the field of showcasing planned Industry4.0 based solutions, how would they work in practice for example implemented in production lines. That is a useful additional value for the leaders of companies and also the standards of educations could be raised with the application of the technology. Connecting trainings to the new devices are going to be organized. To learn how to handle the MIR100 AMR, our organization is going to hold a 2 days long training to try it out properly. Another needed training is going to be covered by own resources to provide the colleagues enough time and chances to get to know the newly acquired staff. 'Staff' means here the following machines: ▪ MIR100 AMR, ▪ 3 pieces of Microsoft HoloLenses, ▪ Unity and Visual Studio software, ▪ indoor drone, ▪ server for gathering and keeping data, ▪ - laptop for Hololens.
Timeframe	15.08.2018 – 31.08.2019
Estimated costs & sources of funding	92.200 € was funded to further improve the centre. Around 21.500 € was assigned for the staff to spend on, that was meant for 4 new employees for 6 months.
Internationalisation linkages	Now, that both PBN and am-LAB have more and more relevant knowledge and experiences in the field of Industry4.0 in practice, active promotion of our DIH started in all relevant partnerships around the whole Europe in various programmes like Horizon2020, Interreg Central, AAL and so on. Since the topic is usually the subject of interest because of its innovative nature, we are usually welcome to introduce it and got positive feedback and possible future co-operations are discussed. Also am-LAB colleagues started to join PBN's project managers for road trips in order to better introduce the DIH and its activities. The motivational video pitch created in the frame of URBAN INNO helps a lot in this process and it is perfect for gathering attention along presentations.
Expected impact	The plan is to make the solutions well-known and widely used in the circles of SMEs' that the new devices offers. Let us explain further how they can be used for this purpose: HoloLens, as a rare combination of hardware and software technology, has demonstration and educational purposes at the same time. Demonstration: with the availability of a new technique, we could showcase the managers of companies that how would their factories look like, if a whole digitization process would be realized there (e.g. automated warehousing, integrated inventory tracking, real-time data tracking and display) and also if the AMR and the drone would be applied. Also with possessing HoloLens(es), we can offer a fun and special way for the attending students to get to know data, information and processes as part of an experience based educational form. Drone and AMR are also available to showcase their operation in am-LAB premises for any reason.

PROJECT NAME: S3HubsinCE		
PARTNERSHIP		
Lead Partner	Carinthia University of Applied Sciences Roland Willmann R.Willmann@fh-kaernten.at	
Further regional / national partners	Policy/administration	
	Industry	Bwcon GmbH, Intellimech Consortium,
	Research & Higher Education	Forschung Burgenland GmbH, Fraunhofer (Division Mechatronics / Department smart), Slovenian Tool and die Development Center,
	Civil society / NGOs…	Ecipa – Training and Service Agency Limited Liability Consortium, Krakow Technology Park, Pannon Business Network Association, Croatian Chamber of Economy – Varaždin County Chamber
	Others	
DESCRIPTION		
Objectives	S3HubsinCE's main objective involves the creation of a common support structure, based on Digital Innovation Hubs (DIHs), which unleash the high potential of transnational cooperation (that currently remains mostly unexploited) to promote bottom-up implementation of RIS3 in significant CE-relevant technology priority areas (TPAs) (i.e. advanced manufacturing systems, ICT, advanced materials, nanotechnology, biotech & medical devices). S3HubsinCE enhances the innovation eco-system by developing an innovation network of CERIS3 Champions, who generate coordinated RIS3-enhancing evidence, from bottom-up & market-focused activities.	
Activities	To tackle CE & specific territorial challenges while capitalizing existing assets S3HubsinCE crosslinks 10 CE areas from AT, IT, DE, PL, SI, HU, HR with the most appropriate mix of policy / R&D / implementation relevant actors. Based on an analysis of synergies & potential coop. areas of S3 strategies in CE (EU/DG REGIO) & due to current status of RIS3 implementation, the PPs regions will strive for excellence in interdisciplinary R&I cooperation & foster a consequent market oriented approach in a regional, national, transnational context.	
Timeframe	01.03.2019 - 28.02.2022	
Estimated costs & sources of funding	The total estimated budget of the project is 1.680.562,91 €. It consists of ERDF funds and public and private funds of the affected countries in the project. The main costs will be spent on the staffs of the partners, that will take a bit more than the half of the total budget (885.451,00 €). Because of the nature of the project and the objectives defined, no budget will be allocated to improve infrastructure per the original plans.	

Internationalisation linkages	The whole WPT3 is concentrating on developing a transnational strategy, its name is 'Transnational Policy Learnings for RIS3 Excellence'. S3HubsinCE directly contributes to SO 1.1, creating stronger & more sustainable linkages & collaboration between triple & quadruple helix RIS3 stakeholders/institutions by: 1) generating new innovation networks based on CE TPAs in the CERIS3 Navigation Crews 2) creating a comprehensive Digital Integration Toolkit to enhance collaboration between partners & helix institutions 3) building joint strategies, action plans & futureproof Transnational Policy & Technology Blueprint for CERIS3 Excellence, to deliver an ongoing practical method to support transnational optimisation of RIS3. 4) implementing pilot actions, starting with operation of DIHs, focused on generating a Constellation of CERIS3 Excellence & promoting coordinated actions that bring networks of CERIS3 Champions closer to the market with activities like the RIS3 Investment Forum.
Expected impact	The project approach goes beyond existing practice of the participating regions and chosen TPAs which are usually based on (a) isolated national/regional strategies, (b) missing overview about evidence proven excellence cases & actors, (c) restricted local/regional/national access to market, funding and finance, (d) short/mid-term planning time frame. The project outputs delivered by project group establishes a novel method to design, manage & introduce innovation in the frame of RIS3, through the DIH structure, while guaranteeing appropriate value for money.

6.1 Strategic area 1: creating the basis for a Digital Innovation HUB and support its starting steps

It is self-evident that PBN needed a labor like am-LAB to be able to contribute to implementing innovative Industry4.0-based solutions. Obviously, it was the biggest step in practice to establish it, but the most decisive part of the process was to appoint the main directions towards the centre want to head. Taking into account worldwide trends, devices and labour force available and the Hungarian situation, the decision was made and process digitization became the focus point to build around. That goes with bits of sensor technology, data analytics, robotics and logistics. Some of the topics are already more or less mentioned earlier, but here you can read further details about them completed with additional sectors' (planned) activities.

The covered topics here are connecting to Hungarian national funded projects mainly, the two EDIOP ones are attached to this topic that can be found earlier here in section 6, which covers am-LAB's establishment and further expansion of its operation fields.

Connecting activities:

- 2 EDIOP project above earlier described
- 1 National project called HGC (High Growth Companies) concentrating on SMEs' modernization
- 1 international conference in the spirit of technological development

High Growth Companies:

The project is running since the December of 2017 and its main aim is to better exploit the chances SMEs' have in Hungary to advance and produce permanent growing.

Here below you can find a summary about its program and connections with URBAN INNO and am-LAB as parts of a complete strategy based experiences gathered for long-long years:

Background of the project

In Hungary there are 1.1 million businesses and over 0.5 million companies registered on court. It is a huge number relative to the population number. However, when we select the businesses that have minimum 5 % growth in net sales, export turnover and staff, owned by Hungarian persons, and have at least 10 employees from the manufacturing sector of the convergent regions, then we end up with 15 companies.

Another challenge is that 25 billion euros in the period of 2007-2013, and an additional 20 billion euros in 2014-2020 were allocated and spent for development, and the competitiveness level of Hungary went down on international rankings. All allocation of subsidies was based on the system of open calls.

Based on the two above phenomena such an intention was outlined by policy makers, that a partnership approach should be applied in distribution of funds, reinforced by focus on medium-sized sector reinforcement. It led to the High-Growth-Company (HGC) program.

Preliminary studies

In order to implement the HGC program in a proper way, preliminary analysis was realized. It was concluded that HGC is present mostly in the service sector, and not so much among the manufacturing businesses, and each high growth period is followed by stagnation or decline, in most cases.

It drove to the conclusion that not the growth in itself, especially not its size is the target, but the sustainability character of that. The achievement of the widening of the medium-sized sector with targeted, multiple actions are the ultimate goal. HGC program was labelled and communicated as Medium-Sized Business Program in the promotion and marketing, which better reflected the content.

Set-up of the program

The program consists of the following elements:

- thematic workshops
- on-the-job mentoring
- international study tours
- digitalization training
- individual customized development plan
- branded communication materials
- subsidy program related to the entire development

Each element is linked to the previous one, and in terms of quantity of businesses it has a funnelling approach. It started with 2.000 companies, and 40 are selected in the final stage.

Operational program structure

The program is realized under the identifier is GINOP (EDIOP) 1.1.4-16-2017-000001. It was awarded as a business contract based on an open tender, on European level. It is the national operational program. The 1 means SME development, while the second 1 means that it has to have a manufacturing industrial focus.

The subsidy scheme identifier is GINOP (EDIOP) 1.1.16. It is the 50 million euro call for the companies.

Realizing Organizations

The contract for implementation was signed by an international consortium, led by Pannon Business Network. Further partners are BizUp Austria from Upper Austria and inno AG from Baden-Württemberg.

Connection points

The main common point of HGC with URBAN INNO is the engagement of SMEs from all around Hungary. The fact that dozens of medium-sized companies (exactly 40 of them had the chance) attended am-LAB's premises to participate on a digitalization training facilitated a lot to URBAN INNO's program in Vas county's pilot.

The process, as it was already described was:

1. Vision factory with target groups to select future direction;
2. Training of co-workers, engineers in the selected fields of operation;
3. Project-in-a-day: meeting with end-users to measure their needs – search for possible I4.0 based solutions to apply;
4. Discuss the possibilities about the recommended products and services by end-users to put them into practice.

Digitalization trainings with SMEs: measure the devices available for producing and the Industry4.0 compatible elements, then discuss the possibilities to manufacture products needed by end-users and approved by engineers, also the possible connecting services.

Further programs are planned to start based on the experiences and success of HGC program. It was a unique added value to URBAN INNO as well, because of the chance it provided to interview managers and co-workers of the companies acting in the Hungarian market.

Techno and InnoCamp - "Smart Services" Conference - Economic and social challenges of Industry4.0 (international conference)

The above event was held in the 15th of November 2017 in Szombathely to convene the important actors operating in the technological sector in Vas County and from other European regions located in Germany and Italy. Guest experts were invited to present topics about challenges per worldwide trends of digitization, as well as to expound possibilities and barriers for the Vas County region with the contribution of PBN's leader, Dr. Balázs Barta.

9.45 – 11.30	**PART I. Economic environment** **Plenary session chaired by: Imre Varga Dr.**
9.45 – 10.15	Industry4.0 policy implications Ministry for National Economy - Deputy State Secretary for Industrial Strategy and Economic Governance **Gyula Pomázi**
10.15 – 10.45	Changes in the economic structure with the respect of digitalization - Global, Central European and Hungarian trends Corvinus University of Budapest **Prof. Péter Ákos Bod**
10.45 – 11.00	New landscape and challenges of the economy in county Vas Pannon Business Network Association **Balázs Barta Dr.**
11.00 – 11.15	Economist education with respect to adjustment to the industrial development ELTE Faculty of Social Sciences Department of Economics **Imre Varga Dr.**

6 Piece of the agenda with performers and topics

A very important aspect to highlight about the event is that the Urban Innovation Quadruple-helix Network of Vas County was established as part of the Techno – and Innocamp. All members participated through the whole event and as a closing session, the launch event of the network was held. They all got even more motivated towards innovative solutions to work out in the region with the participation of end-users, so they gladly joined to the team lead by PBN.

All roles were described per the members' profile, but no financial support was asked for any of the sides, PBN only asked for contribution in engaging different groups of end-users and providing know-how, if needed. Also possible forms of co-operations between partners were discussed, for example 3D printed elements for ELTE GAO's (its main profile is observatory) telescopes to improve their performance and so.

7 Pictures from the Techno - and Innocamp

8 Dr. Balázs Barta is presenting about URBAN INNO project along the launch event of the innovation network

6.2 Strategic area 2: further enhancing the innovation potential of the region and am-LAB

One of the corner stones of this topic is the S3HubsinCE project introduced earlier in this section. It was an important achievement for PBN to participate in such a project like that, because improving its Digital Innovation Hub – am-LAB – is among the first priorities targeted and this is a field in which the co-operation between different regions has even higher importance, because a lot of specific technological fields meet here and it is almost impossible to cover all of them appropriately depending on the workforce applied. We can learn a lot from each other, especially inside the Central Europe region, where the level of knowledge possessed by participating organizations could be somewhat close to each other or at least applicable solutions could be introduced.

Connecting activities/initiatives:

- Expansion of am-LAB's sensor technology team
- Improve in the field of robotics
- Data science training for PBN's and am-LAB colleagues

As it can be seen from the above efforts, the plan is to combine multiple fields for finding unique solutions that have positive impact on both citizens' everyday life and make SMEs more productive and profitable.

Please find a more detailed description of the initiatives below:

Expansion of am-LAB's sensor technology team

Our colleague working on URBAN INNO project, Péter Mátyás is the main force in this area working on innovative solutions and evaluated end-users' suggestions. However, per the experiences of our team working with a high number of end-users and companies, it became clear now that further human resources have to be involved in this field to satisfy our partners' needs and to take the next step towards producing useful and creative solutions. Regarding to the plans, right after URBAN INNO project ends on the 31st of May 2019 our team will be expanded with another engineer expert in sensor technology. It is a big step towards co-operating properly with 40 SMEs in modernizing their manufacturing processes.

Improve in the field of robotics

One of am-LAB's engineers is already dedicated to work with robotic devices and we have a rising number from such machines, as you could already read about it earlier in the second project description (further development of am-LAB centre). Next to the drone and the AMR, we also have a robotic arm that can be used as a co-operative robot, tested by a disabled colleague who learns mechanics.

The next would be to implement new techniques that can be applied in manufacturing processes and decrease the need of human resources in boring, hard or dangerous positions/working stations.

Data science training for PBN's and am-LAB's colleagues

Nowadays, data is becoming more and more the basis of developments and services that have sky-high potential with being able to find the right relations to build on. PBN has multiple reasons to acquire this knowledge, or at least parts of it: the expanding number of co-operating partners and SMEs requires a system now and methods to treat them right in the future for achieving successful co-operations; uncountable number of specific data arriving from sensors. Based on sensor data, connecting services can be added to products with unique built-in sensors, even 3D printed into them. With treating data the right way and 'cleaning' it, useful findings can lead to the attached services and information to be provided for example about efficiency of manufacturing lines.

Python programming language seemed to be the most complex and easy to handle software for the tasks PBN is going to have in the future so a training started in 2019 consists of 12 occasions and building not only around Python, but involving Pandas, handling of SQL systems and more.

7 Management structure

Every single project has its own structure of control and management, but a coordinated system could contribute a lot to the stringent implementation of activities in time. Of course, not every element can be placed in time, because they can be dependent from other actors on the market, successfulness of technical implementations managed by engineers, developments appear in the meantime that can speed up some activities or faulty solutions that makes processes longer than expected.

As it can be seen the number of influencing factors is quite high, but a general framework for every activity has to be created reasonably compared to the complexity and resources provided for them and should be kept strictly.

In practice, the main thing is to motivate each other and providing the right channels for achieving permanent and appropriate data flow between different participating organizations, departments, experts and other external actors.

For example, PBN shares its resources between three main areas: HGC project, am-LAB's activities and project management staff. Permanent meetings with the representatives of each group are planned to be held monthly to share experiences and new findings with each other. This way, the success of a given segment could motivate another one and make it more interesting for possible additional partners to work with in the future. In the opposite side, if a department would be facing with any issues, others could suggest fine solutions with fresh minds on its focused sector with having a different point of view in the given area.

In the case of projects already accepted, it is easier to keep the management related activities strict and punctual, because application forms usually contain guidelines or obligations regulating connecting duties with reasonable frequency. Also, the funding agencies exercise their rights to control the activities on a yearly basis or per half year periods usually. All of them have their own internal systems to accomplish these related tasks.

The two most important funding agencies in the case of PBN are:

- National Research, Development and Innovation Office;
- Széchenyi Program Office Nonprofit Ltd..

Regarding to the management of the Vas County Urban Innovation Quadruple-helix Network, its leader is PBN's CEO, Dr. Balázs Barta. His role and tasks are not defined clearly, they are based on opportunities that the network have in the field of Industry4.0 and digitization. URBAN INNO project manager from the side of PBN Zoltán Molnár is responsible for organizing meetings between the stakeholders and documenting the network activities. Dual co-operation between the network partners is enabled and supported towards useful individual initiatives too, as well as any other formation that is reasonable based on the given topic arise.

Bringing final decisions is up to Dr. Balázs Barta and PBN, but representatives of the other participating organizations have to sign the documents where concrete and mandatory tasks are distributed to them.

The valid signatories per the institutes are the following persons:

Organizations' names and addresses:	Representatives:
Pannon Gazdasági Hálózat Egyesület 9024 Győr, Gesztenyefa utca 4.	Dr. Balázs Barta
IFKA közhasznú Nonprofit Kft. 1062 Budapest, Andrássy út 100.	Dr. Krisztina Bárdos
Eötvös Loránd Tudományegyetem - GAO 9700 Szombathely,Berzsenyi tér 2.	Dr. Gyula Szabó M.
Sárvár Város Önkormányzata 9600 Sárvár, Várkerület 2.	Tivadar Máhr
Institute of Advanced Studies Kőszeg 9730 Kőszeg, Chernel utca 14.	Kornél Németh

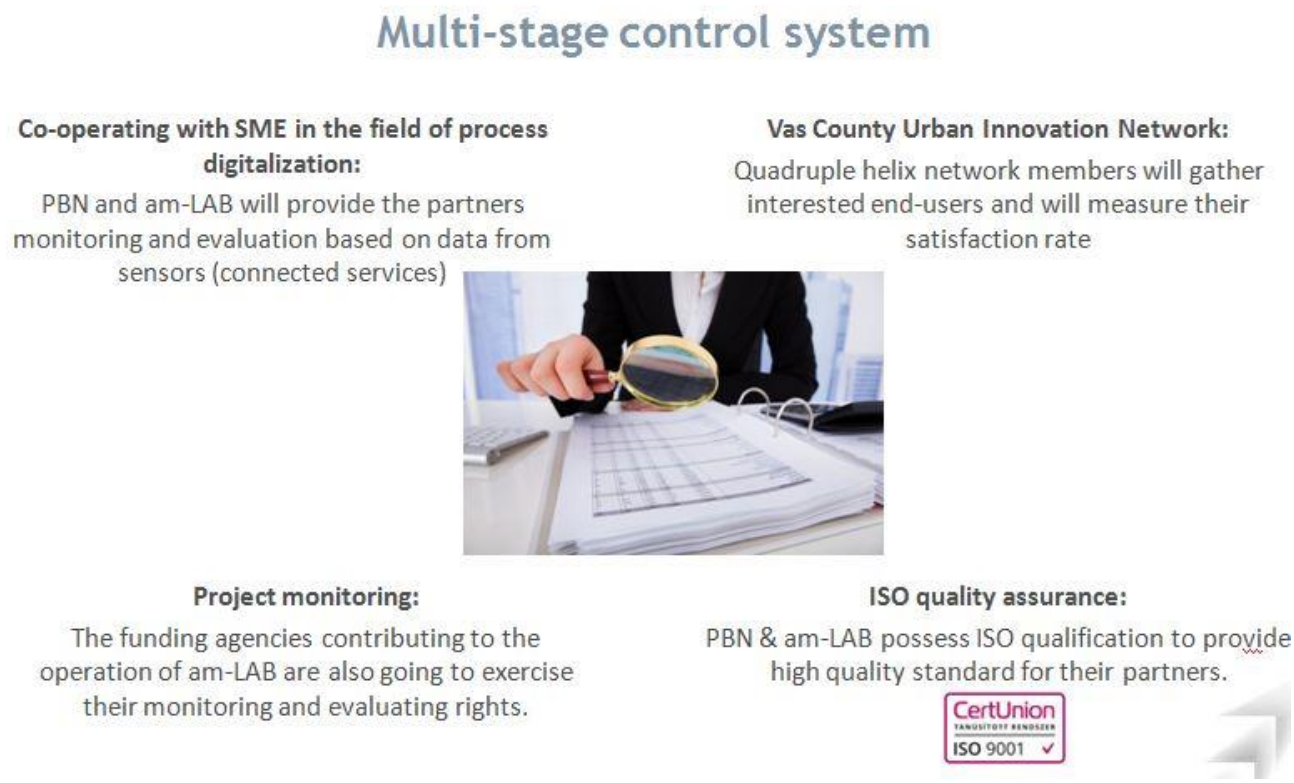
Referring to the aforementioned EDIOP projects, concrete roles were appointed for the newly arriving co-workers started to work in am-LAB as per the applications and also a defined structure was created for the 'founder' colleagues, here below are some statistics about the staff and tasks per roles:

- 80 % of them have diploma;
- More than half of the am-LAB's staff co-workers are engineers;
- The positions filled in via the 1st EDIOP project: logistics assistant, theoretical and practical instructor, event / training organizer, salesman, general administrator;
- Positions filled in via the 2nd EDIOP project: two persons, who are warehouse digitization experts, one person as salesman and one as another general administrator;
- Coordinator of the organization is Attila Joós, the CEO of am-LAB and PBN in one person is Dr. Balázs Barta.

Of course, these roles are flexible and they have to be for the purpose to keep pace with this dynamically advancing digitalization field, new challenges are bringing new answers and the need to extend our knowledge and skills.

Multi-stage system

As much as the selected field of industry and connecting activities are complex, the management structure is just as complex and the following picture reflects to this statement well:



9 Outlook of the multi-stage control system

Another important aspect of the management structure is the ISO certificate PBN applied to its project management related activities. It is a built in self-controlling system for the higher sense of security of our co-operating partners. Preliminary defined steps were appointed by PBN as parts of the workflows and auditor from the side of ISO 9001 provided their expertise on them what to change and what is adequately prescribed.

It is the part of PBN's and am-LAB's future plans to expand this ISO certificate to the different segments of the DIH's operation, like to apply it to R&D and prototyping activities in order to motivate further partners to co-operate with.

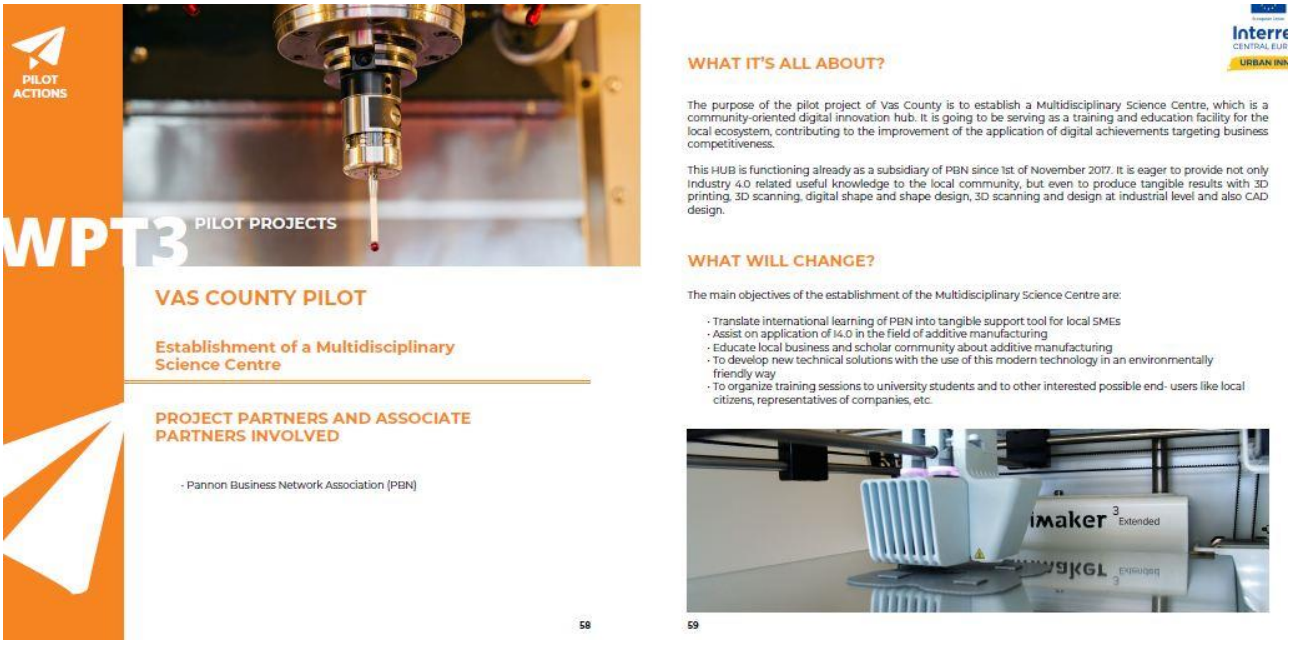
8 Communication

Thanks to the well-prepared program of URBAN INNO's application form, already multiple valuable tools are available to promote not only am-LAB's activities, but every useful segment of the project that could help Vas County and PBN generate attention.

URBAN INNO brochure

The URBAN INNO brochure contains relevant information about both of Vas County's established Urban Innovation Network and about PBN's pilot programme in an easy and understandable language tailored to also 'non-project' readers. Of course, URBAN INNO project has the intention to draw up transnational co-

operation strategies, but for PBN and the county it is very important to get well-known with the efforts taken towards a digitally advanced area. With gathering more experience using the help of media via brochures, later the knowledge transfer on the transnational level will carry much more added value.



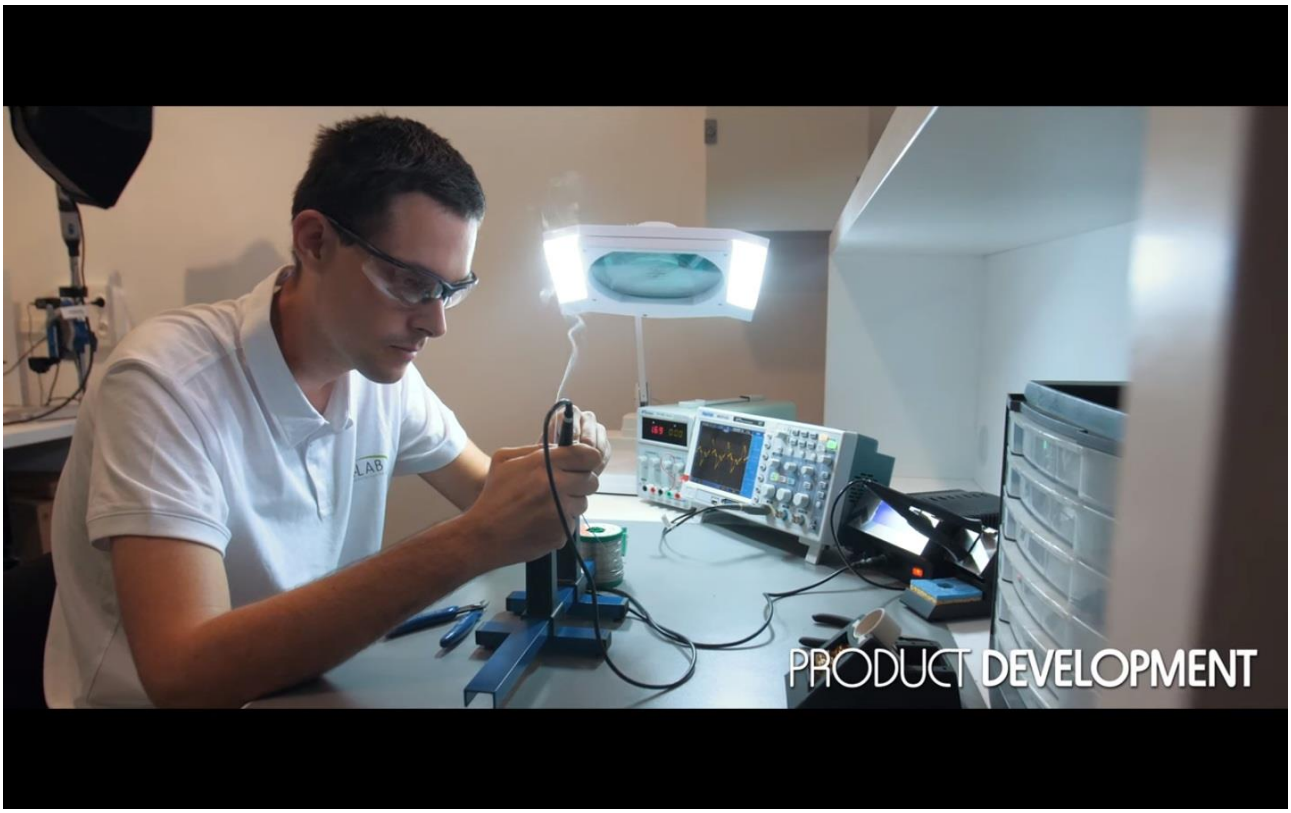
10 Pilot description (Vas County – PBN)

Motivational video pitch

For the purpose of further strengthening the communication towards stakeholders and end-users, PBN and am-LAB decided to create a Motivational video pitch encouraging partners to apply for common projects, also end-users to join participatory methods.

The video is in 4K fitting to global trends as a digitalization based organization should do. Fields of operation are described and am-LAB colleagues are introduced briefly with showcasing some everyday activities. The video is available on YouTube: https://www.youtube.com/watch?v=sPyqzSt_TzE .

It is a mutual benefit for both parties involved: am-LAB is supported by URBAN INNO's funds to have this video and the video is referring to URBAN INNO, so interested users could check URBAN INNO activities too, like participatory methods.



11 Screenshot from the motivational video

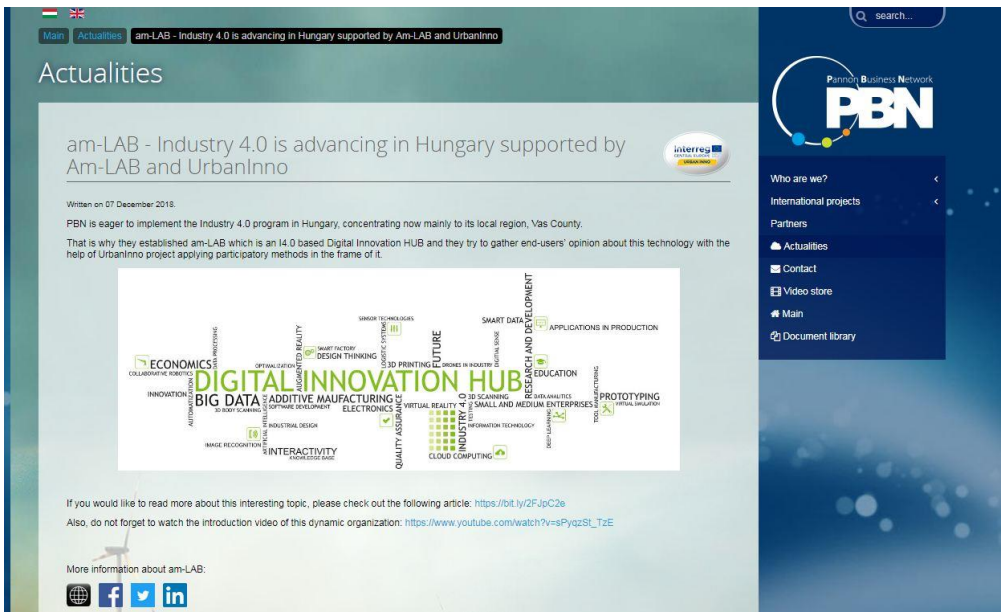
Toolbox of participatory methods

A toolbox is created by the partnership with the lead of e-Zavod from Maribor in a form of a website that consists of detailed descriptions of participatory methods as different way of opportunities to involve end-users to innovative processes next to stakeholders. Furthermore, descriptions are available about all pilots' implemented participatory methods separated into determinative sections. Here you can find the website, which is translated to all participating countries' languages: https://www.user-participation.eu/hu/. PBN and its network is committed to use and practice the Toolbox of smart participatory methods and tools developed within URBAN INNO project framework.

12 Homepage of the website

PBN website and social media channels

PBN is eager to keep their followers up-to-date regarding to all of their important activities, like the realization of URBAN INNO tasks.



13 URBAN INNO article

National and international presence (projects, meetings, conferences)

The presence of the aforementioned tangible and defined results has high importance, because PBN colleagues have the chance to confirm any urban innovation related statements with showcasing them to the actual audience. Having 20+ EU funded projects, some bigger national ones and being a business support organization with extensive network, PBN really has the chance to promote the elements of this action plan towards their earliest possible realization along different partner meetings and conferences held all around the EU and Hungary. That is a strong tool in the organization's hand, which should be treated in the right way.

PBN and am-LAB colleagues have meetings from time to time to update each other and discuss about relevant strategies of communicating their activities.

9 Monitoring and evaluation

This chapter has some overlapping with the management structure part (7), but further details are added here with the aim of implementing the aforementioned section.

Internal controlling and reporting systems of funding agencies provide the frameworks for PBN and am-LAB, but not only the projects are the subjects of the monitoring and evaluation. Also, the activities of the Urban Innovation Quadruple-helix Network have to be coordinated and measured and internal milestones are useful to set in advance.

Projects

Funding agency and ISO audits serves as the basis of their monitoring. An important addition here is that the projects do not end with their closing date, but a maintenance period is set by every funding program in order to take care about the future of the funded initiatives not to get lost along the way. This period usually takes around 3 years, but this could be changed.

Cost of equipment, software, staff budget and transferred know-how towards the organizations in the frame of projects are all measured and reported per reporting periods.

Urban Innovation Network of Vas County

A Memorandum of Understanding was formally signed by all partners after the launch event of the network was held back in the 15th of November 2017 as part of PBN's Techno – and Innocamp event. As per the 'D.T1.2.4 Roadmap of Vas County' deliverable:

The Network will be co-ordinated by Pannon Business Network. Members agreed that PBN has the pioneer role, to engage other players and envisage future goals. Partners agreed to meet on a regular basis, but the core mission is to encourage initiatives related to the hub. No formal steering group was established, as it is a voluntary co-operation of the network members.

These statements have not changed in the meantime and the MoU functioning as a co-operation agreement in practice states that no obligatory fee is required, PBN is going to provide the financial

background for the operation of the network, but any financial support is welcome from members. The funding principle is that it is financed from multiple sources. The key infrastructure is provided by PBN, from its own resources. The hard assets, the demonstration equipment is already provided from national subsidy resources.

The events – like conferences – are based on community financing of the stakeholders, like the university and the local government.

Internal milestones are to be created by PBN and am-LAB based on the experiences while they are going to follow the flow of the activities. The first milestones are already achieved, for example with engaging five youngsters that attended 3D printing trainings to work still in PBN's and am-LAB's bonds.

Next one is to become the official part of the local schools' curriculum with the digitization and Industry4.0 related trainings.

EXPECTED IMPACT FOR THE TERRITORY

10 Expected impact

The expected impact is to raise the level of digital knowledge in general in the county, with which PBN is offering a brighter future vision, where higher life standards will be natural for the local community with advancing in every smart field focusing on open innovation in a gently, but firmly and consciously directed way.

PBN gathered its experience for more than a decade now attending numerous noted conferences and project meetings with successful and experienced partners from all around Europe to get to know which directions should be followed by the organization in the future.

The described vision and mission of PBN, am-LAB and the Vas County Network is to bring relief in the everyday life of the inhabitants of the region. Of course, the process takes time and effort, but looking around the developed areas towards west, higher life standard is achieved with similar initiatives realized earlier.

What PBN offers is a self-generating chain reaction of values: creating value with transferring knowledge; creating quality jobs for qualified smart people that invent solutions contributing to smart living and smart mobility; smart governance has the important task to allocate funds and appoint key areas to be developed in the right way and, of course, smart economy profiting the most of this process with raising the standards of the county.

It is an initiative that could and should be trusted, since there is no loser seems to be showing in this process. Also, keeping its promise and do not disappoint any party, PBN established am-LAB, which is permanently advancing taking into account every significant and determinative aspect:

- More and more Industry4.0 based devices are available (3D printers, 3D scanner, AMR, indoor drone, robotic arm, HoloLens and etc.);
- The number of employed engineers is rising to keep up with all relevant fields' development;
- The number of grateful SMEs participating in the digitization training program;
- The number of companies that want to join;
- The number of attending pupils and students;
- The experience gathered by the organization;
- The number of end-users being engaged and interested to participate in this exciting process.

With implementing the steps expounded in the section 5.2 (Strategic and operational objectives), PBN's expectation is to bring Vas County closer to Budapest in some determinative economic areas and building strong connections with the partners from whom it is worth to learn. The GDP per person rate is the 80 % of the national average (presence of Budapest rises this value a lot), as a result of our actions it would be satisfying to raise this rate in the coming 3-5 years.

11 Outlook

The outlook is clear for PBN, am-LAB and the network: continue working towards common targets while applying for programmes like Horizon2020 with higher business orientation.

Another important strategic target is to engage the Municipality of Szombathely as a whole in the future, not only to co-operate with individual departments of it as PBN did so in the past. For good practice purposes the common projects realized with the Municipality of Sárvár could serve to showcase impacts and efforts like in the frame of the SOLEZ project. It is concentrating on reducing the pollutant emissions in Functional Urban Areas (FUAs) motivating inhabitants to choose environment-friendly solutions, for which an application was created in the frame of the project tailored to Sárvár. Also the measure of the mobility system's effectiveness was done by the partners of the Vas County Urban Innovation Network.

The main focus lies on educating pupils, students, experts and provide knowledge for general public representatives in an understandable way. Investing to our future hopefully brings us prosperous results, where the younger generation will be able to overcome nowadays challenges and raise the life standards of the whole region serving as a good practice to follow in the field of digitalization and co-operation between different parties to reach common objectives.

PBN would like to integrate am-LAB into some local schools' education programme in like 3 years to offer better chances both for the trained youngsters and the companies that going to apply them in the future. After more than 700 visitors from primary and high school, there is a reasonable chance to achieve this milestone.

14 Invest to digitalization seems to be a fair choice

Chances to use the gathered knowledge in the form of participating in future projects, initiating prototyping processes and get to know techniques and distribute knowledge are uncountable. The main task of PBN and am-LAB is to filter the right activities, which serve to advance and achieve tangible and useful results. Also, an important element is to find the right partners speaking about both end-users and stakeholders, who are going to stay motivated all along the way the co-operation is meant to last.

Synergies and common interests are already discovered within the URBAN INNO partnership:

- The described S3HubsinCE project does not only have PBN from URBAN INNO partners, but Forschung Burgenland too;
- InfoTrento also appointed Industry4.0 elements (e.g. 3D printing, data science elements, big data, etc.) as the continued subject of their interest, and as PBN's mentoring organization inside URBAN INNO further co-operation is declared informally.