UIIN OFFICIAL MAGAZINE

UNIVERSITY INDUSTRY INNOVATION MAGAZINE

JANUARY 2020

Universities of Applied Sciences as Regional Powerhouses

UAS – an Important Part of the Swiss Education and Research System p.4 Co-Creative Curriculum Design towards Industry 4.0 Transformation Joint-Publications and Business Funding: the case of Polytechnic University of Valencia

Join us at the leading global event in the field of university-industry engagement, entrepreneurial universities and the future of higher education

UNIVERSITY-INDUSTRY INTERACTION CONFERENCE

9-11 JUNE 2020 | BUDAPEST, HUNGARY



Contents









36

UAS IN NATIONAL ECOSYSTEMS

04 Universities of Applied Sciences: An Important Part of the Swiss Education and **Research System**

08 Collaboration of Universities of Applied Sciences and their SME Partners in Eastern Germany

BUILDING SPACES FOR INNOVATION

12 Smart Production Lab Kapfenberg at JOANNEUM University of Applied Sciences

16 Strategic Industry Partnership Approach at Breda University of Applied Sciences

CONTRIBUTING TO SKILLS DEVELOPMENT

18 Co-Creative Curriculum Design towards Industry 4.0 Transformation

24 The Nature and Impact of Collaboration between the University of Chile and Construyendo Mis Sueños (CMS)

28 Enhancing Quality Higher and Continuing Education with & for SMEs

ENGAGING IN JOINT RESEARCH

32 Joint Publications and Business Funding: The case of the Polytechnic University of Valencia



Managing editor: Hacer Tercanli

Editor: Alexandra Zinovyeva

We thank our contributors: Astrid Hannes Florian Keller Hanna-Greta Puurtinen Hans-Georg Wagner

Joaquín M. Azagra-Caro Knut Schmidtke Martin Tschandl Petri Pohjola

Dear UIIM Readers,

In this round we host a selection of articles reflecting on a range of research, teaching and engagement activities taking place at universities of applied sciences in Europe. These universities, as described by EURASHE, are institutions that profess themselves as profession-oriented. By their mission, this line of higher education institutions have strong ties with regional SMEs and other societal stakeholders in order to translate the needs of the world of work and integrate the desired competences in their educational provisions. Through this magazine issue we intend to highlight successful engagement experiences of universities of applied sciences as regional powerhouses, and discuss their crucial role as intermediaries between higher education, vocational education, and the labour market.

Our guest authors from Switzerland and Germany put emphasis on the key function of the universities of applied sciences within their national and regional higher education systems. The contributions from the Netherlands and Austria draw attention to efforts in facilitating joint research and education with industry through adaptations in both physical space and institutional strategies. Whilst the institutions from Finland and Belgium underline the importance of finding synergies among stakeholders for curricular innovation, a more holistic perspective is provided through the presentation of recent research results on the topic of university-industry joint publications from Valencia, and a guest presence of Chilean entrepreneurship ecosystem.

With reference to the diversity of activities and timeliness of innovations discussed in our articles, one can argue about the dynamic nature of the universities of applied sciences, and its flexibility in responding to the societal needs. We hope these articles serve as an inspiration to many, and resonate globally regardless of the size, nature and location of your institutions.

Notwithstanding, while we are highlighting only a fraction of initiatives and models, we would love to learn your perspective and experience on this subject and bring your ideas to our community. We kindly invite you to share your perspectives via our social media channels, or contact us through office@uiin.org.

We wish you all a pleasant read.

Managing editor, Hacer Tercanli

Designer: Elena Galán-Muros

Sergio Celis Solsiré Giaverini Tijs van Es

FLORIAN KELLER

Universities of Applied Sciences: An Important Part of the Swiss

Education and Research System

n the 1990s, Switzerland faced one of the most economically difficult times since the Second World War. The economy suffered and unemployment rose as major manufacturing companies closed their doors. In the city of Zurich, for example, about 10 percent of jobs disappeared within one year. It became clear that the service economy would need a better-educated workforce in the future. This was the basis on which Switzerland decided to introduce a new type of university that combines scientific education and practical job experience, the University of Applied Sciences (UAS).





society. 🔳

is known as being among the leading countries. The mean in practice? success of the Swiss Model of UAS' is remarkable and the growth of these intuitions has gone far beyond what policy makers expected. Student numbers have increased substantially - in fact, there has been a university and industry cumulated growth of over 700 percent.

of the institutions but so does the remarkably low which UASs can leverage as a major asset. This also unemployment number among their graduates - only means that they earn already good salaries, which is 1.7 percent are unemployed five years after leaving why many of them continue working while studying. university. It is a particularity of these universities that their study programs are very much oriented towards blended learning programs leading up to a Bachelor's profession profiles. So we find strong engineering or Master's degree. At the business school of the Zurich or management schools, schools for healthcare University of Applied Sciences, nearly 60 percent of professionals, social workers or musicians among students are enrolled in part-time programs. these institutions whereas the classical art disciplines such as philosophy or history but also the basic science disciplines such as mathematics or physics are not professional fields offered as a stand-alone study program.

"equivalent to, yet different from" classical universities. lecturers, too, need to have an appropriate professional In the education area, this means that UAS issue the background in addition to their academic achievements. same Bachelor's and Master's degrees, but the way they Their experience in the business world helps them not

Today it is safe to say that these universities have train their students is somewhat different. An important becoman important part of the Swiss education as well guiding principle is to suite the industry or institutions as of the research system. In both areas, Switzerland that students will work for in future. But what does this

How to suite industry and students

Part-time programs - a continuous exchange between

UAS students have already had 4 to 6 years of work Not only do the students numbers proof the value experience when they begin their tertiary studies, To accommodate them, UASs also offer part-time and

Experienced lecturers and professors - in academic and

In UASs it is not only the students who have a foot The Swiss government requires UASs to be in both the academic and the professional worlds. UAS only to understand where their students are coming from, it also adds credibility to the theoretical knowledge they impart.

Applied research – driven by the needs of industry

Different research schemes created by the Swiss federal government compel UASs to orient their R&D activities towards the needs of the industry. Increasingly, government funding for research projects depends on the ability of universities to collaborate with companies willing to invest time and money in innovative research. To be successful in this setting, universities need to be in constant communication with the industry to understand their needs.

Transfer through continuous education & consultancy Continuing education promotes the direct knowledge transfer by participants to the companies where they work. A great variety of continuing education programs and courses are on offer, ranging from one-day workshops to qualifications taking a year or longer to achieve. Examples include courses on specific topics such as business models in 3D printing or the latest trends in compliance or cyber security and even an International Executive MBA.

UASs also offer a wide range of consultancy and University of Applied Sciences.

service projects to companies, including classical problem-based solution design, academic counselling or in-house training programs.

Evolution

With 20 years of age UAS are still relatively young institutions and their role is evolving. Whereas on Bachelor-level the growth in students numbers has slowed and UAS are today pushing out over 14'000 graduates every year, which is about the same number then the classical universities in Switzerland, the growth on Master level continuous. Only introduced about 10 years ago, the number of UAS Master Programs and graduates has seen a steep growth in the last years. Still, only one in four UAS Bachelor graduates runs for a master degree. Also, UAS have started to cooperate with classical universities to offer PhD programs. To summarize, UAS are increasingly living up to the requirement to be "equivalent to, yet different from" classical universities, by offering not only minor degrees but the whole range of academic programs.

Hand in hand with the process, we have seen that UAS have broadened their international reach. Not only do they entertain a large network of partner universities but their professors are integrated in the international science community and strive to contribute to international research projects like Horizon2020. In research consortia, they often take to role to translate

the gained findings into an impact for industry and

tangible outcomes that make **CONTINUING EDUCATION PROMOTES** THE DIRECT KNOWLEDGE TRANSFER **BY PARTICIPANTS TO THE COMPANIES** WHERE THEY WORK.

IMAGE CREDIT: International Management Institute, Zurich University of Applied Sciences.

DR. FLORIAN KELLER is the Head of Center for EMEA Business at International Management Institute, Zurich

KNUT SCHMIDTKE & HANS-GEORG WAGNER

Collaboration of Universities of Applied Sciences and their SME Partners in **Eastern Germany**

he Saxon Universities of Applied Sciences new employees. The funding amount of 15 million (HAW) in Dresden, Leipzig, Mittweida, Zittau/Görlitz and Zwickau are collaborating to strengthen research-based knowledge and technology transfer. The transfer network "Saxony5" a meaningful and productive transfer organisation and brings together the resources and competences of the infrastructure. In addition, the brand can be developed five universities as well as of several direct partners. through central and branded project communication Through interdisciplinary cooperation and intelligent networking, a new quality in terms of content and content. method is to be achieved in technology transfer, and thus a sustainable welfare development for the region. This project is funded by the BMBF and the Joint Science Conference of the Federal States of Germany in the application-oriented knowledge and strengthening "Innovative Hochschule" programme.

cooperation with companies on the basis of personnel management measures. In the project topic "Innovation Trainees", graduates with already existing ties to a cooperation partner are trained in transfer-relevant contents in the initial phase of their professional cooperation partners for the universities and, on the companies. In addition, the application-oriented

euros and the relatively long project duration of 5 years also provide the opportunity for the development and investigation of new event formats and the conception of and broad target groups can be informed with tailored

Education: Teaching at German Universities for Applied Sciences has the clear goal of imparting practice-oriented competencies for assuming The project offers the resources to consolidate the management functions in companies and institutions.

Research: Projects with SMEs generate a large part of research and development projects of the universities. Reasons are the funding structure of the EU, the federal government and the federal states in Germany, which activity. On the one hand, this should generate new mostly require an SME status of the participating other hand, set seeds for later cooperation with these research of the Universities of Applied Sciences is rather 🕨



tangible for SMEs. A low-threshold contact is very well possible. Due to the lower or non-existent research and development budgets of SMEs, the number of SME partners in the field of contract research is also high, but the project volume is usually rather low (< 50,000 \in).

Valorisation: Due to the high number of joint research projects with SMEs, there are also joint inventions and patents with SME from these projects. These result in corresponding license revenues if successfully marketed. The universities each have an appropriate start-up centre to advise academic or student start-ups and otherwise support or make use of the regionally available support possibilities of the cities and business associations. Some universities provide appropriate infrastructure for their founders.

Governance: University management is called upon to anchor the sustainable implementation of recursive knowledge and technology transfer in their strategic development plans and guidelines. To implement this, they must logically provide an attractive infrastructure and permanent positions for the transfer. This will take place the more quickly the more successful the corresponding initial transfer projects, such as the Saxony5 joint project, are. To this end, appropriate instruments of transfer indicators have to be made available to the university management. Meaningful indicators of a successful transfer are currently being developed and evaluated within the framework of Federal Ministry of Education and Research (BMBF) -funded research projects in the Federal Republic of Germany.

Despite the existing prerequisites, too few SMEs are reached and too little ready-to-use knowledge is put into practice. On the one hand, this is due to the lack of transfer personnel at the universities and a correspondingly efficient transfer institution. On the other hand, it is due to the lack of innovative SMEs in the region. The Saxony5 - Smart University-Grid project is intended to carry out development work here on the university side. The resources available in the project are to be used to determine which resources and boundary conditions are necessary for good knowledge and technology transfer at the universities. Furthermore, various approaches and ways of transfer will be tested and evaluated in order to document best practices and failures and their causes.

Co-Creation-Labs (CCL) have been created as an offer for the regional stakeholders to make interdisciplinary, complementary transfer contents on socially relevant topics of technical background available. On these broader CCL topics, the scientists are working across locations under the Saxony5 brand. Target group-oriented solutions are developed and the project also provides the resources for topic-specific sales, acquisition of project partners and branded external communication.

The basis for this will be the Smart University Grid of the five Universities of Applied Sciences in the region. With the complementary authority of the universities and a common marketing strategy as Saxony5 more SMEs are to be reached and the co-operation be arranged more lastingly, in order to make innovations usable for region and world.

There are currently six CCL on the following topics:

- factory of the future
 network mobility
- additive manufacturing
- supply infrastructure
- agriculture and biodiversity
- surface technology

Initial status analyses show that the project and resources have led to a significant increase in industrial cooperation and concrete projects, especially where a certain infrastructure and network already existed. In other places, teams first had to find each other and develop and communicate an offer for cooperation partners. The further development of the CCL is to be monitored and evaluated in the course of the project.

IMAGE CREDITS: pp. 9 Peter Sebb (HTW Dresden)

PROF. DR. AGR. KNUT SCHMIDTKE is the Vice-Rector for Research and Development at Dresden University of Applied Sciences

HANS-GEORG WAGNER is the Project CEO, Smart University Grid Saxony5

GSG BAUBESCHLÄGE GMBH ON THEIR PARTNERSHIP WITH SAXONY5

"For us, as a SME, innovations in our processes and practices are indispensable. The cooperation with the HTW Dresden gives us the opportunity to transfer the results of applied research directly into practice. These are key drivers of our digital transformation".





FIGURE 1 Knowledge and Technology Transfer as a recursive process

Smart Production Lab Kapfenberg at JOANNEUM **University of Applied Sciences**

igitization represents an opportunity for export-oriented European industry in order to succeed as a high-price region in the face of global competition. There are three main reasons for this. Firstly, Industry 4.0 or Smart Production leads to lower costs. Secondly, individualized products with comparable efficiency as in series production can be manufactured. Thirdly, new, digitized business models can be developed and thus achieving new sales or higher margins. Digital transformation is necessary to realize such competitive advantages. For this purpose, internal and cross-company processes have to be optimized according to lean principles. Then, the processes have to be vertically and horizontally integrated and digitized.

MARTIN TSCHANDL

To accelerate digital transformation processes, however, more efforts are needed both in applied research and development as well as in practical implementation, in order to support especially the small and medium sized enterprises (SME) in this process. These companies often do not have sufficient (human) resources available to foster their digitalization goals. It is particularly important to support regions where the proportion of manufacturing in relation to GDP is high, e.g. Upper Styria with about 42 %.

Integrated Learning and Research Factory

For this reason, the Institute of Industrial Management at FH JOANNEUM University of Applied Sciences has designed and implemented the Smart Production Lab – Austria's first applied Industry 4.0 teaching and research factory with an integrated Smart FabLab (see www.fablab.org) – at the industry-oriented university location in Kapfenberg. The Smart Production Lab includes the horizontal integrated machinery (3D printing, CNC, robotics ...), IT workplaces for planning (Manufacturing Execution System - MES, Enterprise Resource Planning - ERP), real-time reporting and other vertical integration applications, a creative zone (NextGen-Lab in cooperation with SAP), the IT Security Lab as well as a seminar and workshop area.

The goal is to qualify industrial engineers for future

THE UNIQUE ATTRIBUTES OF THE SMART of the worldwide advancing **PRODUCTION LAB ARE ITS STRUCTURE, THE** industrial ORIENTATION TOWARDS VERTICAL AND HORIZONTAL (IT) INTEGRATION, THE FOCUS Furthermore, competitive **ON USE CASES AND THE COMBINATION OF** advantages of the industrial TEACHING AND LEARNING DIRECTLY IN A region of Austria in

requirements in the context evolution (human resource function). **RESEARCH FACTORY.** digitization are to be secured through developing

competencies and trigger and implement applied research processes in the form of use cases (project and transformation function). Finally, the Smart Production Lab is an innovation environment for potential start-ups and will be available to an interested public as part of the FabLab (prototyping and dissemination function).

The objectives are achieved through a unique focus on combining vertical and horizontal integration with the possibilities of digitization and the Internet of Things (IoT). The focus is on the optimal use of data from the supplier to the customer, and from the shop floor via the MES and ERP system to Big Data, analytics and management reporting. Since March 2018, the Smart Production Lab has been researching the digital transformation based on the production of customized product prototypes.

What is the unique selling proposition?

The unique attributes of the Smart Production Lab are its structure, the orientation towards vertical and horizontal (IT) integration, the focus on use cases and the combination of teaching and learning directly in a research factory. The lab combines the spatial concept

of an industrial hall with production workstations and three integrated sub-labs (FabLab for public access to the lab, Security Lab and Next-Gen-Lab for generating new business models). The focus on vertical and horizontal (IT) integration does not merely aim at the optimally digitized and operated production machine/plant, but also targets the data flow from CAD designs via planning in MES to the accompanied data flow, via IoT between individual production steps and the connection to ERP and big data systems. The optimal use of data from the supplier to the customer (horizontal) and from the shop floor to management reporting (vertical) is a core principal. Our concept of use cases enables companies to concentrate on digital transformation examples according to situational needs and available resources. At the same time, the Smart Production Lab allows for new developments to be offered on an ongoing basis with less need for replacement investment through applied research. Finally, with its auditorium and further flexible workshop elements, any lecture, workshop or seminar can be carried out in a digital production environment

The continuous development of the Smart Production Lab and future activities are mainly secured by four aspects:

I) Long-term cooperation and partnerships with SMEs and large companies (e.g. train the middle management in digitalization)

2) Anchoring future key topics through research focused use cases (e.g. developing new use cases together in collaboration with partner companies)

3) Integration of the Smart Production Lab into a research-focused and -led academic teaching (especially in the masters "International Industrial Management")

4) Public accessibility of the Smart Production Lab by FabLab activities.



VOESTALPINE ON THEIR PARTNERSHIP WITH FH JOANNEUM UAS

"Since 1995, there has been a close relationship between Voestalpine and the Joanneum at the *Campus in Kapfenberg. It extends to co-location* - the campus building is on the former site of the *R* & *D* building of voestalpine Böhler stainless steel, and the connection between Industrial Management in terms of content - in applied R&D projects as well as internships and diploma theses.

With the opening of our own competence center for digitization in Kapfenberg, Voestalpine High Performance Metals Division prompted the launch of the Smart Production Lab as a platinum partner. A Behringer band saw, among

IMAGE CREDITS: FHJOANNEUM_Kanizaj

PROF. DR. MARTIN TSCHANDL is the Head of Institute Industrial Management and Dean of the Department for Management, FH JOANNEUM -University of Applied Sciences.

other equipment, was provided with the aim of carrying out applied research projects on "digital retrofitting". Different Sensors are installed on the saw so that vibration data can be collected, processed, transmitted and stored in sequence, to be analyzed for predictive quality and maintenance purposes. Additionally, a "Digital Ambassador Qualification Program" was developed together with the institute as academic partner: executives from the division (worldwide 13.000 employees) work on special digitalization topics during five training days, three of them at the university's Smart Production Lab."



Strategic Industry Partnership Approach at Breda University of **Applied Sciences**

new synergies for innovation. ▶



TIJS VAN ES is the Program Manager Connection to Industry at Breda University of Applied Sciences.

SPACES FOR INNOVATION

INTERVIEW BY HACER TERCANLI

n an interview with UIIN, Tijs van Es shared his insights into the most recent developments at Breda University of Applied Sciences on the inclusion of Connection $oldsymbol{L}$ to Industry as a new pillar of the university central strategy, as well as discussing the opportunities and vision on the newly established Innovation Square in creating

HT: Can you shortly tell us about your role in Breda UAS as a facilitator of university-industry collaboration?

TvE: Among my other roles, I have been working in the position of Programme Manager for Connection to Industry. This has come after a recent development we 'Connection to Industry' among our central strategies, as an addition to four others.

HT: What is this new pillar expected to change in the industry engagement activities of the university?

TvE: Industry collaboration has always had a prominent place within our strategy, but to place it as centrally as the 5th pillar, is a new step forward. When you put it centrally as a separate one it creates a lot of attention. Now we have a few streams moving into the same direction of development, including e.g. building up of our new campus. We used to have four different locations, and our academies were scattered out to different locations, for a long time. This led to most faculties in the university grow into islands, and create their own structure of working with the industries. With us moving together in one campus these structures will all come together, allowing industry relations finding crossovers. For this, we acquired an old monastery next to our original main location of the university. Our goal is to first physically bring together buildings and people to develop the campus environment, and second, strategically bring together services and rethink crossovers that will feed from the physical closeness.

HT: How do you plan to facilitate the culture change that will come along?

TvE :We already have a good culture of collaboration and good connection to the industry. However, we tend to act reactively, in a way that industry comes to us, we see it coming, and we act upon it. Our challenge is to move from reactive to a proactive approach to industry collaboration, by asking who the partners are we would like to work with, what our partnership proposition is, and the value we get out of this collaboration. We tend to serve the industry without much reflection on our needs, which is something in our DNA. Our goal is to bring more value to existing partnerships, and asking what value we can offer to each other. We want partnerships to be established in multiple levels - students are involved in, cases are provided by the companies, internships are being offered, the staff is part of joint research projects, and maybe professors are working in the company. It is this strategic approach that brings in the most value.

HT: How do you think these efforts will be realised, and have an impact internally and in the region?

TvE: We are a medium size UAS, built around eight domains of focus and hosting around seven thousand students. Our areas of expertise are very specific: We offer programs in the domains leisure and events, Hotel,

Facility, Games, Media, Tourism, Logistics and Built Environment, with collaboration to the specific industry. which already gives us a good head start. We reserved 1200 square meters area in the campus, specifically dedicated to the shared space called 'Innovation Square' to stimulate crossovers among the domains. This space have had in our strategy where we added the 5th pillar is where we will execute our central strategy. The goal is to allow industries and communities coming in, as well as having our staff and students going out into the ecosystem.

HT: What was your development process of the Innovation Square Initiative?

TvE: We took a trip across the Netherlands, to observe different initiatives, and creative, innovative hubs, including e.g. Cambridge Innovation Center in Rotterdam, Startup Bootcamp in Amsterdam, and the Erasmus Center for Entrepreneurship. These visits helped us to develop our unique working concept of innovation. At the end of our trip, we decided that we want the core function of this space to be the facilitation of innovation that serves as a means to better connection to industry and more than a place we rent out to companies and startups. Now we will give visibility to our industry collaboration initiatives in the Innovation Square, to stimulate crossovers. Our researchers conducting joint research will have place to display their work, as well as startups from the university who we

rent out office space. In addition, four companies will join us, based on their multi-level partnerships with our students and staff.

HT: What are some of the challenges you have experienced in this process?

TvE: In the field of education we tend to talk a lot, and meet a lot, so the challenge is to translate this enthusiasm into action. We bring the stakeholders together in the Innovation Square for synergy, by adopting the approach serendipity - let us see what happens. At this moment, it is impossible to decide what crossovers will happen. You have to trust the process that is an important one, because you have to have faith in who you have and whom you bring together.

HT: What would be the factors that will carry this initiative to success?

TvE: We already have many best practices when it comes to industry collaboration, with many are through our staff who are also working in the industry. and through our international students. Our success will not come from creating more partnerships, but by developing a culture that will allow further development of strategic partnerships with our existing partners. In this development process, what helps us is to use a model of industry partnership canvas. We created this canvas with all the heads of the departments, the management team member from each domain, and

with communications directors. We have launched the 'Connection to Industry Committee', who hold regular meetings and work on developing a common language to be used when working with the industry. The canvas supports everybody to align in common targets, and helps facilitate conversations with industry representatives in discussing the type of activities, and the levels of collaborations to be established.

We work well, because we work very small scale within our learning communities, as part of our strategy. Here, the 'learning communities' mean the communities, e.g. those who are self-steering, all industry and community groups and researchers who collect around centralised domains. Even within the same domains there are separate learning domains.

Being intrinsically motivated is why we have many good practices; however the challenge is to facilitate this on a central level without over-structuring or regulating the processes. This is our goal.

UIIN



18

IMAGE CREDITS: Business Square, Breda UAS

HACER TERCANLI is the Senior Project Officer at

PETRI POHJOLA & HANNA-GRETA PUURTINEN

Co-Creative Curriculum Design towards Industry 4.0 Transformation

he latest digital transformation in industry has reinforced the need for agile, future-oriented skills and competence development, especially in the field of Industry 4.0 related sectors. In this transformation process universityindustry collaboration plays an essential role. The collaboration must be based dialogue, iterative by nature, open and co-creation oriented. ►

SKILLS DEVELOPEMENT

In this article, we describe Tampere University of Applied Sciences' (TAMK) educational and pedagogical approach for Industry 4.0 capability creation, where TAMK FieldLab plays a vital role. TAMK FieldLab is the latest strategic initiative and major investment by TAMK consisting both of state-of-the-art equipment and novel co-creative operational model.

How to respond to the Industry 4.0 transformation needs?

Industry 4.0 is commonly used to describe the widespread integration of ICT in industrial value chain. Industry 4.0 opens up new opportunities for value creation and increases the competitiveness of companies. However, this improvement in competitiveness will not be achieved without the continuous updating and upscaling of both technological and soft skills of students and professionals working in companies. This requires co-creative curriculum design and implementation both in terms of content and pedagogical solutions.

TAMK FieldLab fostering knowledge transfer for Industry 4.0

TAMK FieldLab promotes the expansion of Digital Competences 4.0. In this way, TAMK FieldLab responds to the knowledge challenges posed by digital

transformation as well as encourages capitalization of new business opportunities and more effective utilization of new technologies.

TAMK FieldLab's novel operational model emphasizes an open co-innovation process allowing the use of versatile machines in an industrial-like experimental environment by students, staff and companies alike. Ensuring TAMK FieldLab as an industrial testbed to be compatible with the Industry 4.0 requirements, special attention as regards to technology investments has been paid to accessibility and communication capabilities.

TAMK FieldLab improves student learning as it increases research and innovation activities. In addition to developed skills, students receive new contact space for interaction with companies together with opportunities for internships and job vacancies.

Co-creative curriculum design - Case Technology Academy

Education and related curriculum needs to be designed towards industry and business needs. Simultaneously, curriculum must ensure student mobility and employability. TAMK's strategic ambition is to pursue pedagogical and educational approach having close industry-specific co-creation and joint curriculum design framework. As one example in the field mechanical engineering, TAMK has formed technology academies. In these technology academies, new technologies related to Industry 4.0 will be applied in student projects implemented within TAMK FieldLab.

These technology academies have strong industry cooperation. Students form independently operating student academy teams around specified delivery targets given by industry partners. Teams have also university agreed academic targets and they are credited for their performance. Students learn expertise skills in latest professional technology environment and gain industrial personal networks advancing their career. University offers project guidance for the academy teams ensuring quality of results. In exchange, university gains free access to industry partners' latest equipment and applications.

Join us on this journey!

TAMK FieldLab activities support our vision and
profiling strategy. Our aim is to strengthen the business
cooperation network towards internationalization.of Indus
AppliedTAMK FieldLab conducts research and innovation
experiments and pilots to prioritize the needs of the
labor market. We are open to all collaboration that
enables us to strengthen Industry 4.0. skills. We listenHANNA
Services



and collaborate with interest the experiences of other universities and industrial partners regarding the Industry 4.0 related curriculum design and delivery.

Tampere University of Applied Sciences (TAMK) is a Finnish higher education institution oriented towards universityindustry collaboration. Our strengths are multidisciplinary education, creativity, and a strong international dimension. We provide our R&I infrastructure for business and entrepreneurial cooperation to promote innovation.

PETRI POHJOLA is a Senior Lecturer in the School of Industrial Engineering at Tampere University of Applied Sciences, Finland.

HANNA-GRETA PUURTINEN is a Development Manager in the Research, Development and Innovation Services at Tampere University of Applied Sciences, Finland.

SERGIO CELIS

The Nature and Impact of Collaboration between the University of Chile and Construyendo Mis Sueños (CMS)

onstruyendo Mis Sueños (CMS) was created in 2002 as a project of Industrial Engineering students of Universidad de Chile, with the purpose of supporting and improving competitiveness of entrepreneurs and smaller companies. A student initiative at that time, it was strongly supported by the University of Chile. In 2014, CMS became somewhat of a spin-off, transforming into a private, nonprofit law corporation. However, the company's ties with the University of Chile, and specifically the Faculty of Physical and Mathematical Sciences, are still strong and continue evolving. The collaboration between the university and CMS follows two broad paths: knowledge exchange through student – SME projects and strengthening our networks through shared infrastructure.



Knowledge exchange through student - SME projects

First, we share knowledge and learning opportunities.CMS has strong professional capacities on its own, but through our students and advising of faculty members, we provide highly skilled human capital and advanced knowledge that benefits SMEs in various ways. For instance, the students, participating in a capstone project in our industrial engineering program, may advise an SME on technology, web applications, an optimization process, or a new marketing strategy under the guidance of their professor. Together with CMS, our students help address emerging societal issues. For example, we cocreated the educational resources for broadening female participation in SMEs.

Moreover, through CMS, we are able to enhance practical learning opportunities for our students. Every semester, CMS offers internships, theses topics, courses, and capstone projects to get in contact with the challenges of local SMEs. CMS expertise and knowledge of the sector facilitates these contacts and the learning process, so students can focus on and spent more time with entrepreneurs. Interning at an SME gives the students a chance to integrate their specialized engineering knowledge into a more holistic company's operations picture. For example, students can get exposed and learn about a multitude of SMEs' operational activities from managing finances, human resources, distribution logistic, to production lines in a relatively short period of time. This integration is not easy to replicate within our university walls or in collaboration with larger organizations.

Strengthening our networks through shared infrastructure

Second, we offer CMS our infrastructure (e.g., offices, classroom, Wi-Fi), and we share networks with them. CMS has multiple offices throughout Santiago, but its headquarters are located at the university, where they can use our infrastructure for multiple events: workshops, ceremonies, and SMEs' fairs. In these spaces and events, we benefit from each other networks. CMS recruits students, professionals, experts, and members for its board. On the other hand, we meet the entrepreneurs from the local SMEs. We meet governmental agencies and professionals working in the SME sector. This is pivotal to fulfill our mission as the major public university in the country. CMS strengthens our outreach capacities - something that is not always easy to achieve for a research university.

To replicate what CMS does in our institution will take time, and we will probably never achieve that level of engagement with thousands of SME representatives of Engineering and Sciences, University of Chile.

CONSTRUYENDO MIS SUENOS ON THEIR COLABORATION WITH UNIVERSITY OF CHILE

"Construyendo Mis Sueños, was created in 2002 as a project of Industrial Engineering students of Universidad de Chile, with the purpose of supporting and improving the competitiveness of entrepreneurs and smaller companies. In 2014, it became a private, nonprofit law corporation, under the roof of the Faculty of Physical and Mathematical Sciences of Universidad de Chile.

Since then, Construyendo Mis Sueños has not ceased its labor in the development of an integral way to contribute to the growth of entrepreneurs, a sector with high levels of inequality in Chile through several projects, methodologies and studies that support its initiative. Until now the corporation continues its practice with micro and small entrepreneurs, as well as students who are interested in developing their professional formation in an integral way working from three fundamental bases: support for the entrepreneurs, connection with the territory and investigation, to accomplish the development, design and transfer of tools and programs."

> Solsiré Giaverini, Executive Director at Construyendo Mis Sueños.

and entrepreneurs.

To sum up, through CMS we get acquainted with the challenges and needs of the local and regional industries, in particular from SMEs, and we are able to make an impact through the work of our students and faculty. Thus far, more than 3,000 students have participated in this partnership, and have earned valuable practical knowledge for their (future) professional life. Our partnership with CMS will continue to evolve as the country follows its developmental path. New themes and innovative educational opportunities will emerge from this fruitful collaboration. \blacksquare

IMAGE CREDITS: University of Chile

SERGIO CELIS is an Assistant Professor at the School





Enhancing Quality in Higher and Continuing **Education with** and for SMEs

he University of Applied Sciences and Arts with the network" is the standard of PXL University of Applied Sciences and Arts located in Hasselt, Belgium. A standard that perfectly reflects the DNA of this innovative and entrepreneurial higher education institution. PXL widely engages and co-creates with industry, non-profit organisations, and civil society. It serves to leverage the relevance and authenticity of our high quality programs and research projects but also to maximize our societal impact of the training programs for professionals. PXL offers postgraduate, bachelor and master programmes in 9 domains to almost 10 000 students. Each year, we welcome approximately 18 000 professionals for continuous education, and more than 100 000 external business partners and visitors for networking events. ►

Ob

101210-00

ASTRID HANNES

ad a carri

Outside in, inside out

PXL not only emphasises the importance of synergy among education, research, and service to society in its vision, but also actively practices the latter by establishing relevant partnerships. In addition to a more common practice of creating an industrial advisory commission for curriculum updates, PXL invites an external representative from the industry to chair the board of the each study programme -- a unique practice in Flanders. These liaison professionals enable PXL to stay ahead of the most recent trends and needs of the professional field our students prepare for. For example, the managing director of the Construction Federation of the region of Limburg (CBL) is chairing the board of the professional bachelor programme in Construction, but also chairs the managing committee of the PXL Centre of Expertise. These close ties enable us to set up joint practical research projects with SMEs in the field of construction and energy.

Continuing education: joint projects and honours programme

To maximize the adoption of the latest techniques and applications in the sector, in June 2018, PXL and Construction Confederation of Limburg (CBL) launched a joint project Construction Academy. The academy offers innovative SME training programmes for construction professionals, technical installations experts, and auditors of energy efficiency. Modular thematic workshops attempt to put theory into practice and share the latest applied research conducted at PXL. Topics revolve around technical skills development (effective construction techniques as building information modelling, LEAN, 5S, etc.) but also soft skills development (customer relations, growth mindset, etc.). The training programmes help construction SMEs' leadership foster a lifelong learning climate within their organisation.

The same principle of liaison with a professional federation was already used 31 years ago, when PXL established a joint continuing training programme 'Case Studies' with LVAB, the federation of accountants, auditors and task consultants of the region. The joint undertaking still offers a high standard programme reaching more than 7800 professionals each year.

PXL and CBL also joined forces in a new honours programme, offering bachelor students in construction the possibility to undertake a challenging traineeship in a construction company during the summer break. The students are assigned tasks that go beyond the current training level, which account for three extra credits in addition to the regular programme. Construction SMEs are highly interested in motivated young talent, skilled at the latest digital applications and able to introduce them inside the company. CBL introduced incentives to participate in the honors programme: one year free of charge in at the Construction Academy training programme, and a 3-year tuition fee refund for the best student.

R&D in consultation: H-OPP© tool

Another inspiring best practice covering the entire cycle from education, to research and development, is the Digital Hasselt Occupational Performance Profile (H-OPP[©]) tool. Following the participatory qualitative design process, the tool was developed in iterative way and in consultation with occupational therapy lectures, ICF (International Classification of Functioning, Disability and Health) experts, students and occupational therapists. . In all stages of its development, both the client and occupational therapist perspectives were taken into account. The tool was further elaborated by researchers of the PXL Centre of Expertise in Health Care Innovation, who gathered more evidence on its effectiveness. What started as a didactic instrument to train future occupational therapists turned out to be very useful in the professional practice and caught the attention of the Flemish Association of Occupational Therapists (VE). Furthermore, since this evidence based tool complies with the most recent government standards for electronic client portfolios, the private software-company Q-Topp obtained the licence to implement and launch H-OPP on the national and international market, supported by the VE, while PXL-researchers assist with trainings. This co-creative valorisation project will enable thousands of (selfemployed) occupational therapists to enhance in their daily professional tasks. 🔳

IMAGE CREDITS: PXL University of Applied Sciences and Arts

ASTRID HANNES is the Research Director and Member of the Managing Board of the PXL University of Applied Sciences and Arts.



of Research PXL Centre of Expertise Construction and Energy; Gerrit Schurmans, Director Communication PXL; Astrid Hannes, Research Director PXL; Marleen Scheepers, Head of Department PXL Green and Tech; Chris Slaets, managing director Construction Federation Limburg; Mieke Simons, deputy director Construction Federation Limburg; Ben Lambrechts, General Director/CEO PXL; Heidi Gilis, researcher PXL; Erik Keijers, president Construction Federation Limburg; Franks Smeets, president of PXL; Greet Frederix, programme director construction PXL; Roel Renette, PXL researcher and Wesley Ceulemans, PXL researcher.



IMAGE: Left to right, June 2018 Construction Academy: Eric Gielen, coordinator LLL PXL Department Green and Tech; Adrien Buteneers, Head

JOAQUÍN M. AZAGRA-CARO

Joint Publications and Business Funding: The case of the Polytechnic University of Valencia

irms perform scientific research to boost technological innovation, improve competitive advantage and attract qualified scientists. To maximise those benefits, some firms engage in basic research, publish their results in academic journals and co-publish with universities. There are many modes of interaction between firms and universities (exchange of personnel, contracts or joint projects with industry, licenses, informal contacts, etc.), and co-publications represent just the tip of the iceberg, but with an important facet: they represent high profile, successful cases of universityindustry interaction, in which firms endorse collaborative open science. ▶

JOINT RESEARCH

Economic resources are key to foster scientific publications. The relation between someone's own money and own results is straightforward: university research underlies university publications and business research underlies business publications. When the question comes to whether industry funding enhances university-shared publications, the answer is more obscure. In an attempt to shed some light to this question, my colleagues and I analyzed one of the main Spanish technical universities, the Polytechnic University of Valencia (UPV) [1].

UPV' state of play

UPV is a public university founded in 1971. It is among the top three national universities in terms of Spanish-issued patents and often Spain's top ranking university in the EPO- and PCT-patent rankings. It is also representative of other young European universities, characterized by their small size, technological research and less consolidated public funding, which has made them more dependent on industry support. UPV is increasingly engaging in industry interaction, through a relatively well-endowed industrial liaison office and a pioneering program to support the creation of university spin-off companies. However, public funding has grown at a faster rate than private funding, because of internal

UPV policies to maintain a certain standard of quality in academic research.

University-industry bibliometric and financial data from UPV reveal that around 6-7% of researchers participating in projects with firms were authors of university-industry co-publications in 2008-2011; and around 27% of those university-industry co-publications authors were participating in projects with firms during that period.

A novel aspect of our research was that our conceptual models considered joint publications not only as an output of a previous co-participation in a research project with firms, but also as an element that could shape later participation in joint projects with industrial partners. Besides considering a certain time gap between one and the other, our set of models also embraced the possibility that university-industry copublications and business-funded projects occurred close in time or even simultaneously.

Findings

Our results showed that, in general, universityindustry co-publications could occur without business funding, and business funding without universityindustry co-publications. Hence, we did not find a causal relationship between co-publication volumes and university funding from business firms. [2]

Several reasons support this inexistent causal link. Firms may fund routine university research, useful to solve a concrete industrial necessity, but not justify a publishable scientific contribution. In other cases, companies may fund peak university research, but also impose secrecy if publishing threatens their competitive position. Finally, even if businesses have no objections to the publication of findings, they may not appear as coauthors for their lack of interest or any strategic reason.

There is one exception to our findings: for a minority of authors (those who participate in business-funded projects), there is a positive association of current university-industry co-publications and business funding. It corresponds to a 'science push' model: academics that write publications with firms and are, at the same time, involved in early stages of a project with a firm, can enhance the scientific foundation of this project.

This is a somehow optimistic result. It reduces fears that academic interests are bound to perish under the exigencies of capitalism. Certainly, the capacity of universities to shape private science may not be so tangible as if current co-publication determined future corporate funding. However, the link found is as subtle as sustained human relationships require: popular culture.



university-industry interaction is a matter of mutual trust, and the simultaneous academic touch on business co-publications and projects may be the base for prolonged partnerships. The UPV is an example.

References:

I. Yegros-Yegros, A., Azagra-Caro, J. M., López-Ferrer, M., & Tijssen, R. J. (2016). Do university-industry co-publication outputs correspond with university funding from firms? Research Evaluation, 25(2), 136-150. Notes:

2. We have confirmed the general lack of relationship at macroeconomic level, although business funding of university research leads to more co-publications in crises than in expansions: Azagra-Caro, J. M., Tijssen, R. J., Tur, E. M., & Yegros-Yegros, A. (2019). Universityindustry scientific production and the Great Recession. Technological Forecasting and Social Change, 139, 210-220.

JOAQUÍN M. AZAGRA-CARO is a tenured scientist at INGENIO (CSIC-Universitat Politècnica de València). He develops research about academic patenting, universityindustry interaction, knowledge flows, psychology of researchers and the representations of science in popular culture.



DESIGNING THE FUTURE UNIVERSITY

23 - 24 JANUARY, 2020

The aim of this creative workshop is to share knowledge and collectively analyse the current situation of the university to then (re-)design and co-create a vision of the future university, highlighting its potential roles and functions. Resulting from the collaborative work, you will come away with a blueprint for how you can drive change towards the future university. Join us at www.edu.uiin.org

Upcoming events

Knowledge sharing, building new relationships and discovering solutions are the core of our events. Join the largest conference in this field or attend one of our professional development workshops.



ENTREPRENEURIAL UNIVERSITIES WORKSHOP

16 - 17 MARCH, 2020

In the face of increasing global competition and an increase pace of change, universities are under greater pressure to contribute more heavily to their region. To achieve this, universities are not only being charged with the responsibility to educate and support entrepreneurial activity, but also become more entrepreneurial organisations themselves. However, making this shift is extremely challenging and requires a strategic approach and commitment and strong university leadership. Join us at www.edu.uiin.org



UNIVERSITY-INDUSTRY INTERACTION CONFERENCE

9 - 11 JUNE, 2020

In the face of increasing global competition and an increase pace of change, universities are under greater pressure to contribute more heavily to their region. To achieve this, universities are not only being charged with the responsibility to educate and support entrepreneurial activity, but also become more entrepreneurial organisations themselves. However, making this shift is extremely challenging and requires a strategic approach and commitment and strong university leadership. Find out more at www.university-industry.com and join us in Budapest on June 9 - II, 2020.

Do you want to be featured in our magazine? Or you have suggestions on the theme of our next magazine issue? Please feel free to contact us!

office@uiin.org





University

W



WE THANK OUR ORGANISATIONAL MEMBERS FOR YOUR CONTINUOUS SUPPORT!

UNIVERSITY INDUSTRY INNOVATION MAGAZINE

www.uiin.org