

WP T3

D.T3.2.5

Joint implementation report for the pilot
in the advanced manufacturing sector

Version 1
2/2022





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1 EXECUTIVE SUMMARY

The pilots proposed within the advanced manufacturing sector by the project partners PBN and RDA had reflected actual regional situation and smart specialization strategies. Based on this each of the proposed pilots focused on specific topic.

The economy of Szombathely (Hungary) is dominantly automotive industry, and within that multinationals are decisive. Local industry has limited added value. Digitalization is transforming the international value chain. Regional Digitalization Program – elaborated by PBN – creates the strategic framework of the implementation. It includes actions related to setting up a new competence center, focusing on AI. Thematic orientation is on one hand manufacturing, but increasingly on healthcare. The long run mission is to establish an institute, which will serve as a knowledge background institution for the new economy.

The main motivating idea behind the idea of the so called “smart-senior-test-room” for elderly generation was the fact, which came out due to the COVID-19 situation. It became clear, that this generation is very vulnerable, especially in the case if they cannot get help from their family or their care giver. PBN would like to offer a solution with monitoring their health system and showing them different options (e.g. robots or apps) where they can not only ask for help, but can be used for entertainment functions as well.

The IGA members were involved in the pilot project as well as the local policy makers. Szombathely City and Vas County were officially part of this initiatives. Also, the university was involved in order to transfer knowledge to local citizens, too. PBN is a project partner in the INTENCIVE Interreg Europe project, where we have learned about a good practice from a Finnish University (SeAMK), where the university built up a smart-test room to monitor the elderly generation’s health system. PBN implemented this good practice and built up a similar test room, which is named at.home.

Because the target groups have many different kind of challenges in their everyday life, like loneliness, reduced number of social contacts (especially due to the epidemic situation), needing help with everyday tasks or help in physical movement or staying fit mentally etc., we offer them also different kind of solutions, like support in physical movement with electronic bed, signalling bracelet and devices, which they can use to indicate if they are in an emergency, but we are also teaching the seniors and their relatives in an attractive education environment, how to use social media platforms and social care robots to avoid loneliness, and how they can monitor their health, using smart devices, for example with smart blood pressure meter and smart blood glucose meter, or even with the sleep monitoring device, pulse oximeter and with many other devices.



The scope of the RDA pilot action was the development of Virtual demonstration centre for flexible manufacturing processes; thus, the priority sector was naturally the advanced manufacturing. The main idea behind this virtual democentre was to create a showcase platform with examples of good practices and technology implementation, which would motivate the companies toward digitisation activities.

The main objectives of the pilot action were as follows:

- To ensure access for small and medium-sized enterprises to information on new technologies.
- To assist companies in dealing with the coronavirus crisis with the aid of new technologies.
- To fulfil the planned activities of the regional RIS3 strategy.

Specific project partners who have the relevant knowledge for optimal operation of such type of activities according to theirs experience in similar type of infrastructure in science and technology parks, hubs etc. have been selected for assistance in this pilot. The PBN partner was involved as an evaluating partner but also their experience with running the am-Lab DIH was crucial. The WTP and R-Tech were the other partners that brought relevant information and examples. On the regional level, the IGA partners have been involved, especially the University of West Bohemia, Mechatronics cluster and COMTES research centre.

The selected partners also aided with the development of knowledge portfolio, which will result in educational platform (probably only for several specific technologies like 3D printing, collaborative robotics or virtual reality). New technology trends will be presented in friendly and in interactive form of education. The PR and promotion of the outputs will be disseminated by means of several workshops or seminars.



2 REPORT ON ACTIVITIES IMPLEMENTED

In the following tables, there is a list of activities that have been performed within the pilot.

Table 1.1: Activities performed – PP1

Nr	Date	Location	Type of activity	Total number of attendees*
1	20.10.2020.	online meeting	Transnational pilot meeting with RDA Pilsen	2 colleagues from pbn 2 from RDA Pilsen
2	06.11.2020.	online meeting	Chain reactions partner meeting	22 participants
3	10.11.2020.	PBN office	Internal meeting about implementing pilot actions in Chain Reactions project	4 engineer colleagues 1 project manager 1 managing director 1 financial manager
4	02.12.2020.	PBN office	scheduled meeting with am-LAB	4 engineer colleagues 1 project manager 1 managing director 1 financial manager
5	22.03.2021.	PBN office	scheduled meeting with experts	2 colleagues from PBN 1 colleagues from ELTE University 2 colleague from KTI Hungary 1 colleague from GTE (Mechanical Engineering Scientific Association) 1 colleague from Chamber of Commerce Vas County 3 colleagues from Szombathely city municipality
6	March-April 2021	Online questionnaires	questionnaires were available online on PBN's official social media accounts, links were provided for interest groups	67 participants
7	26.04.2021.	Questionnaires' analysis	Online questionnaires were analysed by colleagues at PBN and am-LAB	5 colleagues from PBN (project management, engineers and data scientists)
8	27.04.2021.	Online meeting with duo partner, RDA Pilsen		2 colleagues from RDA Pilsen 2 colleagues from PBN
9	26.03.2021	Chain Reactions online partner meeting with consortium		18 participants
10	11.06.2021.	Online meeting with duo partner, RDA Pilsen		2 colleagues from RDA Pilsen 2 colleagues from PBN
11	01.07.2021.	Chain Reactions Project consortium meeting		19 participants



12		Meetings with IGA members and interest groups	scheduled meeting with experts	14 participants
13	29.04.2021.	Interreg CE roundtable discussion	presentation of Chain Reactions project and its' pilot actions	34 participants
14.	11.06.2021.	WS1 4.1.6	Transnational pilot meeting with RDA Pilsen	2 colleagues from PBN and 2 colleagues from RDA Pilsen
15.	19.08.2021.	IGA meeting	scheduled meeting with experts	PBN's managing director 1 participant from city of Szombathely's municipality 1 participant from ELTE University
16.	06.09.20201	IGA meeting	scheduled meeting with experts	PBN's managing director 1 participant from city of Szombathely's municipality
17.	08.10.2021.	Workshop in WP. T4.	Transnational pilot meeting with RDA Pilsen	14 participants
18.	12.10.2021.	Smart Senior Room Opening Ceremony	Opening ceremony of the Smart Senior Room	238 participants
19.	02.12.2021.	Meeting and consultation and study visit with doctors	scheduled meeting with experts	5 doctors and 8 colleagues from PBN

Table 1.2: Activities performed – PP5

Nr	Date	Location	Type of activity	Target group involvement*					
				LRPA	SA	HE&R	SME	BSO	Other PPs
1	13.8.2020	Pilsen / university	bilateral meeting – with university representatives in order to obtain demonstration materials			1			
2	4.9.2020	Pilsen / university	bilateral meeting – negotiation with Pilsen DIH webpage supervisor			1			
3	20.10.2020	online	bilateral meeting – presentation of RDA pilot concept to cooperating partners						5
4	27.10.2020	online	workshop – Digitization competences at am-LAB	Aprox. 25 participants					
5	28.1.2021	online	bilateral meeting – coordination with WTP partner on demonstrators						2
6	12.4.2021	online	Innovation course – 1. Topic: Trends, innovations, mind maps			24	3		



7	19.4.2021	online	Innovation course – 2. Topic: Design thinking			24	3		
8	26.4.2021	online	Innovation course – 3. Topic: Personas, Customer Empathy Map			24	3		
9	3.5.2021	online	Innovation course – 4. Topic: Jobs to be Done			24	3		
10	10.5.2021	online	Innovation course – 5. Topic: Value Proposition Canvas			24	3		
11	17.5.2021	online	Innovation course – 6. Topic: Business Model Canvas			24	3		
12	24.5.2021	online	Innovation course – 7. Topic: Pitch presentations			24	3		
13	31.5.2021	online	Innovation course – Projects pitch presentations			24	3		
14	7.6.2021	online	Innovation course – Projects pitch presentations			24	3		
15	21.10.2021	Pilsen	The smart specialisation conference of the Pilsen region	Aprox. 120 participants					
16	26.10.2021	Prague	The smart business festival	Aprox. 60 participants					

*** Target group involvement – number of involved:**

LRPA – Local / regional public authority

SA – Sectoral agency

HE&R – Higher education and research

SME – Small and medium sized enterprises

BSO – Business support organisation

IGA – Innovation and Growth Alliance

Other PP – other project partners

PBN involved actors from the following sectors:

LRPA: Municipality of Szombathely

SA: GTE, Pálos Károly Social service centre

HE&R: ELTE University, and local high schools who attended the opening ceremony of Smart Senior Room, Óbuda University

BSO: Chamber of Commerce Vas County, am-LAB

IGA Members: ELTe University, Municipality of Szombathely, GTE, Óbuda University

OTHER PP: RDA Pilsen and GAPR as duo partners and other consortium members were also involved.



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Project partner implementing the pilot	PP1 – PBN
CHAIN REACTIONS' sector	Advanced manufacturing
Sub-sector	Health
Description of pilot work plan	<p>PP1 PBN decided to change their pilot action from the “ViaNova” to the demonstration and dissemination facility in the category of smart senior test room. The main motivating idea behind the idea of the demonstration and dissemination facility show room in the category of smart senior test room was the fact, which came out due to the COVID-19 situation. It became clear, that this generation is very vulnerable, especially in the case if they can’t get help from their family or their care giver. PBN would like to offer a solution with monitoring their health system and showing them different options (e.g. robots or apps) where they can not only ask for help, but can be used for entertainment functions as well. In addition to be able to provide the best possible solutions and options for the pilot action PBN is asking for the adding of required new budget for the purchase of the equipments for the demonstration and dissemination facility in the WP.T.3.</p> <p>This pilot is cross sectionally focused. Although the primary sector is advanced manufacturing we have selected the health sector as the sub-sector. In the advanced manufacturing, our co-partner is PP5 (RDA Pilsen) and in health sector it is PP3 (CCIA Padova).</p> <p>PBN’s main goal was to implement a pilot where we could successfully combine the advanced manufacturing sector with our knowledge from the health sector. The final outcome is the “smart-test room” for elderly generation, where we can monitor their health issues with modern technology and also provide them trainings about these technologies. PBN shared their training materials with GAPR as well, so the transnationality can be seen in the health category as well, which is PBN’s sub-sector.</p>
Detailed description of activities performed	<p>The main motivating idea behind the idea of the so called “smart-senior-test-room” for elderly generation was the fact, which came out due to the COVID-19 situation. It became clear, that this generation is very vulnerable, especially in the case if they can’t get help from their family or their care giver. PBN would like to offer a solution with monitoring their health system and showing them different options (e.g. robots or apps) where they can not only ask for help, but can be used for entertainment functions as well.</p> <p>IGA members are involved in the pilot project as local policy makers like Szombathely City and Vas County are officially part of this initiatives</p>



	<p>and University level will be also involved in order to transfer knowledge to local citizens, too.</p> <p>PBN could successfully involve local actors, such as Pálos Károly Social Service Center and local doctors in order to develop a room, which is fitting to the current trends and needs of the complex target group. Online questionnaires were advertised, which led us to involve 174 senior persons and their relatives as well.</p> <p>PBN is a project partner in the INTENCIVE Interreg Europe project, where we could learn about a good practice from a Finnish University (SeAMK), where the university built up a smart-test room to monitor the elderly generation’s health system. PBN is willing to implement this good practice and built up a similar test room, which is named at.home. We could learn many things from the Good Practices from the INTENCIVE Interreg Europe project as well, thankfully.</p> <p>PBN held National multiplier conferences in February 2022, where we could successfully present the Chain Reactions project and our pilot actions to big companies, such as Nestlé Hungary, Vodafone, FALCO Wood industry, MAM Hungary and other huge multinational companies. They were very interested and we hope to continue our development with them in the near future.</p> <p>The opening ceremony of the Smart Senior Test room successfully involved 238 participants, from different fields of the target groups: we had universities to visit us, the municipality of Szombathely (the mayor of Szombathely held a welcome speech as well), and the local high schools, local companies also seemed interested in the smart senior room development and also in future cooperation regarding the health and digitalization sectoral trends.</p> <p>Transnational cooperation was also successfully involved, as we had expertise duo partners, such as GAPR,CCIA Padova (both in health sector) and RDA Pilsen (in advanced manufacturing). On the transnational innovation and transnational industrial workshops, we actively worked on the future cooperation and future projects together in the mentioned sectors.</p>
<p>Use of value chain innovation models and instruments</p>	<p>The basic idea behind the value chain innovation models is the tailored and systematic approach to a company’s innovation performance and determining which of the many best practices out there would be the best for them to adapt. In the framework of the Chain Reactions project, PBN could successfully adapt the value chain innovation model, as we could successfully adapt the new sectoral trends</p>



	<p>during the 2 mentioned sector for our pilot action (Advanced manufacturing and Health). We developed a new pilot action in order to fit the newest needs of the sector due to the COVID-19 crisis. Based on our pilot actions, doctors and sectoral agencies, universities could adapt our developed smart senior room, where we can also help them in educational and training materials.</p>
<p>Involved actors</p>	<ul style="list-style-type: none"> • am-LAB • CCIA Padova • R-Tech Germany • Rehabilitation Hospital in Sárvár • Personal trainers • Sárvár Thermal & Healing Bath • MobiNurse – IntellFlow • KUKA Robotics • IGA members • Local experts • Doctors • Relevant experts from social care <p>All the above mentioned involved actors could successfully contribute to the final pilot action, with knowledges from the field of digitalization, robotics (am-LAB, KUKA Robotics, Mobi-Nurse), and with their respected knowledge about the health sector and the sectoral needs (CCIA Padova, Rehabilitation Hospital in Sárvár, Personal trainers, Sárvár Thermal and Healing Bath, Local experts and doctors). Social sector was involved with the help of relevant experts from social care (Pálos Károly Social service center). With the help of the questionnaires we could also involve the target group and their family members or relatives.</p>
<p>Monitoring of performance indicators</p>	<p>- <u>Promotion campaign for awareness raising among local citizens – 1</u> Online questionnaire was prepared in April 2021.</p> <p>- <u>Study visit to partners where this kind of initiative is already working – 1</u> Online study visit was available in INTENCIVE Interreg Europe project, where PBN could see the good practice and also, we had the opportunity to learn from experts and ask them related questions for the health sector.</p> <p>- <u>Artificial Intelligence training material composed by national and international knowledge – 1</u></p>



	<p><u>- Physical and online trainings execution at am-LAB based on the prepared material – 2</u> The trainings are planned for early 2022.</p> <p><u>- Transnational promotion campaign to promote the results and the cooperation – 1</u> PBN promoted the pilot action on Chain Reactions project meetings and also on workshops, and other events were also involved in promoting the smart senior room.</p>
<p>Key results</p>	<p>The pilot action is completed, PBN was trying to involve as many relevant actors as possible to ensure the best possible outcome.</p> <p>During the pilot a survey among elderly people was performed with the following results:</p> <ul style="list-style-type: none"> • 67 participants, with 174 seniors involved • 6% of the seniors move out daily • 25% cannot leave his/her home at all • 90% live alone among the interviewed 65+ • The role of the family is taken over by the social care system • Living in blocks of flats increases the likelihood of loneliness • They want to live in their own home as long as possible • Feeling of security is a priority • 2% of 65+ seniors with dementia are taken care of in the public care system <p><u>What the target groups demand, what are their problems?</u></p> <p>Loneliness In crisis situation, in emergency assistance Lack of social connections Assistance in day-to-day activities Help in rehabilitation Staying fit and up-to-date mentally</p> <p><u>What can we offer? (A few examples)</u></p> <p>Health parameter monitoring devices Applications for signalling Smart furniture solutions Communication devices</p> <p>Because the target groups face many different types of challenges in their everyday life, like loneliness, reduced number of social contacts (especially due to the epidemic situation), needing help with everyday tasks or help in physical movement or staying fit mentally etc., we offer them also different kind of solutions, like support in physical movement with electronic bed, signalling bracelet and devices, which they can use to indicate if they are in an emergency, but we are also teaching the</p>



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	seniors and their relatives in an attractive education environment, how to use social media platforms and social care robots to avoid loneliness, and how they can monitor their health, using smart devices, for example with smart blood pressure meter and smart blood glucose meter, or even with the sleep monitoring device, pulse oximeter and with many other devices.
Follow-up	<p>Scheduled meetings with possible involved actors from the field of Advanced Manufacturing and Health, finalising the purchasing of the equipment.</p> <p>We are also thinking of co-operating with the local social care system, and involve interest groups with their help in order to have proper monitoring and real feedback.</p> <p>Also, PBN would like to continue working on projects related to the health and advanced manufacturing and smart sectors.</p> <p>Development of a telemetry system is also a topic of interest for PBN.</p>
Delays, problems	Due to the COVID-19 crisis the purchase of the hardware and equipment was delayed.

Project partner implementing the pilot	PP5 – RDA
CHAIN REACTIONS' sector	Advanced manufacturing
Sub-sector	N.A.
Description of pilot work plan	<p>The main target of the pilot activity was to create and develop the virtual demonstration centre (VDC) for advanced manufacturing technologies. The VDC is a web platform for collection and visualisation of good practise projects in the advanced manufacturing area. Beside of those automation and digitisation projects, also the educational materials have been developed as will be described later in the activities.</p> <p>However, during the work on pilot a new idea for extension of our pilot action came out in the form of pilot course dedicated to innovation methods. We have created the basic concept of the course and validated this concept on mentoring meetings with bwcon partner representatives. The course was structured to 7 lectures by 3 hours long. Each lecture was dedicated to specific topic/innovation method. The course was piloted on university students (both in present and distant form of study). The students were also asked to complete their own project. The task was to bring some innovation idea for a new product, service or substantial upgrade of the current ones with the aid of different innovation methods that have been presented. Due to covid restriction the whole course was performed online and thus, the online collaborative platform Miro was used for presentation and for practical part, where students have been working in teams on their projects. This</p>



	<p>pilot course was a huge success according to feedback survey after the course realisation.</p>
<p>Detailed description of activities performed</p>	<p>The main activity was the development of a new virtual demonstrator. The final version of the demonstrator was placed on the webpage of the regional digital innovation hub called DIH HIVE (https://www.dih-hive.cz/en/virtual-democenter/). The originally intended technological sections (Virtual prototyping, Additive technologies, Robotics and automation, Virtual and augmented reality) have been extended by Objects digitisation and Digital twin sections. During the pilot phase more demonstrators have been collected with big contribution from the project partners and put online. Beside the demonstrators, we also focused on the preparation of educational materials. The materials for additive manufacturing, collaborative robotics, VR and AR and 3D scanning have been prepared and are already in downloadable pdf form presented on the VDC.</p> <p>As described in the previous section, a pilot course dedicated to innovation methods was lunched and finalised. The course was structured to 7 lectures, each dedicated to specific topic/innovation method, plus 2 more sessions for presentation of students' innovation projects. Online collaboration of the projects was performed with the aid of Miro tool. After the course, feedback regarding the course structure and benefits was collected. Detailed report about this pilot course with feedback outputs and other information was written and is available in annex.</p>
<p>Use of value chain innovation models and instruments</p>	<p>The value chain innovation methods have been used mainly in the innovation methods course. We have been closely working and implementing the following instruments:</p> <ul style="list-style-type: none"> • Mind maps and collaborative tools (esp. Miro) • Design thinking • Personas, Customer Empathy Map • Jobs to be Done • Value Proposition Canvas • Business Model Canvas • Pitch presentations
<p>Involved actors</p>	<p>During the development of VDC, mainly the project partners (PBN, WTP and R-tech) were involved in the delivery of demonstration videos and additional materials. The IGA members have been approached with the same request and University of West Bohemia with Comtes company already contributed. Further, we would like to address also SMEs from the region with the involvement for VDC development.</p> <p>Regarding the pilot course for innovation methods, a total of 27 students have been involved in this activity. There were 17 students in the present form of study and 10 students in the distant form of study. Those students that have been already working, gave us valuable insights on utilisation of those methods in practice. The distant students came from the following companies:</p>



	<ul style="list-style-type: none"> • Faurecia Plzeň s.r.o. - large • Christ Car Wash s.r.o. - large • Faiveley Transport Czech a.s. - large • Infer s.r.o. - SME • Philip Morris International Inc. - large • MEA Metal Applications s.r.o. - SME • Konplan s.r.o. - SME
<p>Monitoring of performance indicators</p>	<p>The indicators stated bellow have been established in order to map the fulfilment of pilot action.</p> <ul style="list-style-type: none"> - Business trips (or online meetings) to partner organisations – 3x (3/2021) – 3 meetings have been organised with PBN, R-tech and WTP partners in order to get some materials for the development of the VDC. Business trips had to be replaced by online meetings due to covid situation. - Cross boarders virtual demo centre with educational activity (the complex one including web platform creation) – 1x (12/2021) – The VDC is available on https://www.dih-hive.cz/en/virtual-democenter/ web page. - Technology promotion actions (workshop, webinar) – 2x (12/2021) – Because of the uncertain situation regarding covid crisis it was hard to plan and organise the public events. However we have been able to participate in programme on two public events. Smart Business Festival was organised in October 2021 in Prague as well as Smart specialisation conference of Pilsen region (also October 2021). On both of these events, the Chain Reactions project and the outputs of the pilot activity have been presented.
<p>Key results</p>	<p>The key outcomes achieved within the pilot are:</p> <ul style="list-style-type: none"> - The working platform available on https://www.dih-hive.cz/en/virtual-democenter/ - Educational materials for additive manufacturing, collaborative robotics, VR and AR and 3D scanning. <p>Piloted course focused on innovation methods.</p>
<p>Follow-up</p>	<p>We must say, that the virtual demonstration centre platform was quite well accepted among relevant stakeholders (companies and public agencies). Thus, we are planning to develop this platform further in the future by adding new showcases. As this activity goes hand in hand with our second innovation action, which is the development of our digital innovation hub (DIH) the new activities are really close. In October 2021 we have signed upgraded cooperation agreement among the DIH partners, which also contained the new name for our DIH which is now DIH HIVE – Hub for Innovations in Virtual Environment. A new logo and visual identity have been adopted as well as the webpage that has been launched recently. The VDC has been moved to this webpage and will be further developed by adding new demonstrators after the project end.</p>



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	Also the piloted course on innovation methods will be utilised in the future as it will become a part of business academy, which will be a long term educational programme for the SMEs.
Delays, problems	There were no huge problems during our pilot activity. The work plan was already developed in the covid pandemic, so we were aware of possible issues that might occur. The only pity was that we were not able to organise physical business trips to our partners to examine their infrastructure. Those trips were replaced by online meetings.



3 CONCLUSIONS AND LESSONS LEARNED

Both of the PBN and RDA pilots have been successfully implemented. The results have been already disseminated among the relevant stakeholders and wider public and a good feedback was received.

3.1 Regional Conclusions for Hungary

Based on the conclusions and lessons learned during the Chain Reactions project, and of course due to the problems, which we have experienced due to the COVID-19 crisis, it became a clear vision, that the economy of our city Szombathely which is dominated by the automotive industry and the multinational companies, need new inputs by focusing on the health sector, especially the elderly generation. As it has been seen on many international (mostly online) study visits, we came across many good practices from the well-developed regions of Western-Europe. PBN is a project partner in the INTENCIVE Interreg Europe program, which made it available to learn from Finnish partners and have their feedback as well.

PBN is willing to co-operate and implement into the future, where we can hopefully contribute not only to the Hungarian, but hopefully to the European economy as well with our smart home development. We are currently working on the telemetry system and we hope to finish it soon. PBN has already held open-day sessions (also called as National Multiplier Conferences in the Chain Reactions project), where we invited many multinational companies (such as Vodafone, MAM Hungary Kft., Nestlé Hungary Kft., TDK, Falco-Kronospan etc.) and they assured us for future co-operations and developments in the field of advanced manufacturing, digitalization and including the health sector as well.

3.2 Regional Conclusions for the Czech Republic

The Virtual demonstration center for Advanced Manufacturing was built in the form of an online platform, where specific showcases of selected technologies are demonstrated. So far, the following technologies/areas have been selected: virtual prototyping, additive manufacturing, robotics, virtual and augmented reality, objects digitization and digital twins. Big stress was put on practical utilization, thus each technology is documented by specific project with exact output and results, which are visualized by videos or animations. The main idea of this platform is to promote the utilization of different technologies that SMEs could use for their innovation activities. Those particular showcases should in ideal way inspire the SMEs to take a similar action or at least to go in this direction. The second part of the Virtual demonstration center is focused on education. There is also additional learning material for individual technologies explaining the basic principles, usage and costs. Those learning materials are available in the form of downloadable pdf files by each technology.

The virtual demonstration centre platform was presented on several promoting actions and was quite well accepted among relevant stakeholders (companies and public agencies). Thus, we are planning to develop this platform further in the future by adding new showcases. As this activity goes hand in hand with our second innovation action, which is the development of our digital innovation hub (DIH) the VDC has been moved to this webpage and will be further developed by adding new demonstrators after the project end.



ANNEX 1: SMART SENIOR ROOM OUTPUTS

Marketing pictures from the Smart Senior Room (promotional video will be available soon, webpage is available: <https://www.at-home.hu/en/index.php>), and the National Multiplier Conference at PBN (Hungary)







ANNEX 2: VIRTUAL DEMONSTRATION CENTRE OUTPUTS

Screenshot from the Virtual demonstration center on DIH-HIVE web



HOME ABOUT SERVICES PROJECTS DEMOCENTER CONTACT CS

Virtual democenter

The creation of this **Virtual Demonstration Centre** was initialised within the CHAIN REACTIONS project from the Interreg Central Europe project which aims to increase the innovation capacity of industrial companies. The main idea is to absorb new knowledge and turn it into competitive edge and business value, growth and profits. The project focuses on a few key sectors based on their embedding in regional smart specialisation strategies. The Regional Development Agency of Pilsen region is responsible for Advanced manufacturing sector. In this sector we are realising together with other partners the **Virtual Demonstration Centre** pilot activity, which is a place where innovative technologies or methods are displayed, with the aim to enable potential users (e.g. SMEs) to get familiar with them and evaluate a potential implementation in their productions. The content of the virtual democenter is divided into several technological sections, which are: **Additive technologies, Automation and robotisation, Objects digitisation, Digital twins, Virtual and augmented reality and Virtual prototyping.**

- [Všechny →](#)
- [Virtual prototyping \(1\) →](#)
- [Virtual and augmented reality \(3\) →](#)
- [Object digitisation \(3\) →](#)
- [Digital twin \(2\) →](#)
- [Automation and robotisation \(4\) →](#)
- [Additive technology \(3\) →](#)



Digital twin in your pocket

Digital twin

Twinto is an exact 3D Live Digital Twin of your facility. Whether your home, office, factory or even a whole city. It enables you to have your 3D model on your smartphone, tablet, PC or MAC and gives you access...



Digitisation of hospital complex

Digital twin **Object digitisation**

The main goal of this project was to create a digital twin of a 25ha hospital complex in Prešov, Slovakia. The photogrammetry technique was used for the digitisation. Photogrammetry is a method of creating a 3D model from 2D photographs....



Digitisation of archaeological dig site

Object digitisation

Virtual and augmented reality

The main goal of this project was a digitisation of archaeological dig site in order to capture and preserve the discovery. Many of the archaeological excavations that are discovered in the field survey cannot be protected from destruction by other...

ANNEX 3: REPORT FROM INNOVATION METHODS PILOT COURSE

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Innovation methods pilot course

Version 1
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Project information	
Project Index Number:	CE1519
Project Acronym:	CHAIN REACTIONS
Project Title:	Driving smart industrial growth through value chain innovation
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1 INTRODUCTION

The following document describes the process of course creation focused on innovation methods from Value chain innovation toolbox document. This course was also successfully piloted on university students in industrial engineering study programme. The following report will also give an evaluation of this course pilot. The created curricula can be now used as an innovation course for middle and top management in industrial companies in order to boost the innovation activities.

2 COURSE CURRICULA

The main goal of this course is to introduce students to innovation and innovation thinking. As in the last couple of years start-ups have been promoted all over Europe the idea is to inspire students in starting their own business. However this might be quite an ambitious goal. The more realistic task is at least to inspire them to think out of the box. To look at broader influences, to pay attention to trends that are affecting the market and the whole society. With this primary idea in mind we have proposed the following course. The time frame of the course is 3 hours every two weeks so in total there are 7 sessions. Due to the COVID situation the whole course was performed online. The sessions were focused on different topics as follows:

1. Introduction to innovations, megatrends, innovation environment + Mindmaps
2. Design thinking
3. Personas + Customer empathy map
4. Jobs to be Done
5. Value proposition canvas + Business model canvas
6. Pitch presentation
7. Student projects presentations

Bellow is a detailed description of the content in each topic.

Main topic	Specific content
Introduction; Trends, technological innovations and innovation environment	<ul style="list-style-type: none"> • Why do we have to pay attention to trends (examples of Nokia, financial crisis in 2008, covid) • Dynamical changes, VUCA approach • Megatrends, what is it and how do we identify them • Disruptive innovations • Video examples from Interesting Engineering media channels. Examples of innovative products. • Terms clarification – start-up, spin-off, fundraising. • Who can help you, or by other words innovation infrastructure in CZ – technology parks, incubators, innovation centres, development agencies, coworking centres.
Mindmaps; Collaborative tools	<ul style="list-style-type: none"> • Introduction to mindmaps, some history, the main ideas from Tony Buzan • How is the brain working, benefits of mindmapping • An example of mindmap – successful presentation • Brief introduction of collaborative tools - contextminds.com , mindmaps.app , Mural • Main platform for the rest of the semester – Miro • Practical exercise with Miro mindmap – together with students we will create a mindmap of current trends and megatrends



CHAIN REACTIONS

Design thinking	<ul style="list-style-type: none"> • Design thinking phases • Empathy • Define • Ideate • Prototype • Test • Brief overview of innovation tools that will be further elaborated
Personas	<ul style="list-style-type: none"> • Personas, main idea, info about Alan Cooper • Benefit of personas, types of personas • How to create a persona • Several persona example
Customer empathy map (CEM)	<ul style="list-style-type: none"> • CEM, main idea, info about Dave Gray • How to fill the 7 sections of the CEM • Specific example of filled CEM • Customers sometimes don't tell truth – example of Kodak • Practical exercise with Miro – together with students we will create a CEM for Nespresso
Jobs to be done (JTBD)	<ul style="list-style-type: none"> • JTBD, main idea, Theodore Levitt, drill and hole • Emotional, functional and social jobs • Milkshakes example • Different approaches to JTBD • Using, consuming, buying, hiring concepts • JTBD canvas – how to fill each section • Practical exercise with Miro - together with students we will create a JTBD for Nespresso consumer
Value Proposition Canvas (VPC)	<ul style="list-style-type: none"> • VPC, main idea, info about Alex Osterwalder • Benefits of VPC • VPC canvas – product and customer side • How to fill the VPC canvas, recommendations • Specific example of filled VPC • Practical exercise with Miro – together with students we will create a VPC for Nespresso
Business Model Canvas (BMC)	<ul style="list-style-type: none"> • BMC, main idea, info about Alex Osterwalder • Benefits of BMC • BMC canvas – description of specific sections • BMC and identification of business risks • Specific example of filled BMC (Netflix, Uber, Nespresso) • Lean Canvas • 55 business model patterns from BMI Lab and University of St.Gallen
Pitch presentation	<ul style="list-style-type: none"> • What does pitch presentation means, differences between elevator pitch and pitch deck • Content of pitch deck presentation - what needs to be in ppt presentation and what doesn't • Psychological background, body language, gestures etc. • How to attract the audience



Student project

The course will be ended by final oral exam, but before that the students will have to create a project. The project will be done in groups of 3 to 4 students. The main task for the project will be preparation of the concept of new product/service that can be introduced to the market. The Miro will be used as a support tool. During the course a continuous example Nespresso company and products will be done on each of the innovative methods to have better insight how they work. In the similar matter the students need to prepare their projects in group work. Bellow are the tasks they need to prepare.

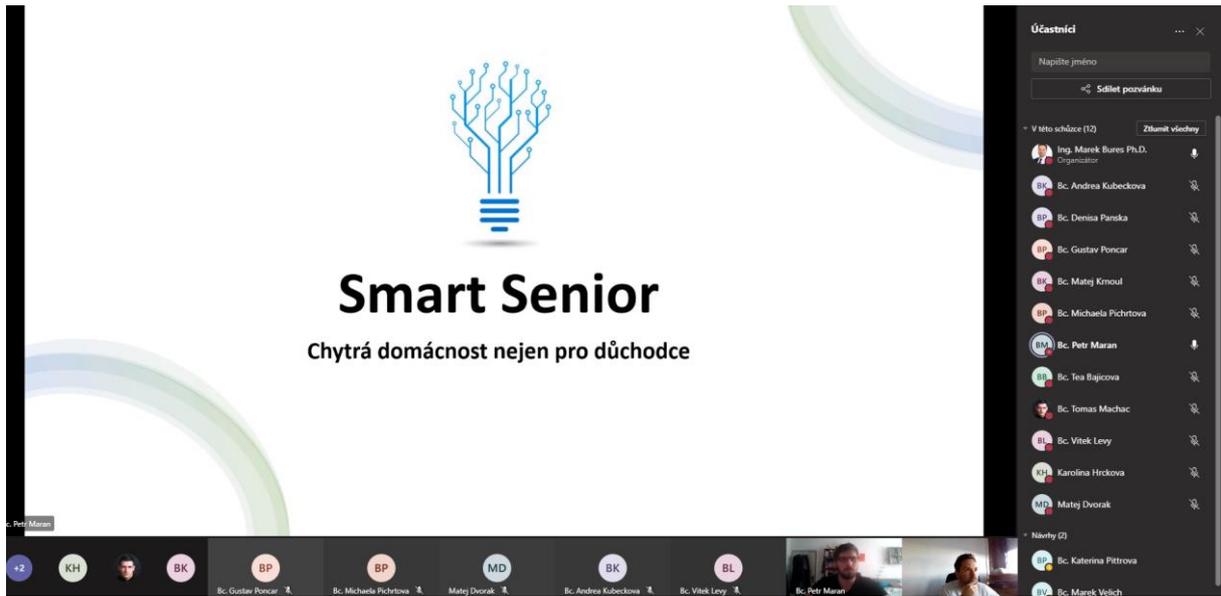
1. First step will be done together. The students can use jointly created mindmap for trends and megatrends from the 1st lecture. They will select the area where they want to target their new product/service.
2. Personas – create a persona that will be using your product/service
3. Customer empathy map – with your persona develop it further by empathy map
4. JTBD – continue the project by defining the job that needs to be done
5. Value proposition canvas – define the added value
6. Business model canvas – create the whole business concept for your product/service
7. Pitch presentation – use the recommendations for effective pitch presentation. The selected speaker from the student group will present in 10 minutes the main idea of the developed product/service and results from the used methods.

3 COURSE PILOTING

There were 27 students in total that attended the course. It was a student's mix from present and distant form of study. Those students were divided at the beginning into 8 teams for student project elaboration. Each team was composed of 3-4 students with mixed gender in order to elaborate the ideas from perspective of male and female. The final student projects have been of different quality. Some were highly innovative some only cope with current trends. The topics of the student project were:

- Ergonomic exoskeleton for reduction of workers fatigue
- Distribution of hydrogen cars
- Home hydrogen charging station
- Rehabilitation in virtual reality
- Smart household for seniors
- Application for carbon footprint compensation
- Running shoes with treadle sensor
- Distribution and rental of electric cars

Bellow are some screenshots from the pitch presentations of the student's projects. Outputs from Miro where the student elaborated their ideas with the help of innovation methods are in annex.




Smart Senior
Chytrá domácnost nejen pro důchodce

Účastníci
Napište jméno
Sdílet pozvánku

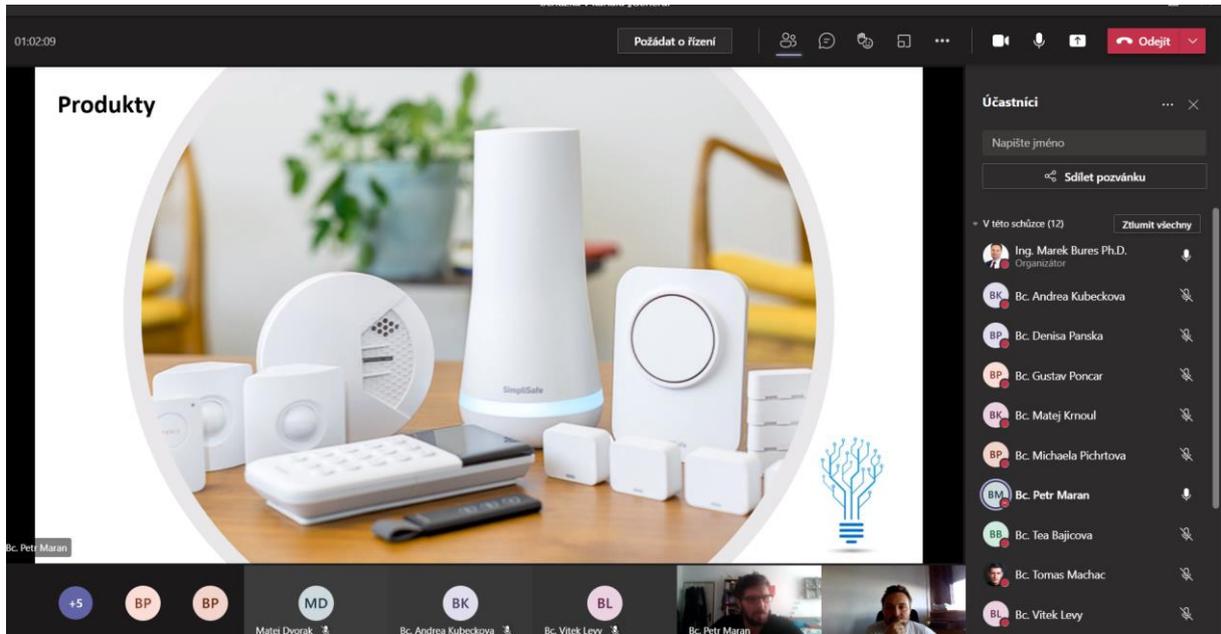
V této schůzce (12) Ztlumit všechny

- Ing. Marek Bures Ph.D. Organizátor
- Bc. Andrea Kubeckova
- Bc. Denisa Panska
- Bc. Gustav Poncar
- Bc. Matej Krnoul
- Bc. Michaela Pichrtova
- Bc. Petr Maran
- Bc. Tea Bajcova
- Bc. Tomas Machac
- Bc. Vitek Levy
- Karolina Hrczkova
- Matej Dvorak

Návhy (2)
Bc. Katerina Pittrova
Bc. Marek Velich

Petr Maran

+2 KH BK BP BP MD BK BL
Bc. Gustav Poncar Bc. Michaela Pichrtova Matej Dvorak Bc. Andrea Kubeckova Bc. Vitek Levy Bc. Petr Maran



01:02:09 Požádat o řízení

Produkty





Účastníci
Napište jméno
Sdílet pozvánku

V této schůzce (12) Ztlumit všechny

- Ing. Marek Bures Ph.D. Organizátor
- Bc. Andrea Kubeckova
- Bc. Denisa Panska
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- Bc. Vitek Levy

Bc. Petr Maran

+5 BP BP MD BK BL
Matej Dvorak Bc. Andrea Kubeckova Bc. Vitek Levy Bc. Petr Maran



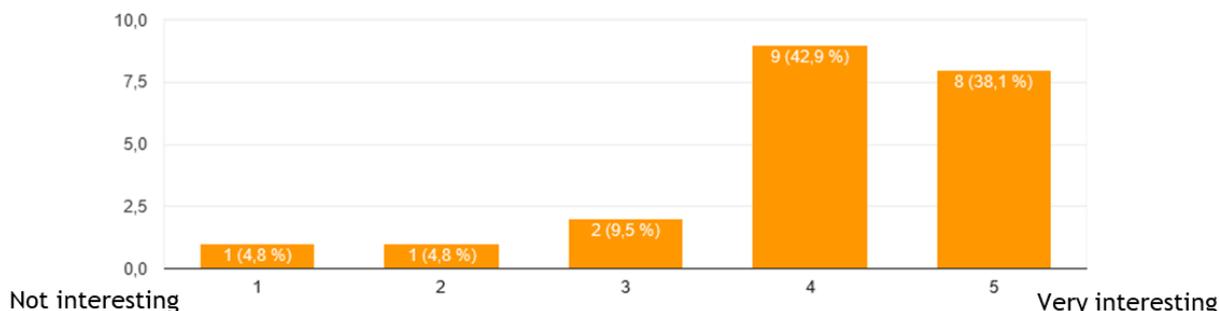
Stát	Počet plynících stanic	Stát	Počet plynících stanic
Japonsko	80	Čína	3
USA	48	Švédsko	3 (4)
Německo	34	Rakousko	3 (5 (17))
Velká Británie	15	Kanada	2
Dánsko	11	Finsko	2
Francie	10	Španělsko	2
Norsko	6	Itálie	2
Jižní Korea	6	Česká republika	1
Švýcarsko	6	Slovensko	1
Indie	4	Austrálie	1
Havaj	4	Argentina	1
Belgie	4	Brazílie	1

4 COURSE EVALUATION

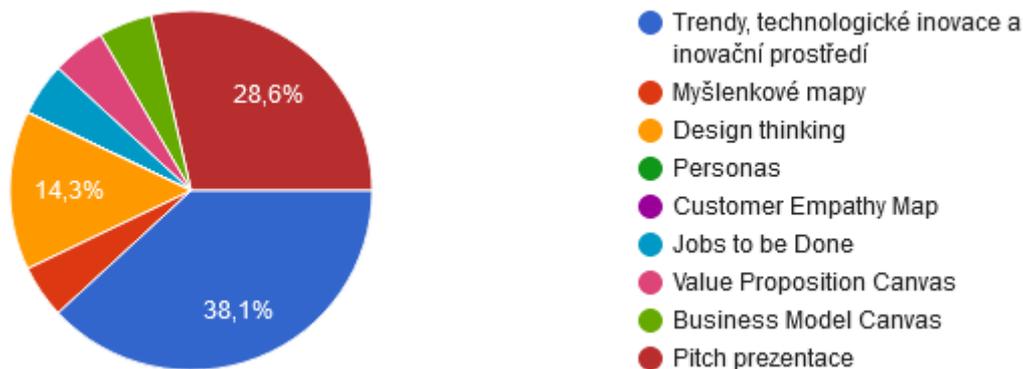
At the end of the course an evaluation was performed. We have asked the students about their satisfaction with the whole course curricula and also about the student project. The completion of the questionnaire was voluntary and anonymous. That's why we have lower response rate (N=21) that was the original number of students (N=27). However, the results from the evaluation are still valid and very useful for further development. Below are the asked questions and the replies.



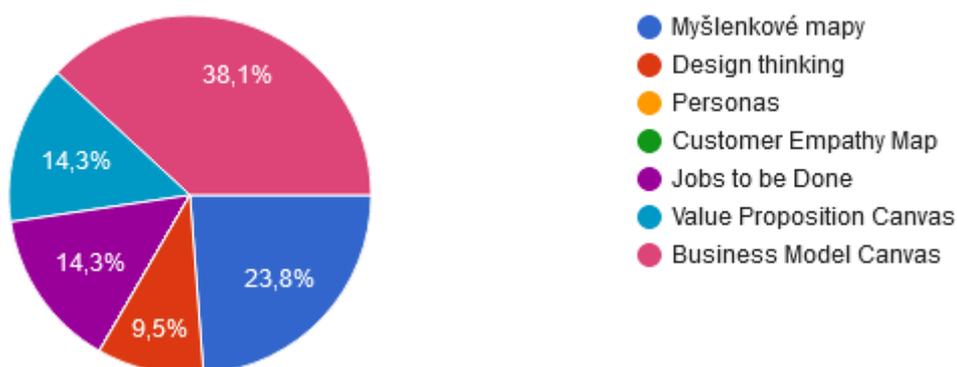
1. Was the course interesting for you?



2. Which topic you liked the best?

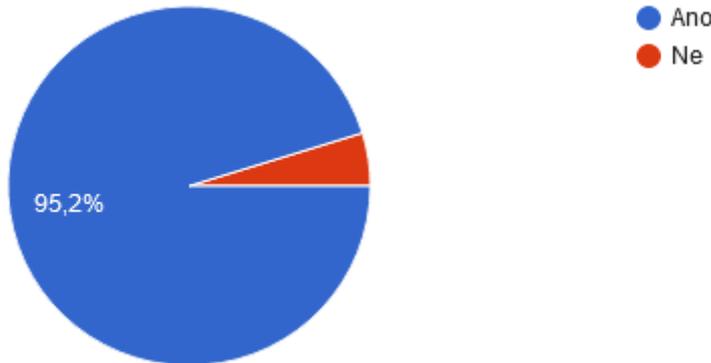


3. Which innovation method you find most useful?

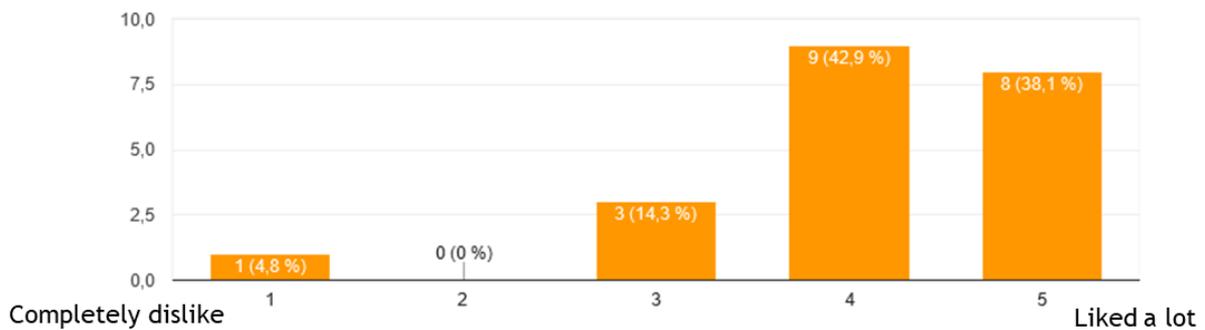




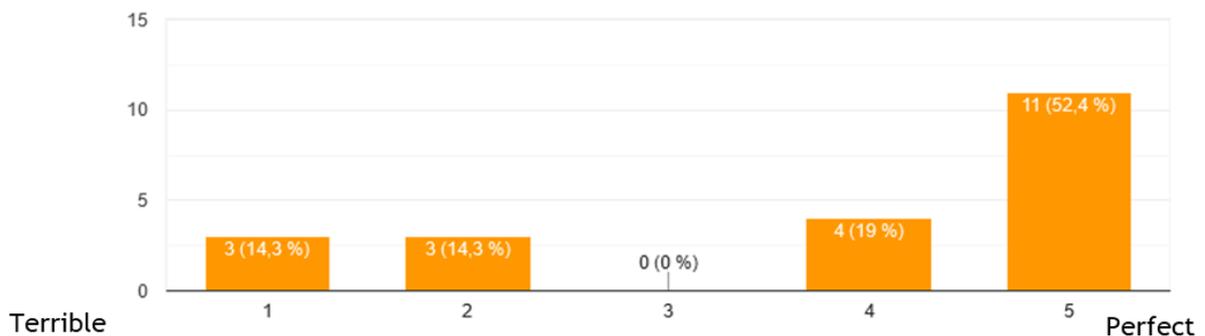
4. Can you imagine using any method in your job?



5. Did you liked working in Miro?



6. How did team work with colleagues suit you?



7. Are you proposing a topic that should be given more attention or that should be supplemented?

- The financing of projects themselves and how we can actually bring our ideas to life. How difficult it is to transform our own idea into a viable company.



- Overall, I would be interesting to see these methods filled in directly by someone based on a practical example, but I do not know if it is possible to get something like this. I assume that it will be the know-how of the company.
- For me, great preparation for real projects. I might add something more to the empathy topic - how to properly prepare a list of questions and maybe some practice, how to talk to people in different jobs - to adapt to them.
- Everything was fine for me. Interesting topics and course content. A very well-run subject, it was not just all theory. So thank you.
- Given the covid situation, this was not possible, but I think it would be beneficial for us if we could try to present ourselves in front of other classmates and get more involved in the pitch presentations.

5 CONCLUSION

We can state that the whole course and its piloting was success. We have created a curricula with interesting presentations filled will as much practical examples as it was possible. In the evaluation the students stated that the topics were interesting and that they can imagine utilisation of innovative methods in theirs practice. The students liked the opening session about innovation, trends and new ideas at most. However, as the most useful method the stated the business model canvas. Also the Miro application and online collaboration was highly rated. Working in the student teams wasn't a hundred percent fine for everybody, but we think it was because of the different levels of work intensity among the teammates. Also, the open question regarding the future development and upgrades gave some useful feedback on what to improve. Now we can state, that we are ready to approach industrial practice with this course design and focus on real industrial applications.

ANNEX 1: COURSE PRESENTATIONS

ANNEX 2: OUTPUTS FROM STUDENTS PROJECTS FROM MIRO SOFTWARE