BEYOND UNIVERSEH

European Space University for Earth and Humanity

UNIVERSEH is an alliance of five European universities established to develop a new way of collaboration in the field of Space, within the "European Universities" initiative.

The alliance aims to create new higher education interactive experiences for the university community, teachers and students, and for the benefit of society as a whole. Such initiatives will enable broadminded, informed and conscientious European citizens to capture and create new knowledge and become smart actors of European innovation, valorisation and societal dissemination within the Space sector, from science, engineering, liberal arts to culture.

In Beyond UNIVERSEH, the alliance will develop the research and innovation dimension. By creating a research policy roadmap for 2035 and a vision for 2050 within the space sector, the alliance expects to notably transform the future Space and New Space research landscape, as well to enhance the links between education and research.

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EUROPEAN UNIVERSITIES Erasmus+

Université Fédérale Toulouse Midi-Pyrénées

AGH

UNIVERSITÉ DU LUXEMBOURG

LULEÅ UNIVERSITY OF TECHNOLOGY

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Dissemination level

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Document History

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2	13/02/2023	Joanna Wieczerzyńska-van Baarle (AGH)	Tadeusz Uhl (AGH) Victor Dos Santos Paulino (UT), Peter Torlind (LTU), Laura Ferschinger (UDUS), Christian Fish (UNI.LU)	Input partners incorporated
3	22/02/2023	Joanna Wieczerzyńska-van Baarle (AGH)	Tadeusz Uhl (AGH) Victor Dos Santos Paulino (UT), Peter Torlind (LTU), Laura Ferschinger (UDUS), Christian Fish (UNI.LU)	Final form of the report defined
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Executive summary

The Beyond UNIVERSEH WP4 focuses on technology transfer and innovation strategy in the space sector. One of its objectives is to develop strategies to induce or upscale cooperation between academia and the private sector. This guide is a tool to support the students and researchers at the partner's universities. The guide focuses on disciplines that can be applied in industry.

In order to get an insight on what exactly the needs and concerns of the UNIVERSEH's students are, a survey has been conducted. Questions focused on students' experience so far, their plans and knowledge on how to get support.

Most important for the project conclusions are:

- Most of the students do not know how to get support for starting a collaboration with industrial partner
- They do not know how to present their idea when talking with an investor
- Only one of four students know how to protect their idea
- Most are not aware of the challenges they might face when building their own business

Furthermore, the survey reveals unclarity of the role of space sector in climate change fighting and lack of understanding of the link between space sector and humanities. This can be deducted from the justifications given on why some students are not interested in developing their careers in the space sector.

Keeping in mind the needs identified in the survey a content of the guide has been determined. Since legal regulations differ per country, no common handbook could have been created, Instead, the report includes descriptions of structures already existing at the partner universities. These descriptions list main support areas and links to the websites of these structures.

Furthermore, an overview of collected guides and instructions has been listed as appendix to this report.

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List of abbreviations

- **AGH**- AGH University of Science and Technology
- **ASD**- Aeronautics, Space and Defence
- **BU**- Beyond UNIVERSEH
- **CEO**- Chief Executive Officer
- **CNES-** Centre National d'Études Spatiales
- **EC**- European Commission
- **HRS4R**- Human Resource Strategy for Researchers
- **IP**- Intellectual Property
- **IPR**- Intellectual Property Rights
- **KTT**- Knowledge Translation and Transfer
- **LTU**- Lulea University of Technology
- **PI**- Principal Investigator
- **ROI**- return on investment
- **TBS**- Toulouse Business School (member of UT)
- **TRL**- Technology Readiness Level
- **TTT**- Toulouse Tech Transfer
- **UDUS**- Heinrich Heine University Duesseldorf
- **UNI.LU**- Université du Luxembourg
- **UT**- Université Fédérale de Toulouse-Midi Pyrénées
- **UT3**- Université Paul Sabatier Toulouse III (member of UT)
- **WP**- Work Package

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Objectives of the task and report

Rapid technology development observed the past years contributes to redefinition of the role of academia and so challenges the researchers face in at their daily work. Particularly, sectors directly connected to industry prove the need to not only be an excellent scientist to be successful. Entrepreneurial endeavour, understanding of law, deep knowledge of market mechanisms and excellent people management seem to be key elements of an outstanding portfolio, made up of several specialists engaged. Basic understanding of these processes seems to be in favour for the researchers. UNIVERSEH, the European space university targets at educating highly qualified specialists, able to initiate new dimensions of space research.

WP4 of Beyond UNIVERSEH, focuses on improving the condition of researcher-industry collaboration. This guide will provide the comprehensive overview for the UNIVERSEH students on how to get support they might need in order to start a collaboration with industrial partner. Doing so, the guide will meet the following objectives and targets of both the work package (Tasks 4,2, 4.3 and 4.4. in particular,) as well as the whole project:

- It is a tool to enhance entrepreneurship between the junior researchers, support spin-offs creation and investments in medium/high-risk collaborations within the space sector.
- It will support educating professionals, who should be able to preserve their independence in research and concentrate on their innovation. This dimension holds a special importance, as, to our best knowledge, most of the times academic partners are in front of more experienced contract negotiators from industry, with a broad background in IP and commercial law.
- It will support implanting the policy of Human Resource Strategy for Researchers (HRS4R), targeting higher education and research institutions in the implementation of the Charter & Code in their policies and practices. The objectives of the document are limited to the public institution itself and do not address cooperation between universities and the private sector. As we can see from the survey conducted, many junior researchers do now know where to get support when thinking about collaboration with industry. This guide will be thus a step towards raising their awareness on how to make considered decisions.
- It will raise awareness of importance of processes involved in collaborations with industry. Innovation and valorisation are continuous processes between academia and industry at all TRLs, and the understanding of one's rights and obligations is essential in all types of research and collaborations with industry.

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- Contributing to getting familiar with industry as a partner to work with, this guide will support brain circulation between universities and the private sector.

Since many handbooks on collaboration between academia and non-academia already exist, this report does not recall the general remarks and lists solely suggestions related to the UNIVERSEH project.

Need to create such a manual is to be justified by the following facts:

- There are many considerations on collaboration between academia and non-academia already existing. Keeping in mind UNIVERSEH's goal to became one university, a guide dedicated to UNIVERSEH's conditions seems useful.
- Consideration on differences between space sector and other sectors. A very common fact about the collaborations with the industry is that investor, being the one to finance the actions, sets the rules of the play. In such a situation, education of (future) researchers on their right and obligations is crucial for their success and satisfaction.
- Out of the handbooks on collaborations with industry, that partially could be adopted in space sector, very few of them put the researcher in central point.
- Beyond UNIVERSEH project supports the UNIVERSEH alliance, which is a space University. Its students consider developing their careers in the space sector.

This way the guide contributes to realisation of 3 out of 4 WP4 tasks:

- Task 4.2 Analysis and proposal for a strategic approach to support spin-offs and investments in medium/high-risk entrepreneurial endeavours within the space sector
- Task 4.3 Strategic drafting of legally sound, competitive, model cooperation agreements focusing on specific collaboration in space sector, with potential extensions to other sectors
- Task 4.4 Human capital in research and innovation and brain circulation

To be sure the needs and interests of future UNIVERSEH graduates and space experts are met, the WP4 team has designed a survey. Based on the replies given by UNIVERSEH students, content of the guide has been determined.

For the adequacy of the information provided, some descriptions have been sources from the organisations' websites.

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Analysis of the survey

Study grade, gender and country of residence

For the analysis below there is a common number of replies: 99.

Majority of the respondents follow the master programme at the moment (65). Number of bachelor and PhD students are almost equal (18 and 16 respectively). There are 69 males who have participated in the survey and 28 females. More than half of the answers (58) comes from France, 24 from Poland, followed by 10 from Luxembourg and few from Germany.

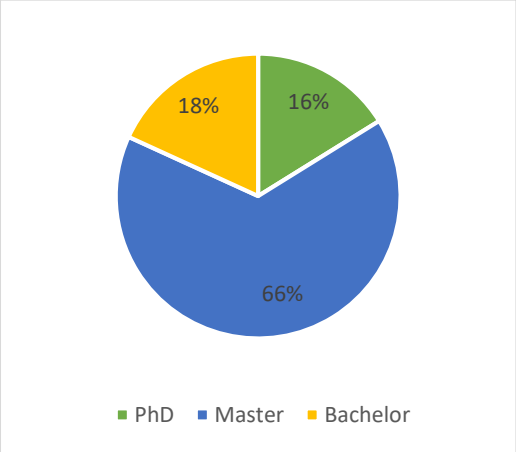

Figure 3 Study grade

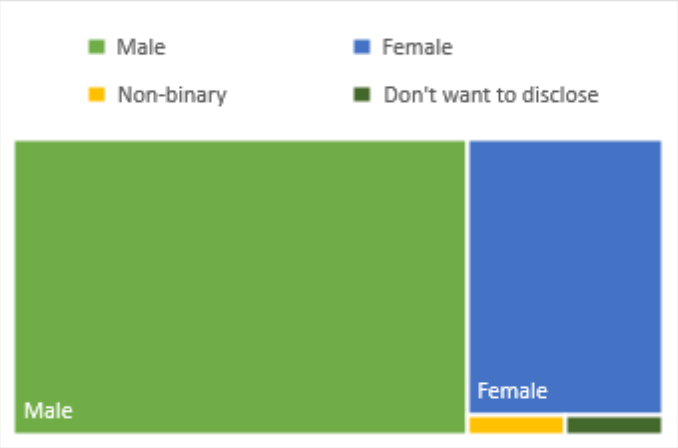

Figure 2 Gender

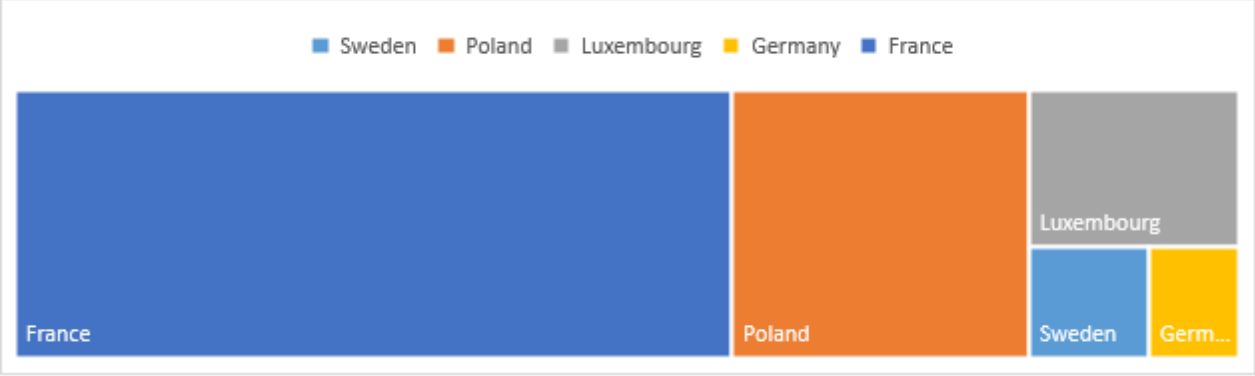

Figure 1 Country of studying

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Plans for the future, business experience

This part of the survey investigates professional experience of the students so far and whether they make any plans linked to the space sector. Most of them follow the job opportunities in industry, or industry and academy (figure 5 below, multiple choice allowed), however, no all of them see their future in the space sector particularly (72 of 99 does).

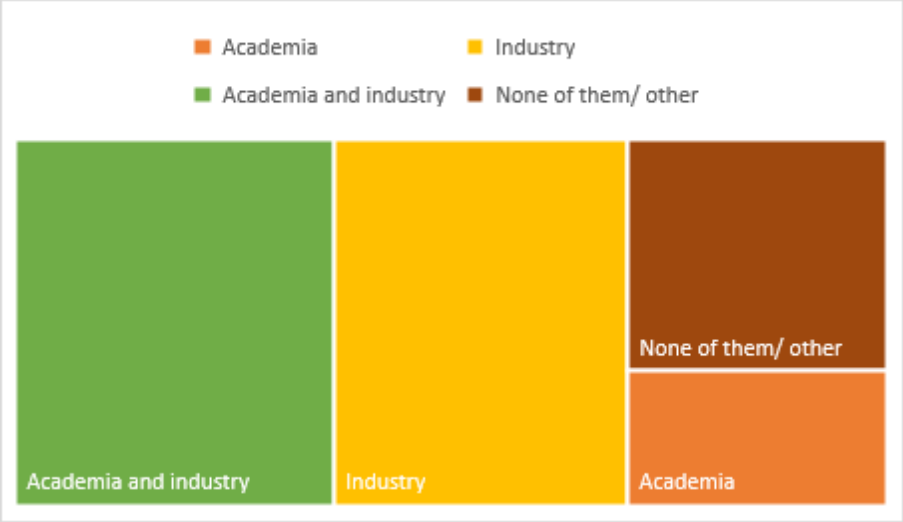

Figure 5 Job opportunities followed

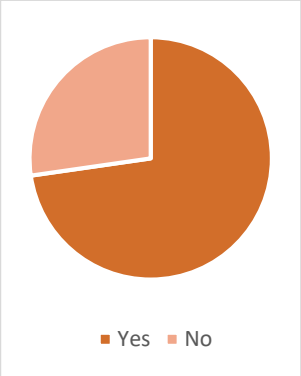

Figure 4 Future career in the space sector

Justifications on respondents lack of interest in space sector was appreciated and few main reasons could be formulated (total of 23 replies):

- career in the space sector seems not accessible to them either they do not find interesting job possibilities
- they have other interests (here psychology and ecology were named, which may suggest role of humanities in the space sector is not clear to the students)
- they do not consider it urgent and they prefer to focus on the environmental crisis (here again the interdisciplinary character of the space sector and its role in climate change mitigation seems insufficiently explained)
- other reasons, mainly seeking for most satisfying career path.

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Professional experience

Majority of students declares not to know how to start a collaboration with industry (60 answers of 'no' or 'not sure', multiple choice allowed).

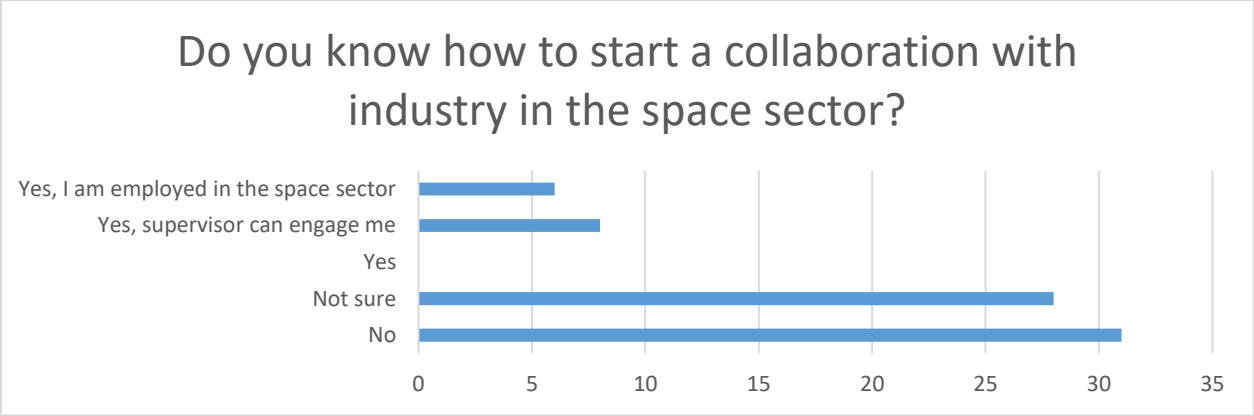

Figure 6 Starting a collaboration with industry

However, at the same time 21% declare to be currently employed in the space sector:

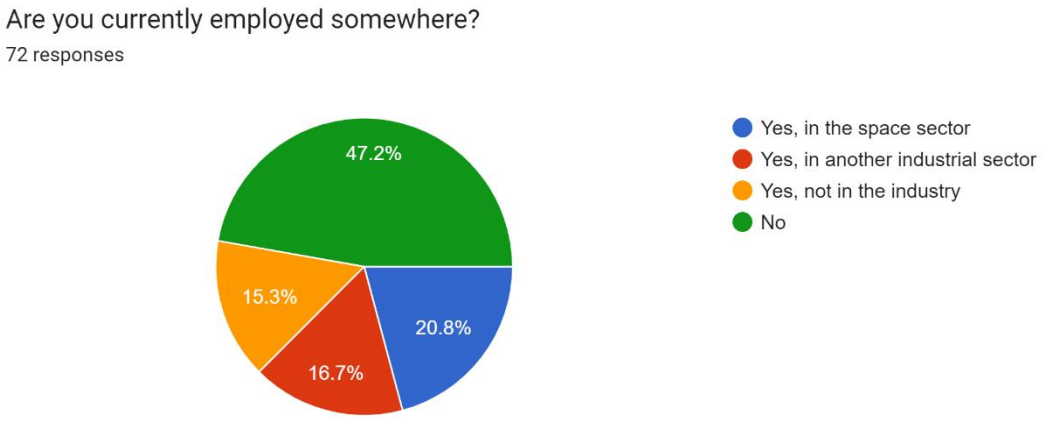

Figure 7 Current employment

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When it comes to the creating their own business, 86% of the students does not know (‘no’ or ‘not sure’) how to get support for doing this. The ones who could participate in trainings (22 persons) declare to could access it in the regular study programme or as extracurricular activity (17 and 10 students respectively). Furthermore, 60% of the respondents is not familiar with the supporting organisations at their universities that could assist them in the process of starting a collaboration with the space industry. WP4’s team investigation proves well established structures are present at the partner universities and in the countries at the national level. Their

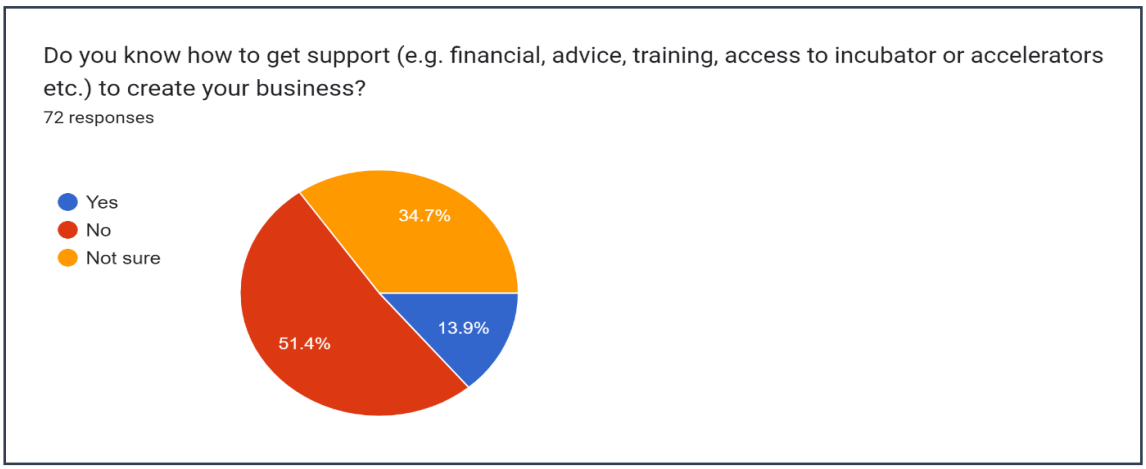

Figure 8 Receiving support

experience specialists offer professional support on various questions. These data can be illustrated by the following charts:

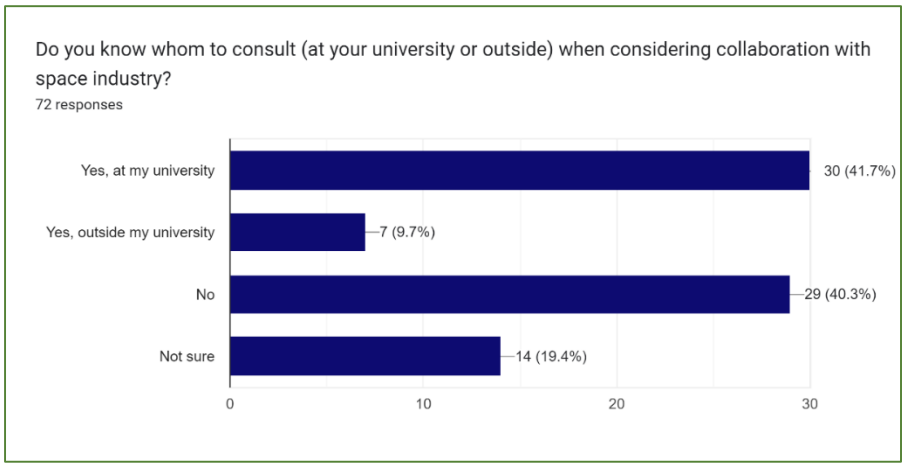

Figure 9 Available consultants

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Guide

General guideline
Each collaboration has its specific terms; however, a very general roadmap can be set up. It may have the following form:

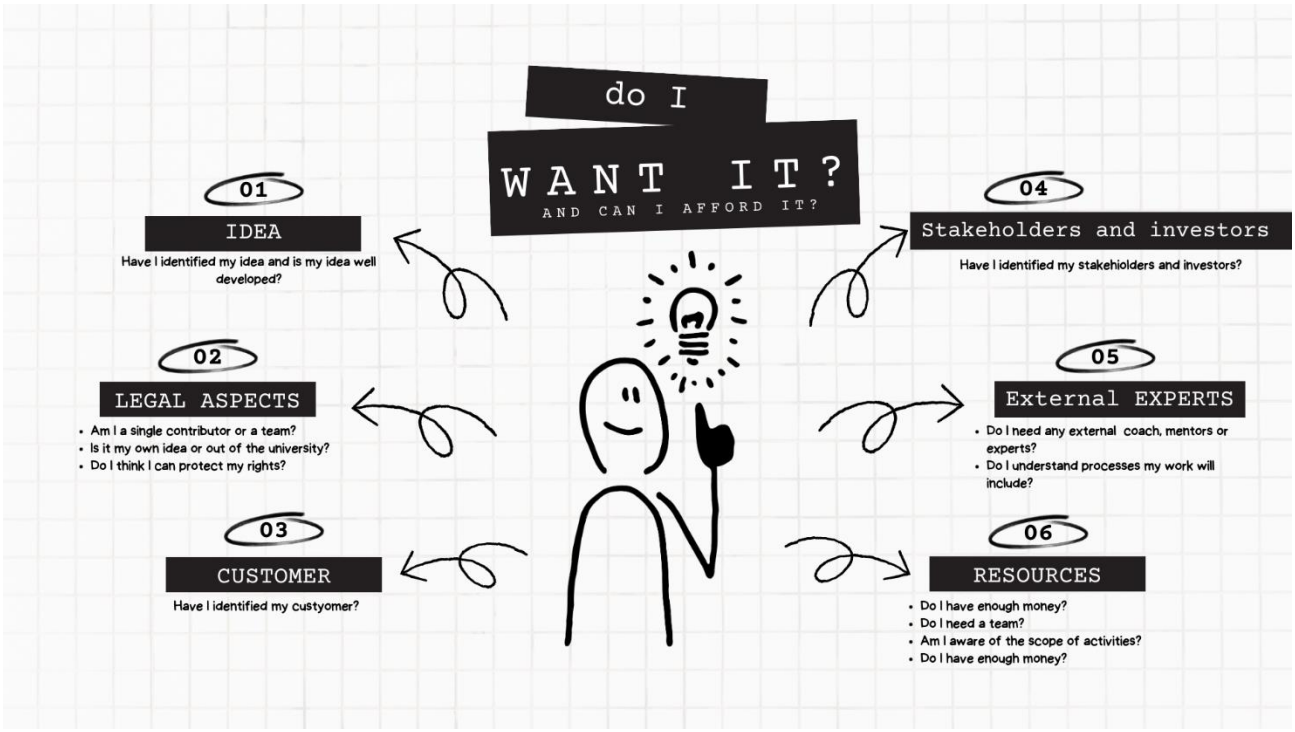

Figure 10 Guide

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Supporting systems at the UNIVERSEH universities

France

Toulouse Tech Transfer (TTT)

Creates value from academic research in Toulouse by bringing together laboratories and companies.

Its role

TTT's core business is to invest in technological development programs, based on academic research done in the Occitania region and includes the following:

- Intellectual Property and legal management, to create more value by filing patent applications and protecting know-how
- Technical operations to design and fund relevant proof-of-concept programs to bring them up to a level that attracts businesses
- Market studies to identify relevant targets and the corresponding market mix; then licensing out the technologies to existing companies or startups

TTT thus bears some of the technological and financial risks of the innovation process in order to maximize the socio-economic impact of academic research and transform it into a source of growth and employment. TTT provides two main categories of support actions:

- Innovation accelerator
- Innovation partner

Companies perspective: innovation accelerator

Toulouse Tech Transfer helps companies find cutting-edge technologies that have been developed in public research laboratories. TTT aims to boost technology transfer, by bringing the most promising results up to a Technology Readiness Level (TRL) so that they can be incorporated in industrial development processes.

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Innovation support

- TTT offers a single point of entry for matching laboratories and their research teams' work with companies' needs.
- If the technological solution needs more development (specific tests, scaling-up, etc.), TTT can invest its own funds in an accelerator program to bridge the technological gap.
- Toulouse Tech Transfer also manages technology platforms to offer private companies the use of advanced equipment.
- Toulouse Tech Transfer is in charge of managing the IP assets (filing applications for patents, protecting know-how, etc.) of laboratories. Technologies can be transferred to private companies through licensing agreements.

Advantages for companies

- Single point of contact
- Responsiveness
- Speeding-up of innovation programs
- Reducing lead times
- Reduction of Technological, legal and commercial risks
- Optimized ROI (return on investment)

Researchers perspective: Innovation support

TTT provides ongoing professional support to research teams to help them advance their work and transfer technologies to private companies. TTT and laboratories work closely together during different stages of the technology transfer process to prove the concept, protect intellectual property rights and to negotiate license agreements.

The support involves:

- Protecting Intellectual Property
- Elaborating the best scenario for penetrating the market and commercializing the technologies
- Running accelerator programs
- Creating start-ups

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TTT provides support to researchers at each step of the technology transfer process:

- It organizes workshops to raise awareness of the technology transfer process
- It identifies cutting-edge innovations, working closely with research teams to identify promising results and potential partnerships with industrials
- It protects intellectual property: TTT ensures, through an IP strategy, that the ownership of the results are protected and managed
- It runs technology accelerator programs: TTT invests in accelerator programs in order to bridge the technological gap between the research and the market
- It catalyses start-ups: TTT invests in breakthrough innovations by creating start-ups

Advantages for the researcher:

- A single point of contact based on the university campus
- It simplifies the technology transfer process
- It creates economic value
- It builds industrial partnerships
- It promotes the expertise of laboratory teams
- It reinforces research through licensing fees

Achievements

Since it was founded, Toulouse Tech Transfer has:

- 954 disclosures: 697 projects scouted, 218 patents filled; 224 patent families managed
- 249 maturation projects launched: 31 M€ invested from 25 M€ engaged
- Signed 96 licensing agreements
- Supported the creation of 14 start-ups

Star launcher program

By joining the Star Launcher program, Deeptech project leaders benefit from facilitating support and tools to guide the development of their startup.

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The program is co-constructed in an individualized approach aiming at adapting the support to the specific needs of the projects and teams. Because it is by exploring the team's skills and their technology with method and expertise that we will be able to shape the innovations that will meet the challenges of our time.

Dimensions of the program

Customized solution-oriented support:

✓ *Training*

Free access:

- Training in Deeptech and Aeronautics, Space and Defense (ASD) offered by partner organizations
- Conferences and testimonies of experts

✓ *Personalized follow-up*

Monthly meetings with a dedicated coach.

Customized advice and services:

- Intellectual property
- Legal aspects
- Team building and CEO search
- Market / product / service approach
- Seed financing

✓ *Technological differentiation*

- Increase in TRL and investment in projects (whose IP comes from the consortium's laboratories)
- Access to fablabs and equipment
- Access to a network of experts in ASD

✓ *Impulse*

Workshops and bootcamps to challenge projects, business models:

- Connecting with networks of experts in ASD, business and Deeptech activities

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- Meetings with investors

In addition, application to one of the partner incubators (IMT Mines Albi-Carmaux, Nubbo or Aerospace Valley District) subject to eligibility

✓ *Acceleration*

Workshops and bootcamps to:

- Accelerate scaling-up
- Move into the industrialization phase
- Find partners
- Prepare for fundraising

In addition, application to one of the partner gas pedals (Nubbo or Aerospace Valley District) is possible, subject to eligibility

Stages of the 3 to 18 months support

- Phase 1
    - First meeting: validate the integration
    - Second meeting:
        - identify needs and diagnosis
        - co-building of the process
        - validate the process
- Phase 2
    - Monthly meetings to accompany you and adapt the program
    - quarterly Bootcamps to promote team cohesion and challenge projects

Foundations and chairs

The purpose of foundations is to facilitate the provision of additional sources of funding to universities. Public establishments of a scientific, cultural and professional nature (of which universities are a part) can create certain types of foundations in order to diversify their sources of financing, by allowing the use of private donations (companies, individuals including former students), in addition to public budgets. Tax incentives are provided for private actors. Although

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several legal statutes have been created to allow for this, this contribution is not intended to replace public funding.

Foundations make easer the collaboration between companies and researchers thanks to the creation of research chairs. These chairs support applied research that could be more easily transferred to companies because the companies can be involved in the governance of the chair.

The links between foundations, chairs, universities, and their sponsors are very specific to the characteristics and the expectations of every actor involved. This offers a significant flexibility but hinder the generalization of chairs among universities. The specificities also imply that people involved (competencies, motivation) is central for the success.

Germany

Support of joint projects between academia and industry at the HHU

Industry projects involve an exchange between Heinrich Heine University Düsseldorf as a provider of research and development work as well as other services and a second organisation (normally a for-profit business) commissioning the University to perform the requested service for a fee.

The Research Management and Transfer Department of the Heinrich Heine University of Düsseldorf consults its members on commercial, legal and tax matters when persuing industry-academic joint projects. They provide the latest relevant tool for calculating industry projects, a finished draft contract, and all further necessary documents as part of the consultation.

The consultations are conducted by a contract lawyer and are structured a follows:

- the intended project and its circumstances are discussed in detail;
- the cost of the project is calculated to commercial standards;
- a draft contract is drawn up;
- tax implications are considered.

Following the consultation, researchers are able to approach their contract partner with a well-prepared, precisely calculated project proposal and a concrete draft contract.

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Support for start-up creations financed by the industrial VC at the HHU

The Center for Entrepreneurship Düsseldorf (CEDUS) team helps to identify suitable funding programs and mediate financing options as well as seek investors for entrepreneurs in the process of setting up a business. They connect founders with funding institutions, banks, business angels and venture capital organizations. In addition to state and federal funding programs, the Heinrich Heine University offers further financing options for HHU startup projects. Regional and national seed funds are also available for external seed capital of technology-based startups.

The CEDUS helps entrepreneurs find the right program (e.g. EXIST Support Programme, EXIST Business Start-up Grant, EXIST Transfer of Research, Biotechnology start-up initiative, Start-up Transfer.NRW, VIP+, Go-Bio-Initial) and supports them in the application process.
Via its subsidiary Technologietransfer Heinrich Heine Universität GmbH (TTHU GmbH), the HHU is able to participate in the university spin-offs. The TTHU GmbH fundamentally strives to secure an initial participation in a spin-off and in return receives shares in the company or a share of turnover or profit. It generally acts as a minority shareholder. Other seed financing then takes place, for example, through the High-Tech Gründerfonds and/or the Sirius Seedfonds Düsseldorf.

The "Gesellschaft der Freunde and Förderer der HHU" (GFFU), a cooperation partner of CEDUS, offers an attractive financing opportunity for startups in the form of a Startup Award. As of 2017 a scholarship of 50,000 € is awarded annually to one startup team.

Support of IP development at the University and licensing funded by the university and industry at HHU

Via the Research Management and Transfer Department, the Heinrich Heine University Düsseldorf offers individual advice and support to the HHU's academic staff in matters concerning inventions and patents. Its service, provided in cooperation with with PROvendis GmbH (the patent marketing agency of the State of North Rhine-Westphalia) covers the following key topics:

- Patenting procedure at HHU
- Inventions in science: Publications, invention and inventor status, sharing of revenue
- IPR clauses in contracts with third-party funding bodies
- How to carry out patent searches
- Commercialization options: Sale and licensing of patents

The HHU also offers workshops and courses on the topic of IP development.

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The Department of Research and Transfer is a close partner of the CEDUS, especially with regard to patents and inventions as well as funding applications. In selected cases, support for startups in the medical field is provided in close cooperation with the medical faculty's Startup4MED facility. In addition, selected events are organized jointly.

Center for Entrepreneurship

The HHU established the Center for Entrepreneurship (CEDUS) as a central operating unit to bundle and support all start-up promotion activities at the HHU. Since its founding in 2012, the CEDUS has been working to create a lively and cooperative start-up culture on campus and to sustainably position the HHU as a start-up university. By bundling start-up consulting and awareness, the CEDUS has become the central contact, both internally and externally, for all members of the HHU who have questions regarding the topics of professional self-employment and creating a business. It supports innovative start-up projects as well as traditional business start-ups of students, graduates and researchers.

The consulting services of the CEDUS are comprehensive and tailored to the needs of the start-up. The CEDUS' start up service supports entrepreneurs through all stages of the project, the initial interview, funding, acquisition and the first investment. The CEDUS promotes regional networking with experts, investors and co-founders. They are engaged in knowledge-based networks, various cooperations and memberships in the field of content-related cooperation. They participate in joint events and show presence at third-party events. The CEDUS actively scouts the HHU faculties for potential start-up ideas and outstanding start-up personalities.

Through the Business Model Canvas, the CEDUS helps classify potential business ideas and create a rough business plan which is used to provide advice on funding options or as a referral to their network of experts. In addition to consultations, feedback is also offered to founders in a 30-minute speed back session.

The CEDUS incubator program "Cube" helps students, graduates and researchers create a start-up and develop their ideas into a marketable business model. The CUBE is a five step process and includes:

1. Application - To participate in the incubator program, interested individuals and teams apply via the CEDUS website. The CEDUS advisors can be contacted to answer any questions that may arise.

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2. Pitch – After applying, individuals or teams pitch their start-up project and present their idea to the CEDUS. This allows the CEDUS to identify the start-up's potentials, weaknesses and risks and precisely tailor their support to the founder's needs.
3. Initial meeting – At this stage the next steps are discussed in detail. Expectations are clarified and the direction and roadmap for further cooperation are agreed upon.
4. Individual coaching – Individual coaching includes basic workshops, regular feedback sessions, open exchange rounds as well as additional offers from CEDUS mentors.
5. Investor pitch – After the idea and business plan have been drawn up, the start-up concept is pitched to investors from the CEDUS network to secure the first funding.

The HHU Ideas Competition, organized annually by the CEDUS, invites members of the HHU Düsseldorf, affiliated institutes and the University Hospital to submit their innovative and creative start-up concepts to create awareness and support entrepreneurial thinking at the university.

The CEDUS also offers a wide range of networking events, workshops, and lectures on the topic of start-ups. The Founders' Dialogue offers students, graduates, and researchers of the Dusseldorf universities the opportunity to exchange ideas with other start-up enthusiasts and founders. In a relaxed setting founders can share experiences and talk about the challenges they faced creating a start-up. In addition, coaches, moderators, and guests from the Düsseldorf startup scene give insight into all important aspects of starting a business in short keynote speeches. The CEDUS Startup Academy offers summer school courses. The HHU Ideas Competition, organized annually by the CEDUS, invites members of the HHU Düsseldorf, affiliated institutes and the University Hospital to submit their innovative and creative start-up concepts to create awareness and support entrepreneurial thinking at the university. The CEDUS also takes part in the Campus Fair Düsseldorf, the central job and career fair of the Heinrich Heine University Düsseldorf, Düsseldorf University of Applied Sciences and the Düsseldorf Chamber of Industry and Commerce. The aim of the event is to create a link between the Düsseldorf universities and the industry to successfully bring companies and graduates together. The CEDUS also is a partner in the Startup Sprint, a three-day event offering a hackathon, idea barcamp, matching platform and startup contest. During this event, interested students, graduates, and researchers find co-founders and together with coaches develop a sustainable business model. On the first day of the sprint ten business ideas are presented to the participants of which the ten best are selected. The sprint participants are then divided into teams and with the support of mentors and coaches develop the chosen ideas into business models. On the final day of the sprint these models are presented to a jury and large audience. The winners are selected and honoured.

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Luxembourg

Partnership Programme

An example of a technology transfer activity at the University of Luxembourg is the partnership programme that is run by the Interdisciplinary Centre for Security, Reliability and Trust (SnT), a research centre specializing in the domain of ICT. SnT is committed to fostering the production of innovative ideas, increasing the depth and breadth of the competence of, and facilitating research in collaboration with, established partners as well as new start-ups in the ICT industry.

Through the partnership programme, partners contribute to and influence the development of SnT at all levels. The partners have representation on the SnT Board where the centre's strategy is developed. The Industrial Advisory Board supports the strategy and operations of SnT. Research is conducted jointly in partnered projects where SnT and partners contribute know-how and resources to achieve common goals.

The partnership programme also allows research activity to be leveraged with public research funding through the European Framework programmes, European Space Agency, and the National Research Funding Agency (FNR). Industrial PhD student projects are an attractive form of collaboration with SnT. Together with a partner, a PhD student project is defined (3+1 years duration) which is of interest to the partner and scientifically appropriate for a thesis. Together, a suitable student is recruited and the project is often carried out both at the partner premises and at SnT.

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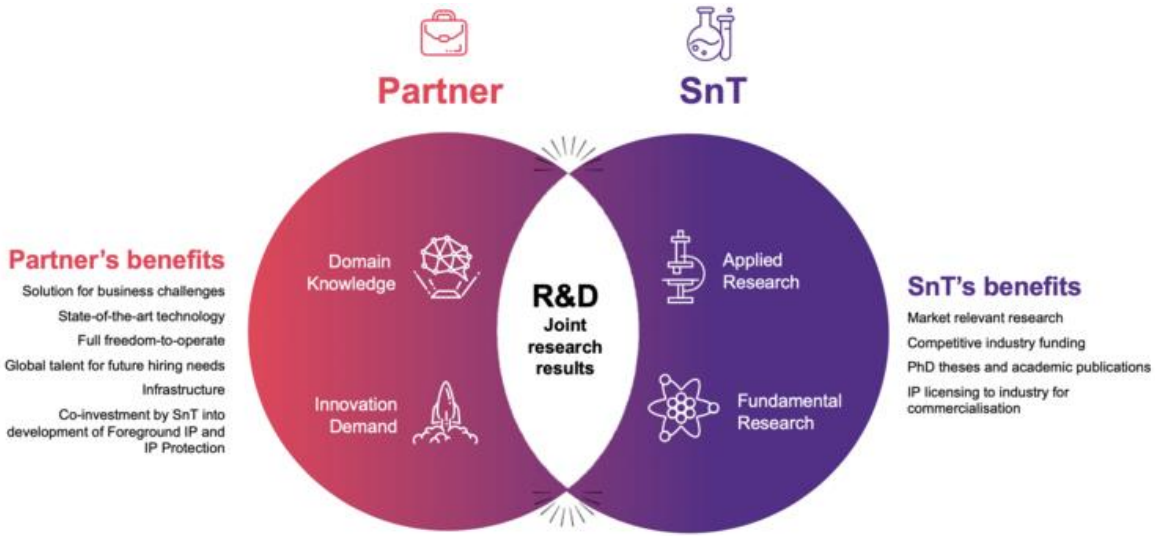

Figure 11 SnT and Partner collaboration

How a partnership works

Principle that excellent scientific research can address the most pressing challenges society faces, and support industry in developing solutions guide the team of specialists. A partnership model that enables truly collaborative exchanges, allows access to relevant challenges, real-world data, and systems to test our research results.

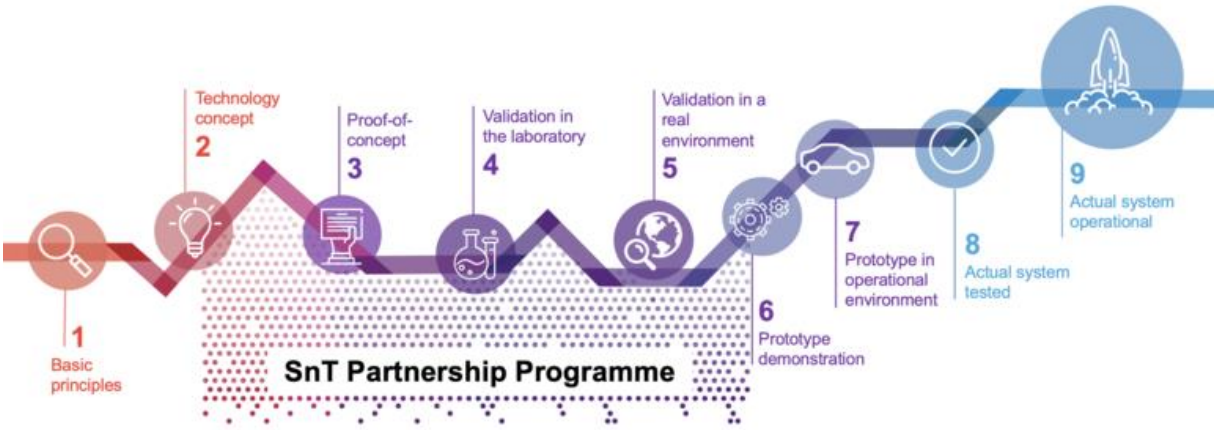

Figure 12 Partnership programme

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Entrepreneurship Programme

The Entrepreneurship Programme gives the community of the University of Luxembourg a possibility to participate in initiatives like Ideation Camp that allow them to acquire business skills. Entrepreneurship Programme works closely with the University of Luxembourg Incubator, a place dedicated to providing support in bringing the University's business ideas to the market. Business leaders from Luxembourg and abroad are invited as mentors and speakers to support young entrepreneurs in being successful in their projects. Get in touch with our team and ask for a meeting to discuss your startup project or take advantage of our mentoring service or accelerator.

To prepare its student entrepreneurs best for running their own company, the University of Luxembourg has created the Entrepreneurship Programme: an initiative dedicated to providing business, technical and personal development skills that will allow its participants to make their startup journey a success. This Programme is open for the University of Luxembourg students across all faculties regardless of their level of studies (Bachelor, Master, Doctorate/PhD) as well as University staff. Entrepreneurship Programme's mission is to champion entrepreneurship education in the framework of the 3rd industrial revolution in the Grand Duchy, to educate entrepreneurial leaders who will create great economic and social value for Luxembourg and to embed the University of Luxembourg and its research institutions into the Luxembourg entrepreneurial ecosystem, acting as a link between the world of education and the business world.

In the framework of the Entrepreneurship Programme, essential skills and knowledge acquisition necessary to build own business with the support of the University of Luxembourg Incubator. Some of the flagship initiatives of the Entrepreneurship Programme are Ideation Cam. The University of Luxembourg Incubator's Accelerator is a sector agnostic equity free accelerator supporting the top, aspiring, and committed University entrepreneurs in scaling their business and becoming investment ready. The University of Luxembourg Accelerator works in partnership with the University of North Carolina and Tel Aviv University. It is funded by the Luxembourg National Research Fund via a Knowledge and Innovation Transfer (KITS) grant. Startups of the University of Luxembourg Incubator are carefully selected to participate in the Accelerator. Once they are part of the program they get access to 1-1 tailored guidance, workshops, networking, as well as access to different programs and funding opportunities. The Accelerator also gives startups a chance to participate in immersion trips to different countries including the USA and Israel. These immersion trips allow the startups to meet and network with different ecosystem players including potential partners, clients and most importantly, investors. During their 2 weeks trip to the USA, Accelerator startups will visit Washington, Philadelphia, North Carolina, New York and Boston.

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EUROPEAN UNIVERSITIES Erasmus+

Université Fédérale Toulouse Midi-Pyrénées

AGH

UNIVERSITÉ DU LUXEMBOURG

LULEÅ UNIVERSITY OF TECHNOLOGY

hhu Heinrich Heine Universität Düsseldorf

Office for Partnership, Knowledge and Technology Transfer

The University of Luxembourg asserts the importance of its official mission consisting in transferring knowledge and technology to society's benefit. Based on a research of recognised excellence, research partnerships with the socio-economic world are encouraged and developed. The Office for Partnership, Knowledge and Technology Transfer (PaKTT Office) is the primary contact point for serving businesses, civil society and researchers.

Networked with a staff dedicated to projects and partnerships in faculties and interdisciplinary centres, the PaKTT Office supports projects from their conception to the valorisation of the scientific results obtained. Alongside the Research Support Department (RSD) and the legal and financial services of the University, the team in charge of promoting Partnerships intervenes on various aspects referring to set-ups, legal contracts, protection of Intellectual Property (IP), commercialisation and research valorisation.

Office's objectives include the transfer of IP rights to existing companies and the creation of spin-offs benefiting from the University's operating licenses. It covers activities of research carried out by the University solely or in collaboration with public and private institutions (start-ups, SMEs, large groups). Partnerships between companies and the University can benefit from multiple regional, national, European and global support, as well as funding. The PaKTT Office actively participates in the development of Luxembourg's innovation ecosystem. Furthermore, the Office also offers and implements the University's KTT policy with respect to its overall commitments, and takes part in the elaboration of its strategy. The university's talents at the service of partnerships and transfer are specifically trained and bring their experience acquired in the academic sector and the business world, in the scientific and technological branches, as well as in commercial, marketing, legal and industrial property sectors (patents, trademarks and licenses).

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Poland

Centre for Technology Transfer and Krakow Centre of Innovative Technologies

The AGH UST innovation ecosystem creates a unique, friendly space for the development of technological startups. It invites all creators of new business seeking a scientific and business partner to collaborate. Two entities specialised implementing the idea of academic entrepreneurship support creation of cooperations; the AGH Centre for Technology Transfer (CTT AGH) and the Krakow Centre of Innovative Technologies INNOAGH. In addition to managing the University's intellectual property and introducing research results to the market, CTT AGH supports and shapes the culture of entrepreneurship among the academic community. Through a network of innovation brokers, it effectively links the needs of industry with research teams. INNOAGH is a limited liability company, which is a university tool for the implementation of business activities. INNOAGH's mission is to create technological startups based on knowledge and modern technologies. Together with CTT AGH, it offers a number of trainings and workshops in the field of entrepreneurship with particular emphasis on the commercialization of intellectual property through the set-up and development of technological startups.

Particularly, it supports:

- Matchmaking with scientific experts and partners at AGH to strengthen the competences of business partners or validate technical aspects.
- Developing and testing of a business models through its network of scientific, industry and business experts.
- Trainings in the field of managerial competences.
- Organising events and seminars on current projects, sources of financing and development opportunities for innovative business ventures.
- Facilitating access to university resources, including modern laboratories and research equipment.
- Supporting patenting procedures

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Sweden

Space for innovation and growth program (RIT)

In the *Space for innovation and growth program* at the space Campus in Kiruna, Sweden, a support system for identifying and transfer of results has evolved. The support system includes identification of interesting opportunities, support to researchers to evolve the idea within LTU Business and then a commercialisation phase for knowledge and technology transfer, licencing, or divestment. Often the researcher creates a spin off that is supported by the Business incubator (Arctic Business or ESA Bic Sweden).

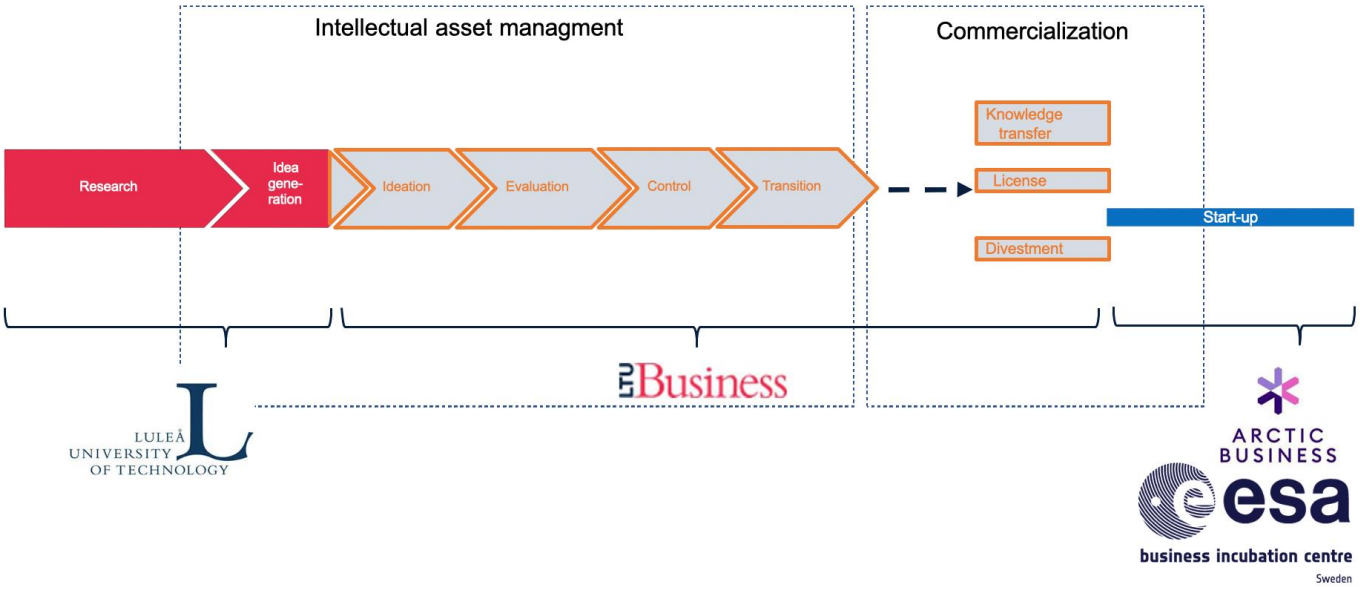

Figure 13 Support system around LTU

To support this process LTU Business uses processes, tools and methods to identify viable ideas. A popular support system is a student summer program – LTU Business Summer, that offers summer work students where they will develop an business idea from a researcher at the university or on real-life cases from SMEs.

In a survey performed by the RIT project 19 PhD candidates and post docs (in space related research) interviewed regarding their research results and how these results can be defined as assets that can be explored and exploited with different types of actions.

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Asset/result	#
Algorithm	9
Data set	1
Methodology	4
Simulation tool	4
New model of a phenomenon	1
Software	3
Patent potential	2
Start-up idea	5
Base for coming research	4
New co-operations	2

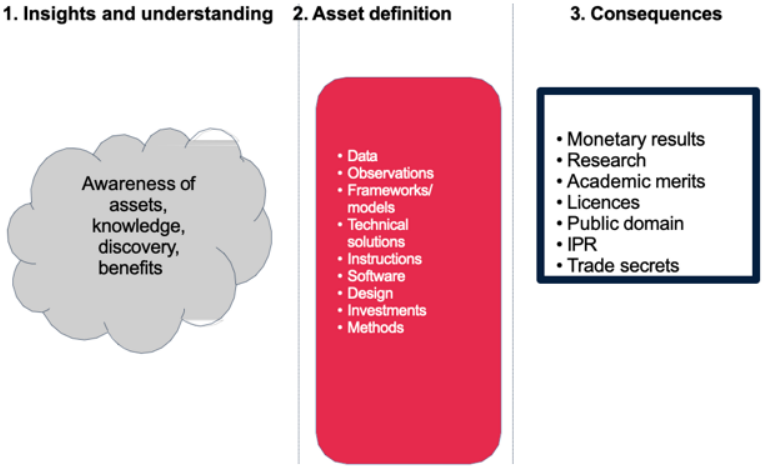

Figure 14 Asset identification and packaging at LTU.

Swedish Foundation for Strategic Research (SSF)

One system in Sweden is the of a strategic mobility programme by the Swedish Foundation for Strategic Research. The strategic mobility program makes it easier for researchers from industry or academia/research institutes to work with the other party by SSF financing the salary costs covering a period of up to two years. Each grant within the programme covers the salary of a researcher during an exchange service period of four to twelve months in another sector than the one in which the person is currently active. During the exchange period, the visiting researcher shall conduct strategic research within one of the Foundation's spheres of responsibility. The allowed mobility exchanges in this program are as follows: Academia or research institute to/from industry or government agency.

IP development at the University and licensing

In Sweden funding from universities is normally not used for founding start-ups due to the teachers' exception.

> *The Act on the right to employee inventions (LAU 1949:345) regulates the extent to which the employer may have the right to take over the right to employee patentable inventions.*
>
> *In paragraph 1, "teachers at universities, colleges or other institutions belonging to the teaching right" are exempted from the law, i.e. they are not considered employees according to that law.*

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In Sweden, teachers, researchers and doctoral students are covered by that exception, and these groups thus own the right to their own patentable inventions even when they come up during working hours.

Therefore, in most cases the university do not have any IPR to ideas that is the results from research. However, teachers, researchers and doctoral students have the right to waive this right, which is typically agreed upon in the beginning of a project (as an example see *Vinnova-Guide for agreements,* in Swedish, listed below).

At several of the country's universities there are support functions for researchers within the universities, where the innovation office is a service function tasked with increasing the utilization of research. An idea that is further developed can form the basis for company formation, and the universities' holding companies can then enter with equity capital or choose to acquire intellectual property rights from a researcher or student and develop the idea themselves. The holding companies can also conduct other activities to develop results from research at the university on a commercial basis. Some companies founded by employees or students of a university can then be developed in an incubator. An incubator is an organization whose purpose is to support a start-up company on its way to profitability. In connection with most universities, there are also so-called technology parks or science parks. These constitute a physical location for (often high-tech) companies and aim to create cooperation between academia and industry. Outside the universities, there are various support structures for business development. Here there is a multitude of different actors who offer different support in different phases and for different industries (see SOU 2020:59 in the list of references).

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Conclusions

Although developed and professional structures are present at the partner universities, they might need some more promotion. This can be definitely said about France and Poland, since majority of the replies of the survey come from these countries. Perhaps an investigation among mature researchers would prove it wrong, however, this definitely pertains to students.

Furthermore, it seems that there is a space to emphasise and explain the link between space sector and humanities and its role in climate change mitigation. This aspect is particularly important for UNIVERSEH, the space university.

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List of figures

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Annexes

Annex 1 List of selected guides or considerations on collaboration between academia and non-academia

In the process of designing this report, some already existing handbooks, reports and templates have been collected and studied. These documents are:

- A theoretical view on public-private partnerships in research and innovation in Germany by Fraunhofer
- TUM Research and Commercial Cooperations by Technical University of Munich
- Sample agreements for research and development cooperation by Federal Ministry for Economic Affairs and Energy in Germany
- EPEC Guide to Public-Private Partnerships by European Investment Bank
- PUBLIC-PRIVATE PARTNERSHIPS: STIMULATING INNOVATION IN THE SPACE SECTOR By the Aerospace Corporation
- Guide to Research Partnerships with Canada's Universities by Business + Higher Education Roundtable and U15 Group of Canadian Research Universities
- Kosmos 2022 by Startup Poland
- Vademecum Transferu Technologii by Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu
- University strategies for knowledge transfer and commercialisation by VINNOVA
- Avtalsguide– en hjälp i avtalsskrivandet by VINNOVA
- Att utveckla öppna innovationsarenor erfarenheter från vinnväxt by VINNOVA

Annex 2 Additional information relevant for France

- https://anr.fr/fr/detail/call/laboratoires-communs-organismes-de-recherche-publics-pme-eti-labcom-appel-a-propositions-editi-1/
- https://www.univ-toulouse.fr/innover-et-entreprendre/actions-de-valorisation-et-transfert
- Lanceur d'étoiles | accueil (lanceurdetoiles.com)
- https://www.univ-tlse2.fr/accueil/recherche/valorisation-de-la-recherche

Annex 3 References

LAU1949:345 Swedish law: Act on the right to employee inventions.

SOU 2020:59 Innovation as a driving force – from research to benefit. Report of the Inquiry of innovation support at universities and colleges, The Swedish state public investigations.

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