Federal Ministry
Republic of Austria
Education, Science
and Research

University of Technology for Digitalisation and Digital Transformation in Upper Austria

Report by the independent Scientific Concept Group

University of Technology for Digitalisation and Digital Transformation in Upper Austria

Report by the independent
Scientific Concept Group

Vienna 2022

Imprint

Media owner, publisher and editor:
Austrian Federal Ministry of Education, Science and Research
Minoritenplatz 5, 1010 Vienna
www.bmbwf.gv.at
Authors: Members of the independent Scientific Concept Group
Coordination: Austrian Federal Ministry of Education, Science and Research,
Department IV/3 – Technical Universities
Design: BKA Design & Grafik
Printing: Digitales Druckzentrum Renngase
Vienna, 2022

Table of Content

Preamble

This report contains the visions, and operational and strategic recommendations of the Scientific Concept Group for the new University of Technology for Digitalisation and Digital Transformation in Upper Austria. In accordance with our mandate, this report documents the most important cornerstones, which would allow the university to live up to the expectations placed in it. The report intends to provide a basis for further steps, both in terms of thematic orientation and organisation.

A German version of Chapter 1 (University of Technology in a Nutshell) and Chapter 2 (Main Principles) can be found in Appendix 1.

1 University of Technology in a Nutshell

Solving the big challenges of the future through interdisciplinary innovation

The new University of Technology performs excellent teaching, research, and the knowledge transfer of interdisciplinary, technology-based solutions and processes for a sustainable economy, a resilient European industry, and human-centered societal progress. Combining expertise and exploring synergies across disciplines to cover current and upcoming challenges related to digitalisation and digital transformation, the university is complementary to existing universities. In this sense, achieving technological progress by covering aspects in these fields and their impact on other disciplines forms the basis of a transversal approach at the highest international level.

Attracting new target groups through new types of curricula

The university addresses new target groups, aiming for students who are interested in the impact of technology and its interplay with society and industry while complementing existing universities—attracting students who otherwise would have decided against studying pure technical subjects. From day one, the university will involve its students in real-life, application-driven projects, in which they work across disciplines and use digitalisation as a means to an end. For the first three semesters, all students will attend the same courses and work in cross-disciplinary teams to learn the basics of digitalisation and digital transformation, before specialising in separate fields combining digital technologies with a second discipline.

Graduating new professionals

Students of the university can enrol in bachelor's, master's and PhD studies. They will become experts in digital transformation. They will work as leading engineers, digital creators, or entrepreneurs and realise the digital transformation of industry and society. Through projects with industry and close dialogue with society about the benefits and limits of digitalisation, these new professionals will bring additional value to the European high-tech sphere, and foster an innovative ecosystem of highly qualified talents, companies, and research institutions.

Realising synergetic research and impactful technology transfer through an agile faculty

Research activities of the university reflect its main principles (cf. Chapter 2) and complement them. The vision includes interdisciplinary shared labs and an agile faculty organised as a flat hierarchy; a broad and modern definition of scientific excellence; a faculty that also includes external experts, practitioners, or lateral entrants without a typical scientific vitae but with the spirit to realise 'the next big thing'. An open and agile recruitment policy will provide the foundation for hiring excellent faculty. This will allow the university to serve as an incubator for new, synergetic ideas and as an active interconnecting hub for cooperation and knowledge transfer. The university's goal is to achieve scientific excellence and to also capitalise on it with impactful contributions to society and industry, in terms of processes and start-ups that are going to change the world.

2 Main Principles

The founding of a University of Technology offers the opportunity to establish new structures and to pursue new approaches—both in terms of content and organisation. From the perspective of the Scientific Concept Group, the following main principles should shape the development and operation of the University of Technology:

1. **A broad perspective on digitalisation and digital transformation:** Digitalisation connects technology with many other areas of our professional and private lives. Building on a digital technical core, the University of Technology should focus teaching and research on the application, impact, and potential of digital solutions and contribute to Austria's technological sovereignty in digital transformation.

2. **Interdisciplinarity:** In order to truly understand digitalisation in teaching and research, the University of Technology overcomes traditional disciplinary boundaries. The University of Technology thinks and works in an interdisciplinary way in all areas. Starting from the University of Technology's foundational course termed Common Core (see below) in the bachelor's study programme, students, scholars, and external experts build an interdisciplinary community of inquiry. Research areas covered by the University of Technology stretch across all areas that are relevant for digitalized organisations and a digitalized society.

3. **Mission orientation:** Technological progress is not a goal in itself, but digitalisation ought to be used as a powerful tool to tackle the big societal, economic, and ecological challenges of our time. That's why the University of Technology's teaching, research, and interaction with businesses and society are organised around broader societal missions (that Austria and Europe want to pursue). For this, the University of Technology also aims to overcome the so-called 'European Paradox', i.e the perceived failure of European countries to translate scientific advances into marketable innovations and societal benefit. The University of Technology will pursue new paths to enable Europe to shape the digital transformation and translate its expertise into products and services. Therefore, a broader definition of

success than in traditional universities is used which includes cooperation, knowledge transfer, and societal outreach alongside scientific excellence. With this new approach and the new skills of alumni, the University of Technology will strengthen industry in Upper Austria, Austria, and Europe through innovative processes and technologies in the long term—especially by combining the latest scientific research results in digital transformation with engineering science.

4. **Addressing new target groups:** Today, virtually everyone uses digital technologies. Yet only a small number of people decide to study technical subjects. By putting applications first and positioning digitalisation as a means to achieve an end, the University of Technology aims to enthuse students about digitalisation through new approaches and methods, and to inspire graduates of secondary schools to take up technology-oriented study programmes. The University of Technology will build bridges and open up new dialogue platforms in the area of cooperation with business and society. In this way, the University of Technology is not only able to address a wider pool of prospective students, but also complements other (established) technical universities instead of competing with them for technology-oriented students.

5. **Common Core and practice-oriented teaching:** From day one, students are involved in real-life projects. They learn the basics of digitalisation and digital transformation in a Common Core module over three semesters, after which they deepen their knowledge in specific fields. Furthermore, they will learn future skills such as creativity in small project groups. In all of this, modern teaching and learning methods are used in interdisciplinary labs.

6. **Twin transition:** Our society is currently facing two major transformation processes: digital transformation and ecological transformation. According to the principle of 'Digital First', students acquire basic skills in technology, which are later combined with sustainability, engineering, and entrepreneurship. Thus, the transformative dimension of digitalisation will be linked to addressing technological, social, and ecological challenges.

7. **Network and partnerships:** The University of Technology is founded as a complementary addition to Austria's scientific landscape and will serve as an incubator for synergies and opportunities. This requires a close network of partners inside and outside of the University of Technology. These include, of course, other (Austrian and international) universities as well as research institutions, companies, NGOs, etc. The University of Technology sees itself as a hub and initiator of cooperation and knowledge transfer. The capitalisation of knowledge by start-ups is supported practically and they are given access to important capital market networks.

8. **Diversity and internationality:** Diversity enriches us. The University of Technology is rooted in Upper Austria, but its branches reach out into the world. Internationality is lived in all fields; English is the working language. The faculty is heterogeneous, as are the students, both in terms of their origins and their interests. This mix also makes the University of Technology appeal to broader student body.

9. **Flexibility and agile structures:** Digitalisation entails a very high level of dynamics. If the University of Technology wants to keep its finger on the pulse in this context, it must be able to adapt quickly. It needs flexible and lean structures, flat hierarchies, few rules, quick decisions, and effective research support, according to the motto: 'Don't kill speed!'.

10. **Open mindset:** The critical success factor in the entire concept is the faculty. Especially in the first phase, much will depend on whether the 'right' people join to the University of Technology. Researchers, visionaries, bridge builders, and designers of digital transformation are needed—people with open mindsets who are passionate about innovation in higher education and in research.

3 Thematic Orientation

At the heart of the University of Technology's thematic orientation is a broad, interdisciplinary perspective on future-oriented topics of digital transformation and digitalisation. Within this framework, the university, as an important societal actor, aims to contribute to ecological, social, and economic sustainability through its research and teaching programmes. To reach these goals, cooperation with the economy, industry and society, as well as applied research and the implementation of open innovation principles are part of the university's identity.

In the spirit of state-of-the-art research-led teaching, the topics that faculty researchers work on and those that represent the specialisations in the university's study programmes overlap greatly. Thus, cutting-edge research on relevant topics of digital transformation and digitalisation underpins curricular content, while insights gained from teaching in turn feed back into research. Thematic interfaces between digitalisation, digital transformation and important other fields and approaches are established and continually realigned according to current requirements.

Among the thematic priorities that have been identified as initial priorities in research and teaching at the University of Technology are the following:

- *Digital creativity and entrepreneurship* to strengthen the important resource of human innovation capability and its translation into new services, materials, products, and business models;
- *Digital sustainability and environmental aspects* of digital technology to enable the twin transition of Europe's economy towards green and digital;
- *Digital systems and autonomy* to fuel data-driven learning models, interconnected machine intelligence, and upcoming technologies such as quantum or neuromorphic computing;
- *Digital production and processes* to optimise machinery, advance automation and enable smart human-machine collaboration and autonomous processes in industry and business;
- *Digital interaction, societal implications and regulation* to support the development of human-centered technologies and reflect ethical dimensions from the outset.

See chapters 4 and 5 for more detailed descriptions of the proposed teaching and research priorities.

Important research fields are aligned with industry. Technology transfer and practice-led interdisciplinary student projects will be at the core of the University of Technology's values. The university promotes entrepreneurship of students and faculty to encourage the successful implementation of research ideas in industry and society, while observing their impact on sustainable development goals. The University of Technology will be one of the first universities worldwide to handle all aspects of digital transformation from research to application in a fully integrated way. Interdisciplinary teams with different competencies cooperate in research, teaching, and in studying. This makes the University of Technology most attractive for start-ups and existing enterprises.

The University of Technology deals with all relevant topics of digital transformation in research and teaching, as well as in cooperation with economy, industry, and society. All activities will respect the framework of sustainable (social, environment, governance) economy and society. The University of Technology core principle is 'digital-first interdisciplinarity'.

From creativity techniques to the design, implementation, deployment, and evaluation of autonomous systems and processes as well as their consequences on society, the basic research domains stretch across all areas relevant for digitized organisations and digitized society.

4 Teaching

The University of Technology follows a 'digital first' strategy in its educational programmes: instead of enriching traditional disciplinary curricula with 'digital' elements (often from computer science), technical digitalisation and societal, economic and environmental implications of digital transformation are positioned as the brand core of the University of Technology. Digital, creative, socio-communicative, and critical thinking and sustainable thinking skills (cf. 'twenty-first century skills', 'future skills') are promoted through inter- and transdisciplinary student projects and practice-oriented learning. These topics and approaches are also at the heart of the innovative University of Technology's Common Core, a start phase that all bachelor's students participate in together, regardless of their later choice of specialisation or study programme. Students at the University of Technology are taught, supervised, and supported in the implementation of their own ideas by academic faculty as well as mentors from professional practice, using leading-edge educational technologies. Through this Common Core students get the chance to early build important networks over different areas and organizations. Overall, the University of Technology will attract students who would normally have decided against a technical degree programme. Moreover, the University of Technology aims to tap into the international student market by providing supporting scholarships.

4.1 Study Programme

The main design elements that went into creating the programme are innovation and uniqueness. Therefore, the new study programmes clearly stand out from existing offerings in terms of both study content and didactic approaches. In order to reach diverse, less technology-savvy students, the breadth and diversity of fields of applications of digitalisation and digital transformation is mapped across and combined with other disciplines.

All study programmes at the University of Technology are offered in English. This makes study programmes attractive to international students and faculty and supports local students in gaining language skills needed on the international job market.

In the sense of complementarity to already existing study offerings, an analysis of existing study offerings in the German-speaking area as well as in the national and international surrounding of Upper Austria was carried out. In addition, two surveys were conducted that examined the study interests of Austrian and international prospective students and high school graduates.

Based on this, the following study programmes are recommended:

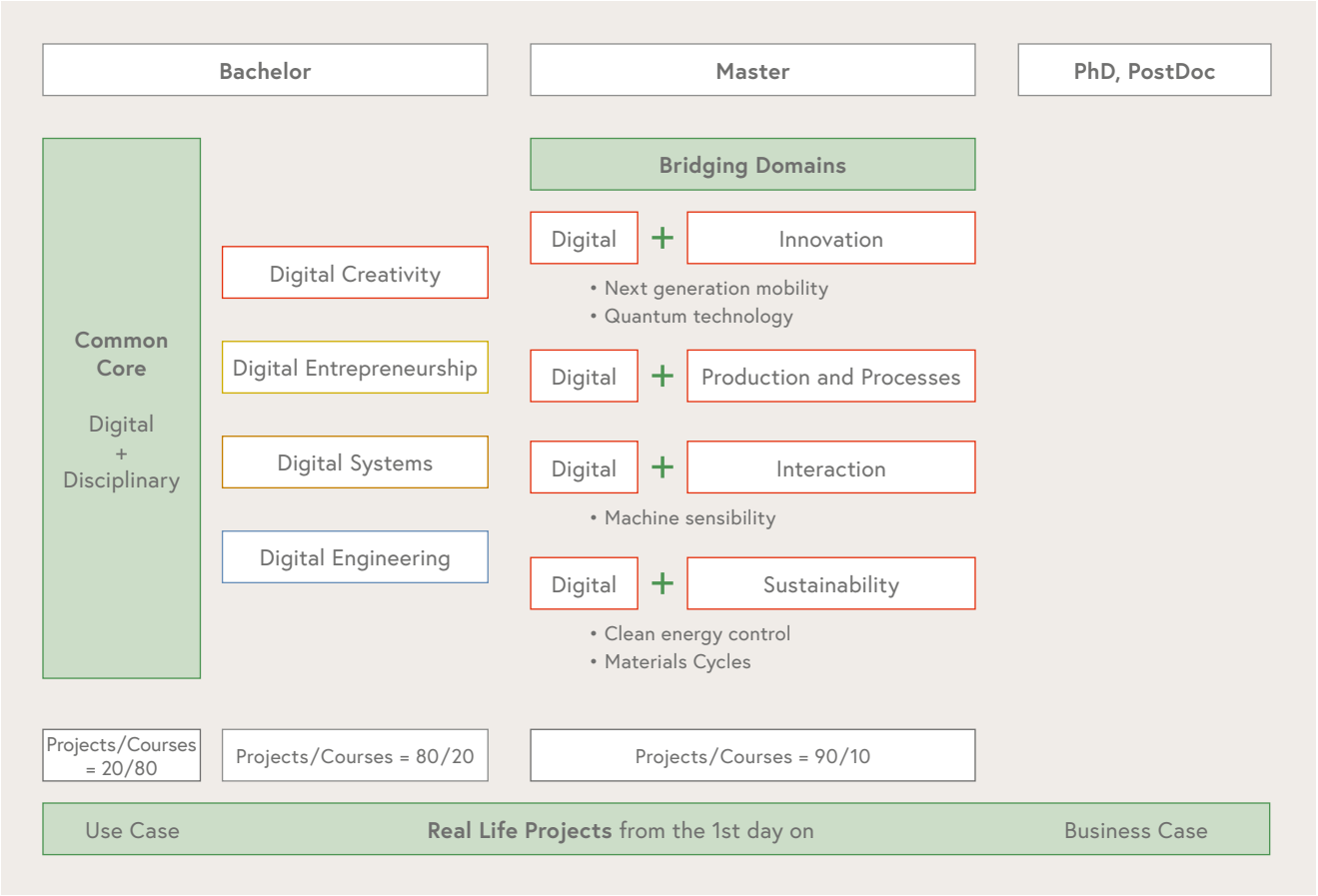


Figure 1 Study Programmes

The study architecture at the University of Technology reflects the interdisciplinarity and digital-first strategy, i. e., the DNA of the University of Technology. This is specifically visible in the University of Technology's Common Core which branches into four BSc specialisations after three semesters (future expansion through additional specialisations is recommended).

Bachelor's programmes

- *Digital Creativity:* The combination of creativity with digital technologies and shape of idea-generating processes in business and society.
- *Digital Entrepreneurship:* The use of digital technologies to develop new products and services from which start-ups can emerge.
- *Digital Systems:* The programming of systems that connect objects in our every-day lives and make them work together.
- *Digital Engineering:* The development of technologies to optimise machines, processes and products in industry and business.

Master's programmes

- *Digital Innovation:* The use of digital technologies to build innovative solutions to problems in organisations, companies, and society.
- *Digital Production and Processes:* The advancement of the automation of production processes in industry with digital technologies.
- *Digital Interaction:* The design of how people and machines communicate with each other and focus on user needs.
- *Digital Sustainability:* The development of sustainable digital technologies and their use to advance climate and environmental protection.

PhD programme

- *Digital Transformation*

The Scientific Concept Group recommends a step-wise approach in ramping up the study programmes, starting with the implementation of the Common Core and the PhD programme in 2023/24. In addition to the study programmes suggested above, the programme can be extended and complemented by additional fields of study (e.g. bachelor's specialisations in Digital Environmental Sciences or Digital Democracy).

Degrees awarded:

Awarded degrees should reflect the broad range of knowledge and competencies gained at the University of Technology in order to help the employability of graduates and to make admission from bachelor's to master's programmes, particularly when switching to other higher education institutions or in case of double degrees, easier.

- Bachelor's of Science (BSc) in Digital Transformation with specialisation in Digital Creativity / Digital Entrepreneurship / Digital Systems / Digital Engineering
- Master's of Science (MSc) in Digital Transformation with specialisation in Digital Innovation / Digital Production and Processes / Digital Interaction / Digital Sustainability
- PhD in Digital Transformation

There is potential for creating synergies with existing higher education institutions in Austria and beyond. In order to expand the range of courses in terms of content and discipline, it is worth considering whether students complete courses outside the Common Core at partner universities. To achieve this, exploratory discussions must be initiated with potential partner institutions in this regard. This could result in an offer of extension certificates or even double-degree programmes.

The Common Core also offers possibilities in the area of Continuing Education (cf. Section 4.4).

4.2 Common Core for Bachelor's Students

The study architecture at the University of Technology reflects the interdisciplinarity and digital-first strategy, i. e., the DNA of the University of Technology. This is specifically visible in the University of Technology's Common Core, a start phase of all bachelor's programme entrants in the extent of three semesters. It is an essential building block and a distinctive characteristic of the University of Technology. The Common Core covers a broad spectrum from socio-economic digital transformation subjects (e. g., Digital Creativity) to technical digitalisation subjects (e. g., Digital Engineering) in order to appeal to a diverse group of learners. Regardless of their chosen field of study, all new students complete the (more or less) same programme in their first three semesters, and in doing so work together in teams on practice-oriented projects. The final decision for the bachelor's specialisation can be made before or after completion of the Common Core.[1]

The backbone of the Common Core is formed by project work in interdisciplinary student groups who team up on practice-oriented projects from the start of the study programme and are supported by mentors from various backgrounds.[2] Each student group has at least one member from each BSc specialisation (i. e., individuals who have expressed interest in continuing their BSc in that specialisation). Groups are formed within the first few weeks of the semester and after an Integration Phase where students are welcomed to the University of Technology, receive inspirational introductory lessons, introductions into the University of Technology's setup, and socialise.

Group formation and mentor assignment should take place around project topics and in a Project Bazaar setting. The projects may be student-initiated topics (if a mentor can be identified) or university-initiated topics that may be inspired by the University

---

1 The University of Hong Kong introduced a similar approach in 2012, a 'Common Core Curriculum' which is offered by all ten faculties of the university. At the University of Hong Kong around a quarter of the content of all bachelor's programmes consists of a common core. For this, six courses from four different subject areas have to be completed. For further details, see 'Example 01—Common Core Curriculum' of Pausits et al.: Internationale Beispiele innovativer Hochschulkonzepte.

2 The University College London follows a similar approach with its teaching framework called "Integrated Engineering Programme" for Undergraduate Students. Main pillars of this programme are multidisciplinary teaching in order to overcome disciplinary perspectives, learning on the basis of real-world problems, with a focus on the development of capabilities like creativity, communication skills and teamwork.
There are different kinds of formats like 'Challenges', which are common projects lasting several weeks and which are defined at the beginning of the studies in order to better learn the contexts of engineering. In 'Scenarios' students gather to develop a design project together. 'How to Change the World (HTCTW)' are multi-disciplinary projects that address societal problems and which are carried out over a period of several weeks. For further details, see 'Example 03—Integrated Engineering Programme (IEP)' of Pausits et al.: Internationale Beispiele innovativer Hochschulkonzepte.

of Technology master's degree programmes (that focus on Sustainability, Innovation, Interaction, and Production and Processes) and reflect cooperation with practice (i. e., industry, NGOs, museums, or internal or external research groups). After the group formation and project finding phase, all project ideas are presented by the groups (and together with their mentors) at a BSc-Kick-Off Event in front of the entire University of Technology.

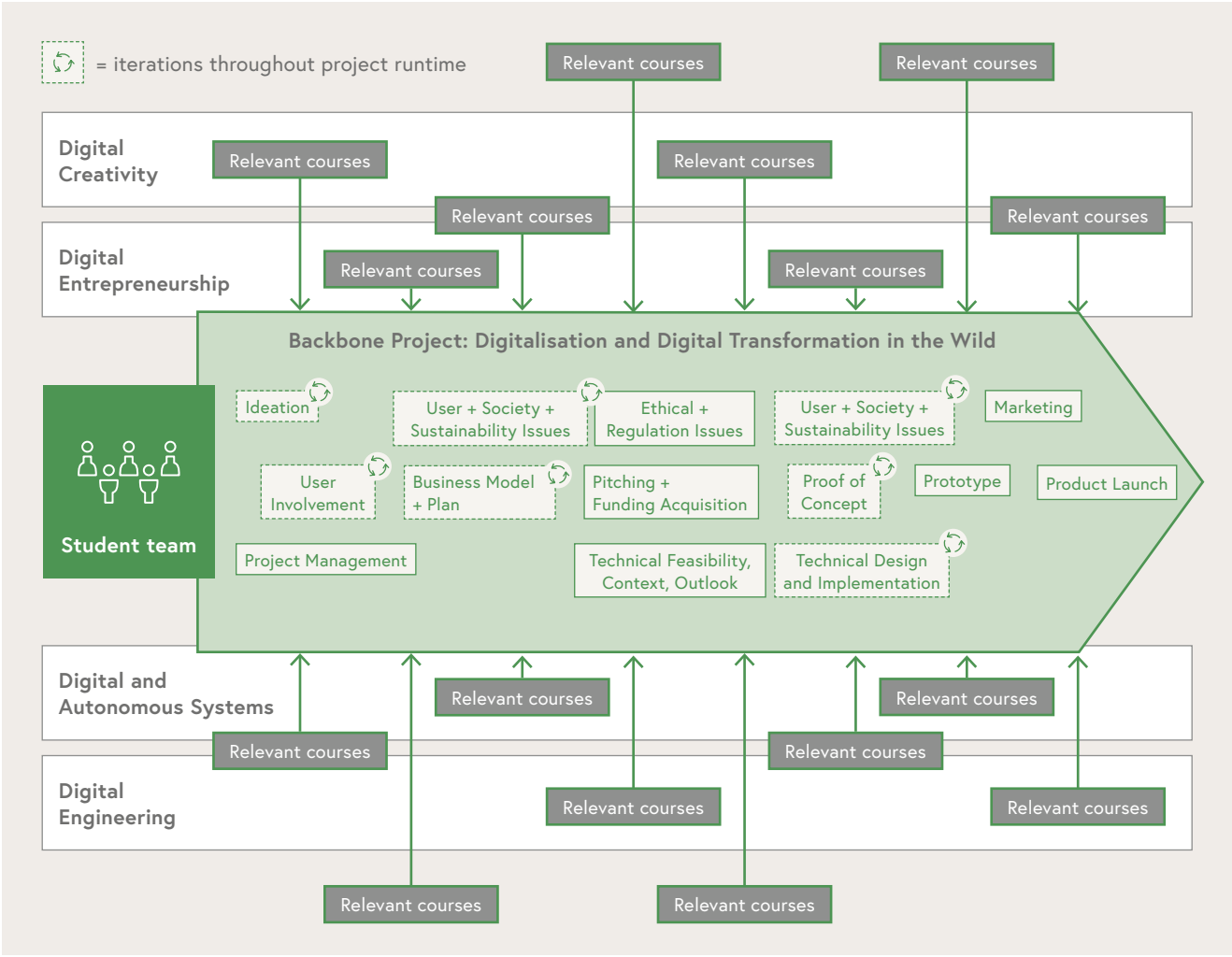


Figure 2 Common Core

While student groups work on their projects, all projects follow the same overall architecture: User-Centric Ideation → Business Model and Plan → Project Implications → Technical Feasibility → Funding Acquisition → Technical Implementation → Marketing → Project Launch Event. A proposed structure of this architecture, together with exemplary courses that feed into the project work, is shown in Fig. 2. Each phase is initiated and backed up by at least one course, and several of the phases should follow an iterative approach where the students continuously integrate new (theoretical) knowledge into their projects. Where necessary (e. g., due to multi-semester dependencies), course con-

tent is split across multiple courses that build on top of each other and feature curated interfaces. This implies that, ultimately, every course that students take at the University of Technology feeds back into the main project. This structuring will enable students to put theoretical knowledge that they acquire in courses as well as technical skills and learned methods into practical application quickly, and in many cases immediately after a course concludes. Grading of individual courses as well as of project milestones consequently happens continuously throughout the study programme. The development of professional skills ('capabilities') is a priority: creativity, communication, interdisciplinarity, teamwork in relation to project work, and the social context of engineering.

4.3 Types of Projects

At the University of Technology's Common Core as well as beyond the study programmes four types of projects are differentiated: Synthetical Projects and three different kinds of Real-World Projects, namely Digital Applications, Research Projects and Blue-Sky Start-ups. The Professional Landing Point (cf. Section 6.2) will help to coordinate the projects and bring projects for all four types from industry and nonprofit entities to the University of Technology.

Synthetical Projects

Synthetical Projects are based on projects that have already been implemented successfully in industry and where the output has high significance for industry. These projects emulate realistic, applied learning environments for students of the University of Technology while allowing access to lead developers of the real-world project to support the students, providing the realistic environment, and offering the opportunity to test cases and relevant data. These projects are pre-structured for the University of Technology students in learning sprints that feature feedback and tests, and where each next coordination point is neither too difficult nor too easy to reach. Students thus enter a state of learning flow within a continuous integration / continuous delivery approach. Theoretical knowledge that is required for the project is prepared in project dossiers that the students work on prior to starting the project over a duration of 3–5 weeks. On the other hand, aspects that are not considered relevant to the project's learning goal (for example, user interfaces, boilerplate code) are given to the students. Students can work on synthetical projects from the very beginning of their studies and shall be able to finish them within some weeks.

Real-world Projects: Digital Applications

Digital Application projects consider an unsolved problem by a company, start-up, or nonprofit entity. Students have access to lead developers who provide a real-world project environment and set the project goal in collaboration with the professor / mentor of the student team. While working on the project, students are project members and are aware

of the project context. They know the 'big picture', are aware of the significance of the project within the company or non-profit, and are responsible for setting up feedback loops and regularly present their work progress. Missing basic knowledge is treated as a risk factor to the successful completion of the project, where the professor / mentor supports students gaining missing knowledge quickly. Similar to Synthetical Projects, these projects can be parallelised across student groups. For complex projects, individual groups work on sub-projects where the interfaces between groups are well-defined. This type of project is selected after a pitch of the problem and project by a representative of the company, start-up, or non-profit who then also takes over a mentoring role for the student group. It is furthermore possible that a student group pitches a Digital Applications project—in this case, the student group may propose or be assigned an internal or external mentor. Students will work on their first real-world projects during their bachelor's or master's studies after having successfully completed the Common Core, and shall be able to finish them within some months.

Real-world Projects: Research Project

Research Projects are application-oriented real-world projects derived from current ongoing projects in research groups of the University of Technology alone or in cooperation with industry. These are supported by senior researchers from the University of Technology and target proofs of concept and prototypes. Similar to Digital Applications projects, student groups become first-class project members and are integrated into a University of Technology research group in suitable form. These projects are pitched either internally or similar to Digital Applications projects by an industry mentor. Students will typically work on this type of project during their master's or PhD studies, and senior researchers integrate them into their research agenda. These projects have a runtime of several months to a year.

Real-world Projects: Blue-Sky Start-up

In Blue-Sky Start-up projects, student teams work together with the University of Technology faculty and international experts on futuristic blue-sky challenges with the goal of creating a start-up company. Blue-Sky start-ups are multi-dimensional curiosity-driven start-ups with high investment risks, which address new phenomena and push the frontiers of knowledge. The underlying challenge cannot be solved with today's know-how and requires significant investment in technology and / or financial backing over a period of five to ten years. Ideally, this challenge is highly societally relevant (for example, contributing towards the UN Sustainable Development Goals) and is supported by internationally relevant companies and / or institutions. Teams present their results in an internationally visible format (such as a TV show) in front of an international expert jury and audience. Students receive support by a professional marketing team from the University of Technology or an external contractor to market, finance, and develop their project, with the goal that an international audience watches their presentation. External contractors will be conveyed by the Business Club, a committee being part of the Hub

(cf. Section 6.5) or existing organisations (for example, 'tech2b Inkubator GmbH'). In the ideal case, this leads to student-led and faculty / mentor-supported companies that are already founded during university studies. Students gain valuable entrepreneurship experience as well as professional networks very early in their career and in a controlled and safe environment at the University of Technology.

4.4 Fostering Continuing Education

Entry to the Common Core module will be offered as a further training programme to prepare participants for digital transformation. Alumni of this further training shall get a special certificate. Industry professionals as well as employees of SMEs may be interested to qualify for digital transformation and take this programme. Companies generally have an interest in improving the skillsets of their employees and are therefore likely to pursue this opportunity.

The University of Technology will charge participants for participation in this programme, bringing revenue that can be used to support research and teaching. While continuing education thus fits very well with the University of Technology's Common Core, it is not an immediate focus.

4.5 Skills for the Future

Digital technologies drive change in many areas of our lives, while demands on the job market are shifting. Therefore, it is essential that the University of Technology supports its students in the acquisition of both profound expert knowledge and important competencies for their future career to take leadership in the digital transformation.

On the one hand, students will be taught skills in the creation of digital systems, foundations of computer science, software development practises and information modelling, algorithms and data structures, autonomous systems, cyber security, process knowledge, and digital business models. On the other hand, students will acquire communication skills, creativity and ideation skills, entrepreneurial and (agile and lean) project management skills, and critical thinking and sustainable thinking skills ('future skills' or 'twenty-first century skills').
The University of Technology will enable graduates to apply their knowledge flexibly to new situations, to come up with creative solutions to complex problems, to communicate their ideas effectively and in simple terms, to collaborate with interdisciplinary, international, and highly diverse groups of people, and to shape the digital future in responsible, sustainable and human-centric ways: they will become communicative generalist engineers.

In order to regularly align the relevance of taught skills with real-world requirements, the University of Technology establishes an advisory board to enable stakeholders from industry and practice, societal institutions and research to make recommendations regarding knowledge levels and skills of graduates

4.6 Didactic Foundations

A University of Technology of the twenty-first century needs to place the learners and their learning processes at the centre. Digital and analogue learning formats as well as theoretical knowledge and practical competence transfer must intertwine and complement each other in meaningful ways. Teaching concepts at the University of Technology are characterised by a high degree of interdisciplinarity, teamwork, creativity, and practical relevance. Within hands-on group projects, students are able to work together on relevant topics and develop their own ideas. The responsible task of teaching is held in high esteem at the University of Technology. The state of future-oriented didactics is constantly consulted, and attempts are made to contribute to didactic innovations in higher education at the University of Technology itself.

In order to align the didactic concept of the University of Technology with the state-of-the-art innovative university teaching, an analysis of international trends and best practice examples was carried out.[3] Based on this and taking into account the fundamental principles of the University of Technology, university teaching at the University of Technology is to be aligned with the following didactic guidelines:

Fostering competencies and skills

In addition to profound specialised knowledge and broad contextual knowledge, the training of relevant skills and competencies is essential to ensure the applicability of acquired knowledge in different new situations and to enable the collaborative solution of complex problems. Since it can be assumed that the aforementioned skills (cf. Section 4.5) are of growing relevance in the labour market, a stronger competence orientation of the University of Technology also promotes the employability of its graduates. The development of future-oriented competencies must be ensured through appropriate teaching and assessment formats.

Hybrid learning spaces and flipped classrooms

The University of Technology is characterised by well-designed hybrid learning formats that combine the respective strengths of digital and analogue learning worlds into a

3 Pausits, Attila; Geppert, Corinna; Lessky, Franziska; Campbell, David F.J.: Internationale Beispiele innovativer Hochschulkonzepte. Darstellung von Konzepten zu Lehre, Curriculum und Studienzulassung/Studienrekrutierung (2021).

coherent overall experience for students. Formats that do not experience considerable added value through physical presence take place virtually. Content from courses that primarily serve the unidirectional transfer of knowledge can be accessed independently and asynchronously by students. Valuable joint attendance time, on the other hand, is primarily used for discursive and interactive formats such as seminars, workshops, project work, or expeditions. By means of didactic strategies such as flipped or inverted classrooms, this strategy can also be taken into account within individual courses by allowing students to acquire online content at home at their own pace, thus leaving time for interactive exercises, discussion, and reflection during live lessons of the same course.

Interdisciplinarity and transdisciplinary

Since real-world problems often transcend disciplinary boundaries, it is important to familiarise the University of Technology students with problem-solving in interdisciplinary teams early in their studies and to train social-communicative skills in diverse groups. Courses in which topics are examined from the perspective of different disciplines familiarise students with different approaches and methodologies, broaden their own horizons and promote networked thinking. Interdisciplinary and transdisciplinary work can be implemented through projects in which students, teachers, and external experts (for example, from industry and societal institutions) from different backgrounds are involved. Courses and project work are partly supervised simultaneously by several teachers from different disciplinary backgrounds (co-teaching).

Hands-on projects and mentoring

From day one of their studies, students at the University of Technology should have the opportunity to translate their interests and newly acquired knowledge into practical projects. Inter- and transdisciplinary projects form the backbone of the module Common Core of all bachelor's students and continue into the master's programmes. The projects may cover different relevant stages from idea generation, presentation, project management, user studies, and societal implications to technical implementation and the creation of a business plan. Student projects at the University of Technology should address important future topics of digitalisation and digital transformation and may take place in cooperation with mentors from different fields of practice. For conceptualising, tinkering, designing, and technical prototyping, labs and maker spaces as well as experienced mentors are available to support the students.

Inquiry-based learning

In order to emphasise the students' active role in the learning process, methods of inquiry-based learning are applied. Students are encouraged to ask questions, develop their own ideas, and think for themselves about what information and knowledge they are currently lacking, for example, for the implementation of a project. Necessary knowledge can be obtained in a targeted manner through courses during the Common Core's group projects. Topic-wise, tasks or problems to be worked on in the projects

on may be pre-specified (for example, in case of a collaboration with a partner from industry), but there is always the possibility for student groups to come up with their own task definition on the basis of a mission called upon or an umbrella question / topic (for example, derived from one of the master's degree specialisations). Overall, students should be enabled to shape their education according to their interests and ideas and to become self-determined and self-managed learners.[4]

Individual learning paths

Students spend the first three semesters together during the Common Core. Afterwards they can choose a specialisation. To allow for individual learning paths, designing the curricula in such a way that students have some flexibility to choose their courses according to their interests is recommended. To have a specialisation listed on their degree certificate a certain amount of ECTS credits related to their specialisation of choice should be enforced, while allowing for a certain amount of electives from other specialisations. To allow students to choose courses covering a broad range of topics related to different specialisations, a general bachelor's degree in 'Digital Transformation' without a particular specialisation could be an option.

4.7 Student Recruiting

The goal of the University of Technology is to develop new student target groups and to complement existing higher education institutions with a focus on technology in Upper Austria, Austria and neighbouring countries. The international spirit and diversity of the student body (in gender, cultural background, socio-economic background, interest, and motivation) should be strategically pursued. Increasingly, young people for whom the completion of a traditional computer science degree is not an option, but who are instead interested in more interdisciplinary and broader perspectives on the digital transformation, should also be targeted. There are various examples for student recruitment such as outreach activities in schools or trial days at universities.[5]

---

4 The Charles Sturt University in New South Wales' approach of the 'Topic Tree' follows a similar approach: lectures are organised as 'topics'. Students organise themselves by choosing the topics they need out of a 'topic tree'. This approach enables students from the very beginning to work on real engineering problems and to be treated like industry professionals. For further details, see 'Example 05—Topic Tree' of Pausits et al.: Internationale Beispiele innovativer Hochschulkonzepte.

5 A very interesting best practice is the 'IT for SHE' campaign, a mentoring programme in Poland, where representatives of leading technology companies support young women on the transition from school to university. While still in school or immediately after their final exam first-year students can apply for a mentor who works in an international leading technology company. Together they plan goals, the career of the student, and the optimum curriculum. This programme runs from June to December in the year where the student starts in October. Additionally in July after the final school exam a 'Women in Tech Camp' will be organised where female students get in touch with successful women in technical positions in Science and industry. For further details, see 'Example 11—IT for She' of Pausits et al.: Internationale Beispiele innovativer Hochschulkonzepte.

However, recruitment will also require a new and innovative approach to cope with the challenges of getting more students interested in technology and reaching a large international community of potential students. The concept will need to build on two key concepts: engaging via modern digital media (such as Twitter, TikTok, Netflix, and Youtube videos) vs. traditional ads, and openness and accessibility (for example, by providing free lectures, content).

Open education is a key principle to engage with a wider audience. For the University of Technology this means that lectures can be viewed without being an official student. As these lectures are digital there are no additional costs nor space restrictions. This will attract students and industry members through the content produced by the University of Technology. This is a proven strategy for technology influencers who use Youtube as their principal way to build large audiences. However, in order to study in a degree programme, students will need to become official students of the University of Technology. Beyond being awarded a degree, official enrollment will be required to participate in labs, face-to-face activities and more.

Student recruitment with a special focus on underrepresented groups is of great importance. Therefore, the Founding Convention should pay special attention to this issue, for example, by commissioning a student recruitment strategy.

4.8 Teaching Staff and Mindset of Teachers

The success of the University of Technology's teaching programme depends on the teachers. They are experts in their respective fields, committed to interdisciplinary teaching and the didactic concept of the University of Technology and its study architecture. Great teaching is considered instrumental for the success of the University of Technology and the university values its highly motivated teaching staff. The University of Technology consciously trades off teaching quantity for teaching quality to permit the successful recruiting of individuals who are able to perform quality teaching and quality research at the same time. Teachers who try out new teaching formats, hold interdisciplinary courses, complete further didactic training, and inspire their colleagues are valued at the University of Technology. To allow for this, the University of Technology features a reduced teaching load. Further, to support interdisciplinarity not only in research but also in teaching, incentives are in place that support co-teaching of individuals from different research areas.

Courses that belong to the Common Core section of the University of Technology's study programme are taught to a large extent by core faculty members. This is essential to guarantee stability. However, the innovative teaching of the University of Technology requires core faculty to be complemented by new teaching personas such as:

- Mentors: the contact person for students regarding the design of their studies and their learning process, accompanying student projects, providing support, giving feedback, etc.
- External Experts (for example, Expert in Residence, Guest Lecturer): experts from industry, society, politics, the arts, research; experts for the training of special techniques (engineering, user studies, design thinking, etc.)

In order to implement the didactic concepts described in Section 4.6, a very good supervision ratio is needed. In addition, small teaching units and a good student-to-teacher ratio contribute to high transfer rates to master's programmes and PhD programmes. Therefore, a student-to-teacher ratio of 20:1 should be aimed for with core faculty, mentors, external experts and student tutors.

4.9 Study Organisation

Questions of study organisation (for example processes, concerning necessary IT structures) must be urgently clarified in the founding phase of the university. In particular, processes related to the start of studies (including admission and enrolment processes) and the execution of studies (including registration for courses) must be given priority attention and should be made digitally accessible as far as possible. A digital-first approach must also be pursued in the study organisation of the university. It could be examined whether, for pragmatic reasons, cooperation with existing university institutions should be entered into from the outset.

Study organisation includes different processes around the start of studies, the study process, the organisation of examinations and proof of academic achievements.

Start of studies:
- Admission
- Establishment of student support facilities (general student support as well as subject-specific support);
- Setting application, admission, and enrolment deadlines;

The study process:
- Semester organisation: With regard to semester organisation, orientation towards the usual Bologna standards and deadlines is recommended, among other things to ensure permeability (e. g. transfer between universities, double degrees).
- Course catalogue and registration for courses;

Organisation of examinations and proof of academic achievements:
- Registration for examinations;

- Conducting examinations;
- Assessment of examinations;
- Academic achievements are recorded by the examiners and credited or credited on the basis of the Bologna model (ECTS + assessment with grade or 'pass' in the case of examinations or other personal achievements).

4.10 Quality Assurance

The 'European Standards and Guidelines for Quality Assurance in the European Higher Education Area' (ESG)[6] represent the international reference framework for the Austrian higher education quality assurance system. The standards and guidelines formulated therein should therefore also be the reference point for quality assurance at the University of Technology. In particular, the University of Technology must draft a policy for internal and external quality assurance, which is then implemented through appropriate structures and processes, and make these publicly available.

This includes structures and processes for example:

- The development and approval of study programmes.
- Student-centered learning, teaching, and assessment.
  - Ensuring good support relationships.
- Student admission, progression, recognition, and certifications.
  - Establishing predefined and published guidelines regarding all phases described above.
- Teaching Staff (in particular ensuring the competencies of the teaching staff).
  - Selection of teaching staff (ensuring a fair and transparent process and providing incentive mechanisms that reflect the importance of teaching).
  - Further training opportunities (for example, with university didactic training, opportunities for didactic coaching, etc.).
  - Promotion of innovative teaching and learning methods.
- Learning resources and student support.
  - Provision of resources such as libraries, learning facilities, and IT infrastructure as well as support in the form of tutors, advisors, and counsellors.
- Information Management.
  - Collection and analysis of relevant information for the management of study programmes.
- Public Information.
  - Publication of information on study programmes.
- Ongoing monitoring and periodic review of programmes.
  - Cyclical external quality assurance.

---

6 https://www.eqar.eu/assets/uploads/2018/04/ESG_2015.pdf

5 Research

The main principles of the University of Technology summarised in Chapter 2 are also reflected in the research strategy and accordingly affect its research profile, laboratory setups, research support infrastructure, support of junior researchers, structure of the faculty, and hiring policy, as well as the final assessment.

5.1 Research Profile

The research profile of the University of Technology reflects the aim of offering a broad perspective on digitalisation and digital transformation and a clear emphasis on interdisciplinarity: from creativity techniques to the design, implementation, deployment, and evaluation of autonomous systems as well as their consequences on society, the research domains covered by research groups at the University of Technology stretch across all areas that are relevant for digitalized organisations and digitalized society while focusing on interfaces and synergies between these domains and on interdisciplinary research. Through this, the involved faculty also provides the basis for the Common Core (cf. Section 4.2). In the following, examples of individual research foci and corresponding research topics are provided. These examples are compatible with foreseeable teaching needs at the University of Technology. Members of the proposed research area should be active in teaching across the University of Technology's degree programmes. However, for each rearch focus a teaching focus is provided below.

'Creativity' research focus: This area focuses on creativity as the increasingly important human ability to create something new, to generate original and useful solutions, to make previously unmade connections, and to offer new perspectives on the familiar—here applied to the domains of digitalisation and digital transformation. This area empirically investigates contextual, situative, individual, and technical factors that foster or hinder creativity and ideation in the digital field, studies the differences between individual creativity and creative processes in groups, examines current questions of machine creativity and creative processes in human-machine teams, and explores the potentials of collaborations between art, design, science, and technology. Based on this research, novel (digital) creativity support tools are proposed, evaluated, and implemented. This area interacts with all of the other University of Technology research areas, with a particular emphasis on collaborations with 'Future Entrepreneurship', 'Autonomous Systems', 'Data', and 'Sociotechnology and Societal Implications'. Regarding the integration with teaching, members of this area focus on the 'Digital Creativity' and 'Digital Interaction' programmes.

'Future Entrepreneurship' research focus: This area considers new and emerging technologies from the viewpoint of business models and business opportunities. Then, towards realising these opportunities, it additionally investigates ecosystems within and around start-up companies. This area proposes novel business models, evaluates their market potential, and investigates their effects on markets. It furthermore evaluates organisational structures in start-up companies and proposes novel forms of supporting ecosystems for start-ups in the field of digital transformation. This area interacts with all other University of Technology research areas, with a particular emphasis on collaborations with 'Regulation and Digitalisation' and 'Sociotechnology and Societal Implications', and draws technological inspiration from 'Autonomous Systems' and 'Data'. With respect to teaching, members of this research area focus on the 'Digital Entrepreneurship' and 'Digital Innovation' tracks.

'Autonomous Systems' research focus: This area focuses on digital systems that exhibit ever higher degrees of automaticity. Combining research in symbolic and subsymbolic artificial intelligence with research on distributed systems and pervasive computing—especially towards constrained devices—it investigates the design, implementation, deployment, and limitations of artificially intelligent systems that pervade our surroundings and that physically and mentally disappear. The area works in close collaboration with 'Data'; it derives inputs from 'Creativity' and provides its findings to 'Regulation and Digitalisation' as well as 'Digital Sustainability Management' while itself being the subject of study of 'Sociotechnology and Societal Implications'. This focus area provides teaching predominantly for the 'Digital Engineering', 'Digital Systems', and 'Digital Production and Processes' degree programmes.

'Data' research focus: This area investigates mechanisms to collect and analyse data towards the largely or fully automated derivation of knowledge and 'actionable' insights from large- and small-scale, and structured and unstructured data sets. Emphasising higher-level understanding and predictions from such data sets, it closely cooperates with the 'Autonomous Systems' area while sourcing inputs from 'Creativity'. It also has key interfaces with 'Regulation and Digitalisation' and 'Sociotechnology and Societal Implications', especially concerning personal data and with respect to systems that enable meaningful computation on data that remains encrypted. Similar to the 'Autonomous Systems' area, this area's teaching focuses on 'Digital Engineering', 'Digital Systems', and 'Digital Production and Processes'.

'Digital Sustainability Management' research focus: This area is concerned with the advancement of sustainable development goals through the design, implementation, deployment, and evaluation of monitoring systems as well as interventions that are based on novel technologies. It leverages the 'Autonomous Systems' and 'Data' areas of the University of Technology towards the creation and evaluation of novel sustainability solutions while feeding into 'Sociotechnology and Societal Implications' as well as 'Future

Entrepreneurship' both regarding the planet-scale implementation of such solutions and corporate sustainability management. With respect to teaching, members of this area concentrate on the 'Digital Sustainability' and 'Digital Production and Processes' programmes.

'Regulation and Digitalisation' research focus: This area considers the transformative effect of digitalisation on how individuals and societies govern themselves and how regulations are enforced in an increasingly personalised manner. With respect to the first focus, and linked to the areas 'Future Entrepreneurship', 'Autonomous Systems', and 'Data', policymakers have been catching up with technologies that have a disrupting impact on societal norms and values. New regulations, from the protection of privacy and data protection rights to the regulation of business models, emerge to find a balance within the markets and society, and guarantee the protection of fundamental rights. The second focus of this area of the University of Technology evaluates how regulation is shaped by technology, with a particular focus on how access to regulation is granted and how regulatory processes can be designed, implemented, and deployed in a more efficient manner. The area works in collaboration with 'Sociotechnology and Societal Implications'. Given the interdisciplinary nature of this research area, its members provide teaching for all degree programmes at the University of Technology.

'Sociotechnology and Societal Implications' research focus: This area investigates the interrelationships of technological innovation and users, society, politics, and culture. It considers technological, organisational, legal, and application innovations in the other areas at the University of Technology while cooperating with all these fields in specific and concrete projects, giving it a bird's-eye view as well as an internal perspective of the processes and individuals who are involved in these innovations. The second focus of this area is on the formation of hypotheses about the societal implications of innovations from the other areas. This not only enables these areas to broaden and reflect their perspective regarding their research today, but additionally, it allows them to project beyond their disciplinary innovation cycles, drawing inspiration for fundamental research that will become relevant decades from now. Similar to 'Regulation and Digitalisation', members of this area provide teaching across all degree programmes.

5.2 Interdisciplinary Lab Concept

In a similar spirit to the Common Core in teaching (cf. Section 4.2), the research infrastructure also rests on a strongly interdisciplinary basis—incentivising the faculty to work together in teams and on practice-oriented projects. This is reflected in a lab concept which fosters interdisciplinary research across multiple research areas and provides a core part of the 'DNA' of the University of Technology (realising one of its main principles). This is in stark contrast to the traditional approach, where most research is driven by

a single institute leading to low cross-institute collaboration, lower attractiveness to industrial partners who often need to work on cross-disciplinary problems, and lower degrees of disruptive innovation.

The interdisciplinary labs at the University of Technology provide a collaboration space for individual faculty while allowing them to drive their own topic-specific research goals. New research projects will be primarily created in the labs as a collaboration of at least two faculty and often with direct involvement from industry partners. For the latter, the ideas and concepts of the Shared Labs (cf. Section 8.2) should also be considered.

This will be achieved by providing a significant proportion (> 50 %) of the university's own research funding not to individual faculty but to these labs. Faculty who provide their expertise to a larger number of interdisciplinary research projects will therefore have access to higher levels of funding for their research.

An individual lab within the interdisciplinary lab infrastructure will work on a five to ten year research vision. The vision is defined in a charter and there needs to be a clear—while nevertheless somewhat flexible—roadmap of deliverables. The teams will be composed using modern approaches like value-creation teams. Each lab should define three value streams (as also sketched in Fig.3):

- Vision stream: working on longer term research topics.
- Innovation stream: creating new applied research for the industry stream.
- Industry stream: applying results to the industry (here, particularly in conjunction with the Shared Labs described in Section 8.2).

Labs should be seen as highly innovative start-ups in a very early phase. This should translate into curiosity-driven basic research with unclear probability. The lab lead should have a deep understanding of product development and act as the 'CTO' of the lab. The lab lead works closely with the research board which consists of the researchers of the individual fields and defines the research agenda.

Labs will have dedicated personnel, such as PhD students and postdocs (in addition to the faculties' individual resources), that are jointly used by the faculty to foster cross-faculty research, awareness activities, projects, etc. This could be enriched by a structured PhD programme / graduate school for each lab which, for example, requires PhD students to have supervisors from different faculty.

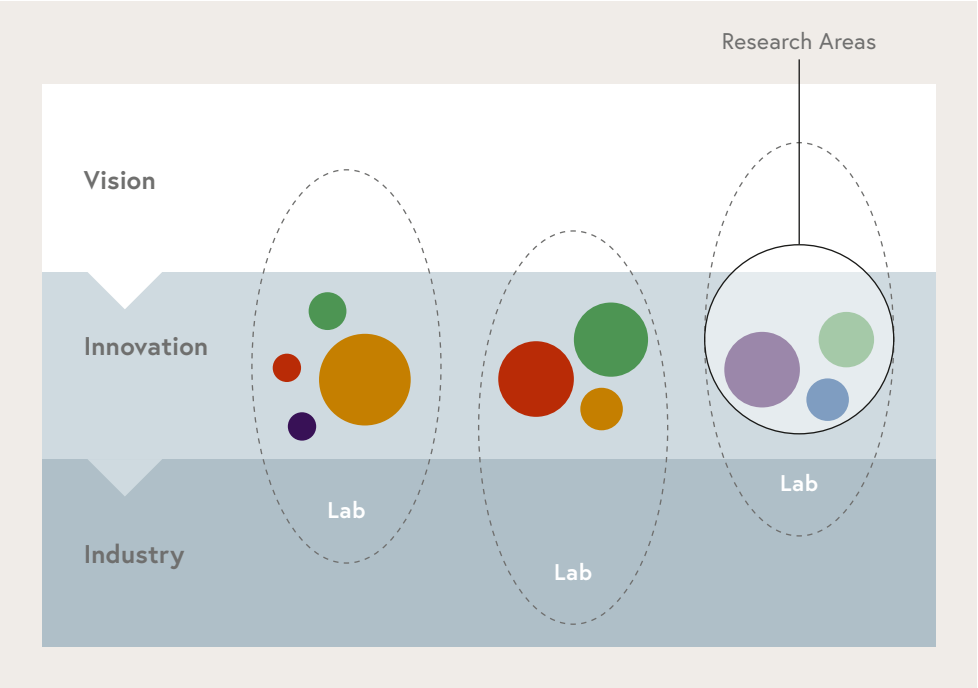


Figure 3 Interdisciplinary lab concept

5.3 Research Support Through a Dedicated Grants Office

To facilitate the acquisition of competitive external funding, the University of Technology and its members will be supported by a 'Grants Office'. This office is responsible for the following activities along the life cycle of research projects and researchers:

- Awareness and Motivation
  - The Grants Office holds a profile of each researcher at the University of Technology, including eligibility-relevant metadata (DoB, DoPhD, Type of Contract, etc.). This enables it to actively approach researchers that become eligible for funding lines.
  - The Grants Office motivates and supports all academics at the University of Technology to write and submit appropriate grants. They receive maximum possible support with respect to information and calculation, and the Grants Office acts as professional administrative link between the academics and the funding bodies.
  - The University of Technology incentivises the acquisition of competitive grants through reductions in teaching duties.
- Internal Strategic Funds
  - The Grants Office has its own funding pool for acquisition of promising mid-stage researchers. This could take the form of a two-year Postdoctoral Fellowship only available to individuals from outside the University of Technology.

Candidates are coupled to a host within the University of Technology. While primarily targeting the acquisition of new PIs at the University of Technology, this scheme could also be expanded to PhD positions.
  - These positions are competitively advertised and granted, where the granting decision lies with an academic committee from the University of Technology that is supported by the Grants Office.
- Grants Acquisition Support
  - The Grants Office supports the administrative processes for both project grants and career grants. Its role is to accumulate all possible information about existing grant schemes.
  - Ideally, the Grants Office has employees who have experience with grant-writing, ideally from their previous academic careers and who can support grant applications strategically as well. This is akin to professional grant-writing institutions that offer grant-writing services.
  - The Grants Office designs and organises strategic exchange events between (already successful) PIs and other academics at the University of Technology. At these regular events, such as lunches or 'soirées', existing grant holders (possibly also from other institutions) share their secrets on writing a successful application.
  - The Grants Office supports the pre-evaluation of proposals (before submission) by finding experts and asking them to review proposals and provide feedback to the proposers. They furthermore support academics in organising trial talks (typically for the second evaluation rounds in large grant schemes).
- Grants Operational Support
  - The Grants Office provides support for financial reporting and other administrative matters during the runtime of a grant. It handles relationships with human resources regarding the booking of individual researchers on grants and controls the grant finances.

The Grants office is supposed to work closely with the Professional Landing Point (cf. Section 6.2). Indeed, this may give rise to collaboration on various levels, as both the Grants Office and Landing Point rely on a deep understanding of the background and expertise of the faculty working in the University of Technology. Such synergies can also be exploited with respect to consortial projects involving both academic and industrial partners. At the same time, it is important that each office is equipped with a proper amount of personnel. Both entities will only be successful if the corresponding tasks listed above are acknowledged as 'full-time' tasks and nothing is delegated, for example, to faculty or other employees at the University of Technology for whom such tasks are not the main priority.

5.4 Promotion of Young Scientists

Obviously, the success of the University of Technology heavily relies on the young talent it can attract. Accordingly, substantial efforts are made to promote and support young scientists. To this end, the following activities are established:

Get talented master's students interested in research: Many master's students will engage in a thesis project that already contains research aspects, and that involves faculty members or PhD students as other project members. This will be a natural way for a master's student to touch base with research. To get a broader overview of research opportunities, master's students will be given access to a PhD research seminar, where PhD students report their findings. Attending a certain number of PhD seminars may even be mandatory and/or provide ECTS credits. In addition, all students will be invited to research talks given by guests and international visitors. The University of Technology shall also be active in a specific form of 'talent scouting', whereby brilliant undergraduate and master's students in their last semester will be identified, and will be invited to, for example, a dinner or other event at which they will be incentivised to continue their studies at the next degree level. Furthermore, the question of whether results of the work by students are suitable for publications/presentations in international workshops, conferences, and journals should be constantly considered.

Promote current PhD students: Several 'skills courses' will be made available to PhD students. The topics of these courses range from scientific writing and presentation courses to courses about IP and patenting, ethics, and similar relevant topics. In order to give a PhD student a broad overview of the various existing job opportunities and choices for career development, it is recommended to offer the course 'Research and Career Planning for Doctoral Students', where PhD students will be informed about the various stages and career paths of the academic profession, and about various alternatives such as working at a (non-academic) research institute, or as an industry researcher. This course shall also introduce PhD students to various types of funding and address the question of how to obtain funding—in particular, how to write a good research proposal. Finally, the course should shed light on how the refereeing process works and how research publications listed in an academic CV are evaluated. In addition to such courses, the University of Technology shall organise various research-oriented networking events, centered around broad topics, where short research presentations are given by faculty members, invited Austrian and international top researchers, industry representatives (presenting concrete research problems), as well as by research-active alumni. At the end of such networking events, the students have a chance to informally meet the senior participants in the relaxed atmosphere of, for example, a buffet. Finally, as already mentioned, there shall be special research seminars where PhD students present their results and yearly progress. These seminars shall be mandatory and will be graded not only based on the results, but also on the clarity and wide intelligibility

of the presentation. The University of Technology will also provide means for sending PhD students to international workshops and conferences in their respective areas. This will help them connect and network with international peer researchers.

Industrial PhD Programme: The University of Technology will closely collaborate with industry on research-related topics. Therefore a dedicated programme is provided to enable professionals who have been working in the industry for several years to continue their academic career with an industrial PhD. The programme needs to be structured so that they can continue their industry career part-time while also having dedicated time for their research. In the past, the 'Austrian Research Promotion Agency (FFG)' had a similar programme as part of the Semantic System research funds. PhD research could be submitted where the student was working part-time for the company and part-time (30 % to 50 %) on their PhD research. The programme funded the income difference—the time spent on research was not covered by the company—for a defined period of time (for example, up to three years). This programme will not only bring important industry knowledge back to research, but also increase the chance of professionals choosing further work in academia and research, as they won't need to relinquish their industry roles.

Promotion of Female Young Scientists: The University of Technology is committed to diversity, and active promotion of female students and scientists is an important tool in achieving this. The University of Technology will actively recruit women at all levels. This starts with school outreach activities to make children, and girls in particular, familiar with the challenges and the tools of digitalisation. Such activities will include school visits, summer schools, etc. At the young scientist level, it is important to actively monitor female students in the bachelor's and master's programme. Excellent female students will be actively recruited into the PhD programme. Promising female students at the bachelor's, master's, and PhD level will be provided with internal mentoring in the form of more senior (female) students and faculty members, as well as career and leadership training.

5.5 Faculty

The University of Technology will have two types of faculty (cf. Fig.4)

- **Scientific Faculty:** The scientific faculty will be the core of the University of Technology; it will be responsible for research, teaching, and technology transfer, and it will be closely involved in the management of the University of Technology. The University of Technology will have a US-style tenure-track model with assistant, associate, and full professors. The faculty model will be flat, without hierarchical distinctions between the types of faculty and with the same access to resources and personnel. In addition to traditional hiring, scientific faculty may be recruited from practice (cf. Section 5.6).

- **External Experts:** The core faculty will be extended to experts with proven expertise in relevant areas. However, these experts will not completely join the university for a long tenure and/or will join only for a limited period of time; in other words, they will have positions limited to one or two years, or part-time positions (for example, 20 hours a week). These positions are handled separately from regular faculty and also provide flexibility, for example, with respect to teaching commitments. These experts are supposed to remain a foothold in their original profession (e.g., at a company, an NGO, the arts, etc.) and are supposed to support students and faculty in the initial phase of launching a start-up or spin-off, creating a minimum viable product (MVP), setting up a basic company structure, working on partnerships, etc.

The University of Technology will actively contribute to the professional development of its faculty. Development measures will include training on leadership, academic excellence, and industry collaboration. Female and nontraditional faculty will be actively promoted and provided with international networking opportunities.

5.6 Hiring

Excellence in research and teaching as well as the 'right' mindset as outlined in the main principles in Chapter 2 are the most important criteria for recruitment of scientific personnel. The University of Technology subscribes to the San Francisco declaration on Research Assessment (cf. Section 5.7) and will thus be explicit about the criteria used to judge excellence and will use a broad set of impact measures.

In particular, it will place emphasis on the following:

- **Focus on young promising candidates:** The University of Technology will have a future-oriented hiring strategy: it will focus on young people with high potential of academic excellence rather than on established people with an extensive track record. The University of Technology will treat faculty of all levels as equals, without imposing hierarchical differences and will provide highly promising young faculty with a considerable amount of freedom to unleash their potential, thus building excellence from within. The University of Technology offers a tenure track model that gives the candidate a large degree of academic freedom.
- **Don't kill speed:** In the spirit of a flexible and agile process, the University of Technology will have quick decision processes to secure promising candidates for the University of Technology. This requires management with the authority to make decisions quickly, while guaranteeing the excellence of the recruited faculty. The appointment of those decision makers is key for the success of these decisions.

- **A broad definition of excellence:** The University of Technology will follow a broad definition of excellence, including excellence in science, impact, and society. This may include typical metrics of excellence (such as publications, awards, third-party projects, etc.) but also should put more emphasis on securing promising and excellent researchers who do not fall into the established 'pattern' of scientific excellence. Examples include lateral entrants from practice (such as companies, NGOs, or the arts) that have proven their excellence through other activities and provide the 'right' mindset to realise the main principles of the university as summarised in Chapter 2.
- **Diversity:** The University of Technology will actively recruit female and nontraditional faculty members from across the world. It will establish methods to identify and contact promising young researchers (PhD students, postdocs) and to encourage them to apply for a position. Such tools may include monitoring conferences and start-ups, hosting summer schools, and creating an advisory board.
- **The 'right' mindset:** Hires will form the culture of the institution. Accordingly, it is key that the hired people have the 'right' mindset needed to realise the main principles of the university proposed here. To this end, every applicant for faculty should be provided with a description of the concept of the university (for example, based on the present document) and should be asked to explicitly outline how she/he will help in realising those main principles. The final selection should significantly depend on whether the outlined ideas are convincing.

The University of Technology will hire at all levels: assistant, associate, and full professors. It will advertise positions without specifying the level, and will hire whichever person is most promising. The University of Technology will have four different recruitment schemes to cover the entire scope of the University of Technology, while maximising the chances that future topics will be covered by a faculty member.

- **Core Hiring** (suggestion: approx. 40 % of positions): This scheme aims to recruit faculty to properly cover all of the University of Technology's main profiles and areas.
- **Broader Hiring** (suggestion: approx. 20 % of positions): This scheme allows the university to advertise much more broadly. The goal is not to particularly fill a gap in the University of Technology's main coverage of areas but to recruit researchers that explore other promising directions, thus ensuring the constant evolution of the University of Technology's scope.
- **Opportunity Hiring** (suggestion: approx. 20 % of positions): This scheme allows unsolicited applications from renowned researchers who show exceptional accomplishments. More precisely, any researcher working in the field of 'digitalisation' who meets a particular criterion (such as winning highly competitive prizes or ERC grants) can submit their application and will be offered a faculty position, should they be a good fit. This way, excellent researchers could be secured for the new University of Technology by providing an easy and fast offer.

- **Hiring from Practice** (suggestion: approx. 20 % of positions): This scheme aims to recruit renowned people from practice (from a company, an NGO, the arts, etc.) who are interested in (1) partially working at the university while not completely leaving their current position or (2) taking a (temporary) break from their current (for example, industrial) career to find out what their next move will be. Accordingly, this scheme mainly addresses recruiting external experts as defined above in Section 5.5 (even though people hired through this scheme also could eventually become scientific faculty).

Note that this classification is explicitly not supposed to imply any hierarchy upon the appointed professors (once recruited, all faculty have the same rights and responsibilities). It merely describes the different options for how excellent faculty can be recruited and secured for the new University of Technology. Furthermore, the latter three choices in particular (which offer the most freedom of recruiting) should be used to attract and secure female faculty.

Overall, Fig. 4 summarises the anticipated faculty and how they are supposed to be hired. The majority of the faculty will be scientific faculty, however this will be substantially complemented by external experts. Most of the scientific faculty will be hired through core hiring, broader hiring, and opportunity hiring, while most of the external experts will be hired through hiring from practice (even though some scientific faculty may come through this scheme).

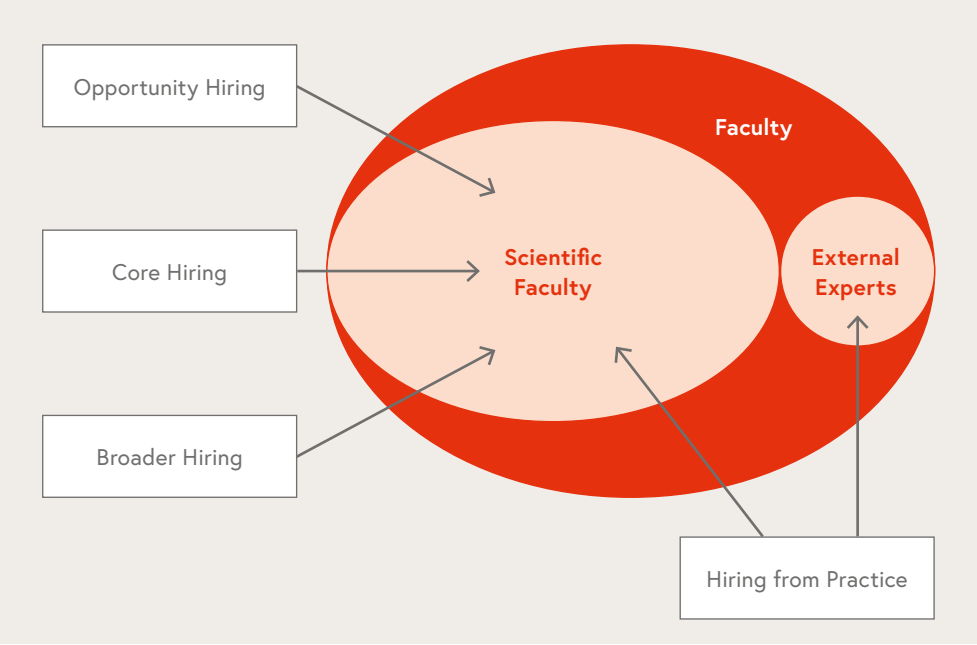


Figure 4 Research structure and roles

5.7 Assessment Metrics

It is unrealistic to assume that a newly founded University of Technology will be able to compete with established universities nationally and internationally within a short period. At the same time, due to its strong focus on interdisciplinarity in teaching and research, the University of Technology might be positioned at a disadvantage with respect to the currently used dominant metrics for research assessment (for example, paper counts, citation counts, h-indices, and third-party funding). Since interdisciplinarity as well as non-traditional, more qualitatively oriented, metrics are advancing globally, this disadvantage should vanish over time. The University of Technology could therefore focus on future assessment metrics from the beginning—here, primarily the San Francisco DORA guidelines[7] and the Leiden Manifesto[8] are of interest. The following is a proposed catalogue of metrics for self-assessment of the University of Technology, as well as for a basis for the continued assessment of the University of Technology by external stakeholders:

- Research-oriented:
  - Quantitative discipline-adjusted citation counts and h/i10-indices;
  - Competitive grants acquisition (specifically 'excellence grants' such as ERC, etc.);
  - Qualitative expert opinions and peer reviews;
  - Cooperation index between the University of Technology and other national / international universities;
  - Index for interdisciplinary research;
  - Research sustainability: openness, transparency, verifiability of research results;
  - Relevance for the local and national context.
- Education-oriented:
  - Peer reviews of the teaching programmes, possibly as part of accreditation processes;
  - Labour-market-oriented metrics;
  - Interdisciplinarity metrics.
- Impact-oriented:
  - Joint projects with practice;
  - Joint-funded projects with practice;
  - Metrics for spin-off activity;
  - Cooperation index with partners from practice;
  - Relevance for local and national contexts.

7 https://sfdora.org/
8 http://www.leidenmanifesto.org/

- Society-oriented:
  - Research dissemination and research communication;
  - Outreach activities (beyond schools!);
  - Openness, transparency, and verifiability.

These metrics are to be updated regularly.

6 Knowledge Transfer and Public Engagement

Engagement with businesses and society as well as knowledge and technology transfer will be key to the impact and success of the new University of Technology. As a publicly funded institution, the university meets its responsibility to generate wider benefit for the communities, businesses, and regional industry within which it lives. Instead of being an ivory tower, the University of Technology actively engages these stakeholders at all stages of research, teaching, and development of new projects, products, and businesses.

To solve the 'European Paradox', the University of Technology proactively coordinates its research areas with the main interests of regional industry in order to develop a strong connection between the industrial sector and the University of Technology. Upper Austria has a strong industrial sector. Besides industrial production in innovative fields like materials, automotive, chemistry and energy, in which autonomous processes, sustainability, recycling and energy transition are critical to future success, creative industry and software industry play an important role. Combining forces with the University of Technology, regional industry will contribute to and benefit from knowledge and technology transfer. It will guarantee attractive working conditions and new job profiles for graduates. This setup will transfer exciting, new research results to applications much faster, with the region becoming a European beacon for knowledge transfer.

Public engagement will be an important axis to make the University of Technology visible and gain awareness and enthusiasm for technology. Thus young people will experience new job profiles and exciting new study and research possibilities.

Since many initiatives in the field of information technology, digital transformation, and digital arts are already established in Upper Austria, a close exchange with and between regional research institutions will be beneficial.

Together with establishing the new University of Technology, a strong and efficient knowledge and technology transfer network will be built. Agile development of this network, along with the culture of knowledge and technology transfer in Upper Austria and the University of Technology more broadly, will thereby act as one factor determining success.

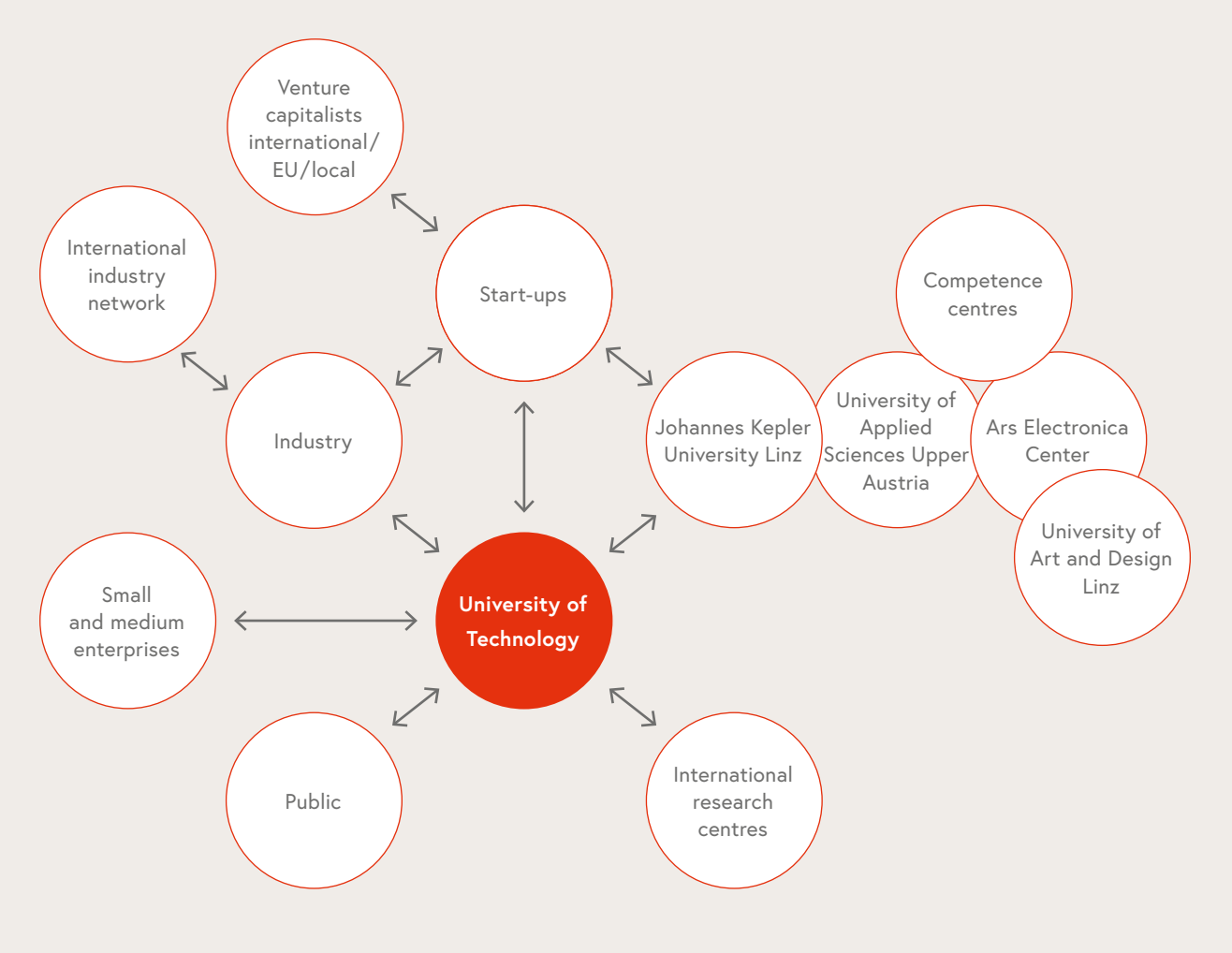


Figure 5 Knowledge and technology transfer network

The curricula and the new ways of learning and teaching at the University of Technology build the basis for this strong network. Therefore, learning through experience and an emphasis on citizenship as well as strong community and societal engagement are of particular importance at the University of Technology.[9]

9 A very interesting example in this context is the Reed College in the USA, which also emphasises the citizenship aspect and community aspect of scholars and students. Reed College has, for example, the world's only student-operated nuclear reactor, which illustrates the responsibilities that students take. For further details, see 'Example 02— Community of Scholars and Students' in the Report of Pausits et al.: Internationale Beispiele innovativer Hochschulkonzepte.

6.1 Real-Life Projects

Over the years industry has developed best practices, craftsmanship, and standards for development, simulations, testing, and deployment to market offering in order to be successful in a globalised world.
It is important for students to know these best practices in a global digital world and it is important for industry to introduce these standards in cooperation with the University of Technology. Therefore, industry opens their projects (from simple to complex-use and business cases) for students and professors to work on them from the very first day of their studies.

Students shall work right from the beginning in projects with:

- industry-standard (agile) project management;
- development environments set up for fast iteration (in the cloud);
- productivity tools for design thinking, user stories, requirements, access to real users, testing, simulating, validation and verification, demonstrating environments, coding, multi-stage and hybrid cloud deploying, reviews, distributed development, etc.;
- feedback loops for all kind of working stages (design studios, UX paper prototyping, real user feedback, real customer feedback, real investor feedback at every iteration, code reviews) to meet acceptance criteria;
- craftsmanship workshops to simplify solutions and to strengthen problem solving.

Latest research results and interdisciplinary creativity will be applied on industrial-use cases, projects, and business cases. Faculty of the University of Technology proactively approach the industry to learn about and acquire their operational-use cases. On the other hand, companies will also approach the University of Technology with their problems, cases, and projects.

Working on real-life projects right from the beginning of their studies during the whole curriculum, students can and will transfer theoretical learnings directly into practice every single day during the entirety of their studies.[10] In this way professions which preserve the local economy are strengthened. This project-based education combined with self-motivation, entrepreneurship, and systematic thinking, positions the University of Technology astride all engineering education programmes and qualifies urgently needed leading engineers.

---

10 The Singapore University of Technology and Design takes a similar approach: the central element of SUTD is design- and maker-based learning where design activities and projects are an integral part of the whole curriculum to support students. Depending on complexity, there are 4 types of projects ('4D approach'). By graduation, a student is involved in 20–30 projects. For further details, see 'Example 07—Der "4D"-Bildungsansatz der SUTD' of the Report of Pausits et al.: Internationale Beispiele innovativer Hochschulkonzepte.

The start-ups and businesses born out of the university are ideally businesses of the future—those combining profit with purpose. They could, for example, aim to become certified as a BCorp (Certified B Corporations): businesses committed to leading the way in building a sustainable and inclusive economy that works for everyone. BCorps are legally required to consider the impact of their decisions on their workers, customers, suppliers, community, and the environment.[11]

The Professional Landing Point (cf. Section 6.2) will help to bring projects from industry and non-profit entities to the University of Technology. The project types are described in detail in Section 4.3.

Overarching Industry Mentor Concept

The university graduates are trained to become successful as entrepreneurs, researchers, or managers. At the very beginning of such a career, it is extremely time consuming to establish and maintain a necessary global network of people. In fact, it usually takes over ten years to foster such a resilient network. Granting beginners access to established networks is a common solution to this problem. Therefore, if possible, each student at the University of Technology should have two mentors from industry, one aged 30+ and one aged 45+, as people in the industry at that age tend to have additional helpful access to a network of experts, start-ups, politicians, economists, and researchers. Industry mentors, in turn, can benefit from this relationship: since getting skilled employees will become increasingly challenging in future, companies will be happy to support this mentoring concept. If this is not possible, the scheme should be piloted with a selected group of students

International industry mentors can be won via incentives like visibility on the University of Technology's website and connecting them with other networks by inviting them to annual exchange meetings.[12] Especially for women and entrepreneurs, such industry mentors are essential for accessing and building networks. It is practically impossible for students to enter networks without introduction, yet these connections and contacts are invaluable.

---

11 Companies who are already part of this global movement range from big corporations to new start-ups and entrepreneurial institutions like Impact Hubs across Europe. https://bcorporation.eu/

12 For an example, see: https://house-of-mentors.org/

6.2 Professional Landing Point

Low-threshold access to the University of Technology for industry and especially for small and medium enterprises is crucial for supporting knowledge and technology transfer. This will be assured by a professional landing point for initial contact, and general terms and conditions to start cooperation fast.

Companies overall tend to be unaware of the excellent expertise that can be found among the faculty and the University of Technology's research foci. Especially smaller enterprises might only have few contacts within the university and little awareness of the university's activities. Establishing a central orientation point here named 'Professional Landing Point', is therefore necessary, enabling cooperation with the University of Technology via low-threshold access. Proactive people with networking mindsets will be hired for this office. They will engage this mindset to connect companies to the right contact at the University of Technology. If the first contact is incorrect, they try to find another. Even if no cooperation results, the Professional Landing Point stays in contact with the client, invites them to events, and reaches out to the client with new ideas which might be of interest. The Professional Landing Point regularly maintains the regional, national, and international networks, speaks English, and understands cultural differences.

At the same time, the Professional Landing Point stays in permanent contact with faculty and knows their research fields well. A group of professors shall accompany them on industry visits to propose cooperative projects. The Professional Landing Point shall be connected / combined with the Grant Office proposed in Section 5.3. This synergy—with the Professional Landing Point getting involved with the funding proposals of the University of Technology, as well as connecting faculty with industry and SMEs—will bring great benefits for the technology and knowledge transfer, and will enormously improve the translation of scientific advances into marketable innovations.

In addition, inspiring events (here termed 'Get Inspired Events') shall be organised by this office and they shall stay in close contact with all relevant funding agencies.

Get Inspired Events

These events are the University of Technology's point of contact with younger generations in order to inspire them through technology, as well as an opportunity for small and medium enterprises and the industry to demonstrate research results and their future application possibilities. These events could be advantageously organised in close collaboration with the 'Museum of the Future' at the 'Ars Electronica Center'.

Students present their work in an accessible way, encouraging their audience to think about potential applications (cf. 'FutureFest' in Section 6.5). Using a case-study or story-based approach, the students explain what they are working on within one minute.

The audience is always able to follow the explanations. Depending on the audience, the students are prepared to explore business, technological, or society-related aspects too. Such an event can be booked individually by individuals or enterprises to learn what a research group can provide to solve their problems and to place questions effectively. The University of Technology provides potential topics for these events, with the interested person, group, or company choosing the topic which most interests them. The university also provides a guided tour through labs and working areas.

The intention of these events is to spark young people's interest in digital transformation and technical studies in general. A possible scenario in this setup is for instance a thirteen-year-old girl visiting the University of Technology. In the Get Inspired Event she can experience the technology of tomorrow in a playful way and enquire where it can be used. Ideally, she also learns about the breakthroughs and challenges of the team, encounters potential role models and is captivated by science, technology, and the possibilities they offer.

6.3 General Terms and Conditions for Cooperation

Once in contact with the right research group it is essential for a collaborative project to begin quickly without wasting time with contract negotiations.

To overcome this, the University of Technology shall provide clear standard contracts for these collaborations (General Terms and Conditions for Cooperation) that follow university as well as industry interests, are easy to handle, and allow the fast and pragmatic start of cooperation projects. Ideally, they are pre-agreed by the participating organisations and then applied on a per project basis. This is similar to the approach of companies like the 'Austrian Research Promotion Agency (FFG)' or 'Austria Wirtschaftsservice Gesellschaft (AWS)' toward their partner ecosystem, with the use of standard consortium and enterprise contracts. Perhaps different standard contract versions are needed for industry, small and medium enterprises, and start-ups.

Research and industry cooperation as well as spin-offs face a number of challenges that need to be carefully solved with general terms addressing these subjects:

- Research timeframes are usually longer than industry go-to-market times;
- Research results are in most cases before minimum viable product (MVP)-level;
- Results are in general owned by the beneficiary that generates them—ownership of cooperation-project results must be defined;
- Intellectual property handling (patents, utility designs, copyright and neighboring right, design patents);
- Non-disclosure regulations and trade secret protection;
- Start-ups / spin offs require a proper funding landscape;

- Definition of performance indicators;
- All other project-related topics (work package responsibility, reporting, payment terms, funding).

Usually, most difficult discussions in cooperation contract negotiations arise from how to deal with IP. Many IP challenges can be solved by fostering an open-research approach. This means that wherever possible, research is performed following an open-source approach. Open core will be the preferred approach for all research, meaning that there is a core which is entirely open using a standard open-source license—for example, 'Apache 2' or 'MIT'—allowing commercial and closed technologies to be built on top. However, beyond this ideal world of open source or at least open core, the reality of cooperating on patentable projects is usually more complicated in practice. Therefore, explicitly regarding inventions, the following topics must be regulated within the General Terms and Conditions for Cooperation:

Inventions generated by the University of Technology alone

- Ownership of inventions generated by employees, guest researchers, and industrial part-time professors connected to their research work at the University of Technology.
- Ownership of inventions created by students who are co-workers in a project of a University of Technology or using some resource of the University of Technology (such as, for example, laboratory space, computing resources, travel money, data sets) under a user agreement.
- Utilization and application for patent by the University of Technology or return to the inventors.

Inventions generated in a cooperation project

- Ownership if the company finances 100 % of the research project.
- Co-ownership and right to use if every partner finances a part of the project (directly or via funding).
- Right to use and license fees for background patents, if patents generated in the cooperation project depend on background patents of one or more partners.
- License on common patents to third parties outside the project consortium.
- Inventors' remuneration, and exploring how students can be treated as equal to employees of the University of Technology.
- Payment of inventor's remuneration for employed project members and the students involved.
- Scientific publications by the University of Technology about inventions, at least not before the priority date.

Start-ups founded on basis of inventions of the University of Technology

- Founding start-ups is an important goal of this new University of Technology. The University of Technology shall do its best to put its students and staff in the position to be able to spin out start-ups based on the generated patents. They must be sure under which conditions they can use the patents of the University of Technology.
- The question of how the patents owned by the university that are necessary for start-ups' business models can be treated as open source in the nascent phase of these companies shall be explored.

Further input for the possible design for General Terms and Conditions for Cooperation made by industry representatives of Upper Austria is given in Appendix 3.

6.4 University of Technology is Everywhere

A university of the twenty-first century, above all one in the field of digital transformation, can branch out into multiple real and virtual locations in Upper Austria. While the majority of faculty and students work and study at a central location typically in a metropolitan area, it is possible to move a research project to a place of application and to be able to participate in lectures and study programmes from abroad.

Even though the University of Technology needs to have a central campus with all disciplines in one place (cf. Section 8.1) it may be necessary or advantageous to have special infrastructure for example for prototyping, public engagement, and citizen science in other locations as well. Such pop-up satellites may also generate the public interest in innovation and technology, which is necessary to address our big future challenges like climate change. A project team (for studies and research) might therefore move close to a place of application (industrial process, community, traffic situation, or administration) for a limited period of time. These temporary or permanent satellites (hangars) complement the central location.

Topics like autonomous driving, autonomous flying, waste recycling, alternative energy harvesting and distributing, water treatment may qualify for a special location. Research and testing may need infrastructure which cannot be implemented on campus. For example, working on autonomous cars or aerial vehicles requests a safe testing track. It might also be more efficient to work on real-life industrial projects in close proximity to the company involved—where 'close proximity' might encompass either physical or virtual presence. One idea for the future would be the use of autonomous flying cabs to move between the campus and its satellites; this would gain enormous international attention and would be a sustainable and fast means of transportation.

Besides serving the needs of the project, these satellites will make the public aware of the University of Technology and enable interaction with the public. The pop-up satellites shall therefore be designed to maximise visibility, and their existence shall be communicated to the public. The Upper Austrian people, especially children and young people, should see and feel the research activities of the university in the context of their day-to-day lives. The University of Technology will therefore meet them at the places they frequent. A promenade could lead from the next small village directly to the satellite of the University of Technology. People use it every day for their workout or pass by on their way to work or public transport. Large windows between this promenade and laboratory spaces provide the public with an insight into the work of researchers and students, fostering interactions with visitors. Additional installations show what researchers and projects are working on, to make it more approachable for visitors.

The University of Technology shall attract students from everywhere in the world. Some of them will not be able to move to Upper Austria for the entire duration of their studies, or may have to stay in their home countries for a certain period of time due to a force majeure event. Even in such situations, students should be able to participate via digital channels (cf. Section 8.3).

6.5 The Hub

The Hub gives start-ups a stage to present their ideas to private and enterprise investors. It is advisable to create a physical event / collaboration hub in the form of an accessible-to-everyone co-working space / exhibition space / event space / cafe where research, entrepreneurship, and the public can meet. This can be in addition to or in combination with the incubator labs. Importantly, this Hub opens up what happens inside the University of Technology and allows different groups to merge and experience the innovation generated in and around the University of Technology. The Hub also becomes a symbol for the openness and interdisciplinarity of the University of Technology, and a suitable place to, for example, welcome journalists and politicians. Examples from other countries include the open café and exhibitions space of the 'Wellcome Trust' in London, 'Google campus' in London which was instrumental in turning London into a start-up hub, and open co-working spaces in places like Oxford, which every student can join to tinker around with new ideas.

The Hub could also organise a yearly festival to celebrate innovation / the future / digitalisation. For example, the innovation fund 'Nesta' ran 'FutureFest' over the past few years, which the public could visit to touch, feel, taste and experience different technologies and visions for the future and critically engage with their own role in shaping the future.[13]

13 For further information: https://vimeo.com/123782396

A permanent community ('business club') of students, professors, potential founders, investors, and start-up founding and funding experts shall be established, meeting periodically (every two months) to exchange. This group shall help start-ups in their funding between (well-funded) research and series C funding-stage. There shall be a strong tie with start-up incubators in Upper Austria but also in Bavaria (especially incubators around TU Munich) and Great Britain (incubators in the London region). Further partnerships with other regions have to be evaluated (e. g. Czech Republic).

Easy start-up founding conditions, including a new organisation form like Inc. instead of GmbH., will be necessary. Access to research results is an important basis for this.

6.6 Cooperation Enabler

Excellent research and fast, efficient application of scientific results in rapidly changing technological fields needs intensive regional, national, and international cooperation. This cooperation additionally supports interdisciplinary thinking and working, as well as intercultural exchange and competence. These qualities are essential for the research and implementation of future technologies in digital transformation.
Therefore the University of Technology shall develop and secure a cooperative mindset; it will enable closer cooperation between existing Upper Austrian universities and research institutions.

Unfortunately the existing performance measurement system does not honour collaboration. Today the KPIs for universities in Austria boost competition between institutions rather than cooperation. Whenever researchers cooperate with another organisation, they work against their existing KPIs. The new legal structure of the University of Technology makes it possible to add new KPIs for the faculty which incentivise cooperation. These new criteria will be critical to success in cooperation and shall reward the University of Technology for engaging in cooperative projects and programmes.

As a young university, the University of Technology will benefit from the efforts it puts into enabling these activities. For example, within design, the University of Technology can foster positive outcomes by cooperating with the 'University of Art and Design Linz' and the 'Ars Electronica Center', who already have activities in digital arts and digital industrial design.

Internationally, long-term partnership and exchange programmes with universities and companies all over the world shall be established. Virtual connection of the programme partners' research and teaching environments will be unique. Along with the possibility of working part-time in Upper Austria and part-time abroad, this increases the appeal of the university for international students.

To be able to handle industrial cooperation from small projects with small and medium enterprises to large projects with local industry, the new University of Technology needs an easily scalable faculty.

7 Legal Constitution and Organisation

In addition to the Scientific Concept Group, a special working group ‘Law’ was tasked with making fundamental considerations regarding the legal constitution and organisation of the new University of Technology. These considerations relate in particular to organisational structure, governance, study law, and employment law. The development was carried out in close cooperation with the Scientific Concept Group and is outlined in the appendix (Appendix 2).

8 Infrastructure and Set-up

The requirements for the architecture and infrastructure of the university building result significantly from the conception and organisation of the university. The main principles of the University of Technology (cf. Chapter 2), such as practice-oriented teaching, interdisciplinarity, flexibility, and exchange with industry and society, shape the way in which teaching, learning, research, and administrative work take place. They therefore also determine the conceptual utilisation of the building. In other words, the facilities provided support the university's new working methods.

8.1 Location and Building

It is highly recommended that the new University of Technology be established as a campus university with all disciplines in one place. However, temporary, decentralised pop-up units in Upper Austria could complement the campus in order to bring the university closer to the population (cf. Section 6.4).

The new University of Technology embodies internationality and diversity. Accordingly, the location is in an international and multicultural environment and provides infrastructure that makes it attractive for foreign students, professors, and researchers. This includes, for example, quality and affordable housing, an attractive range of recreational facilities, excellent health care, easily accessible and flexible childcare facilities, and a diverse cultural offering. Another key factor in the choice of location is a good connection to important international technology hubs, as well as excellent accessibility by public transport within Austria. In addition, the location needs sufficient free space in its immediate vicinity for any later expansion.

From an architectural point of view, the university building should make a statement and have a high recognition value. Flexibility and sustainability are the two central requirements for the building's architecture. Agile and creative work requires structures that adapt to the ever-changing needs of users. For example, shared labs and shared offices must be easily adaptable in size. Intermediate walls and installation have to be as flexible as possible. To assure that supply is available everywhere in the lab space all electrical, water and gas lines must be mounted on the ceiling. Ecological sustainability is to be taken into account both in the choice of building materials and energy supply, as well as in the envisaged use of the building.

8.2 Rooms and Labs

In addition to classic spaces such as lecture halls and seminar rooms, spaces which enable virtual and physical collaboration in teams and joint experimentation and development are needed. All spaces should be designed to foster creativity, inspiration, and ideation.

A sufficient number of workspaces such as co-working spaces and shared labs is essential for working on real-life projects. Ideally, each project team (cf. Section 4.2) shall have its own project group headquarters where students can exchange ideas while studying and working together. Spaces for interactive video conferencing shall be available for all university members. Designated laboratories with state-of-the-art infrastructure shall facilitate working both in person and virtually. Sufficient social meeting spaces must be available to promote exchanges between students but also between teachers and students.

A physical library is no longer considered necessary in a university of the twenty-first century with a focus on digitalisation—rather, a library for the digitized and digitalized, with e-book readers abound.

Shared Labs with Incubator Function

Shared labs are an essential part of the university's envisaged use of space (cf. Section 5.2). They provide space and basic infrastructure in which professors, students, industrial R&D specialists, and trainees cooperatively solve industrial and societal problems.

From the very beginning, professors use common interdisciplinary labs instead of holding their own dedicated infrastructure. This sharing supports cooperation and interdisciplinary exchange. In addition, it uses infrastructure investments most efficiently and allows for more investment in unique technologies, which will attract excellent professors and students.

Working teams consist partly of common lab staff, of research teams from the university (assistants, PhDs, students), and of researchers from industry, SMEs, and start-ups. The common lab staff form the service-oriented organisation structure. Responsibility for the lab has to be clearly defined and is ideally held by one professor. Industry finances and installs equipment and lab personnel and / or transfers part of their R&D teams to work in these labs.

Shared labs shall also serve as incubator labs for start-ups, who have free access from the beginning of their activities until their first external financing round. After they enter a competitive phase, they shall set up their own infrastructure and leave the labs. Successful start-ups shall pay a success fee back to the University of Technology in return for support received through the incubator lab.

Access to these labs is given 24/7. While inexperienced students only get access during supported opening hours, experienced persons can use the labs any time (as one finds at, for example, the 'Grande Garage' in 'Tabakfabrik').

8.3 Digital Infrastructure and Virtual Campus

Digital transformation is at the core of the University of Technology and does not stop at the curriculum. Teaching, research, and industry collaboration need to leverage the latest technologies for digital learning and collaboration. Research teams will also develop some of these tools themselves.

Rather than being structured around a 'brick-and-mortar campus', the University of Technology is centred around a virtual campus. The university needs to go beyond providing lectures via 'Zoom' or online learning tools like 'Moodle' by using technologies like virtual and augmented reality technologies, digital/human interaction models (for example, virtual bots helping students with tasks), and could even use learning analytics to help students find their best individual education path. Following this approach makes the University of Technology itself a 'petri dish' of the latest digital transformation technologies. Crucially, in-person interaction is still a central part of the new concept. However, it is used where it adds value, rather than a one-size-fits-all approach.

Implementing these concepts requires a significant investment in digital technologies and infrastructure. Most likely the digital infrastructure will be more expensive than the physical infrastructure once it is fully implemented. This requires early investments in building this infrastructure in a timely manner so that it is ready when teaching and research begins. The University of Technology shall appoint a dedicated CIO/CDO who works closely with the faculty to drive innovation and execution in this area. As this approach requires significant investment from students in digital technologies, a proper fund needs to be established to support students who don't have the financial means to make these investments. This is crucial for inclusion and diversity. A student's financial background must not dictate whether they can participate in these studies.

8.4 Alumni Network

The University of Technology establishes and maintains an alumni network. The alumni will be invited to various events (for example, the networking events described in Chapter 5) and will be asked to support the students in different ways. For instance, the alumni may offer internships to students, provide contacts to their respective companies, provide input for teaching and research, etc. The alumni network may also be useful for finding and attracting lecturers who are not part of the permanent faculty, especially those who teach courses of a practice-based nature.

9 Next Steps

The Scientific Concept Group recommends that its scientific concept be implemented rapidly and that the operational establishment of the University of Technology starts expeditiously. For this purpose, the group can pass on the following recommendations for key next steps from its experience: the establishment of a Founding Convention, the appointment of a Founding President, and finding of a suitable name. Another important point that should be addressed is the international attractiveness of Upper Austria as a location for international experts. This scientific concept shall be the guiding principle for all further founding activities.

9.1 Supporting Infrastructure

As the new University of Technology aims to attract international talent, it will be vital to create proper infrastructure for members joining the university and their families. Many will not be native German speakers, children will need to continue their education, and family members will need to find occupations that do not require proficiency in German. In addition, cultural and leisure activities in English will be needed to make people feel at home and enjoy their expected standard of living.

Vienna already has a lot of the required infrastructure implemented due to international citizens living in the city (United Nations, Embassies, etc.). It will be of crucial importance to create a similar standard at the location of the new University of Technology.

Implementing this concept is a necessity as it would otherwise result in a significant competitive disadvantage in attracting top talent compared to other universities across Europe. These projects will also require proper funding and support from local and state institutions. Ideally, a dedicated programme and initiative is established in line with the creation of the University of Technology, ensuring that proper facilities are in place when the new university starts.

9.2 Founding Convention

The further steps are to be guided by a Founding Convention ('Gründungskonvent' in German). This convention should be the 'Guardian of the strategy' and ensure that further steps in all areas follow the vision of this concept. The Founding Convention should consist of approximately 10 experts in areas related to digitalisation. Relevant institutions and scientific organisations should have the right to propose some of the

members of the Founding Convention. In addition, the Scientific Concept Group will also make proposals to the Federal Ministry of Education, Science and Research. A diverse and international representation of experts is important. They would be mostly academics, but should also include members from outside academia who bring industry, innovative communication, and outreach expertise. It is paramount that at least one member is a communications expert familiar with new and innovative approaches to communications strategies. The members need to essentially agree on the concept and spirit of the University of Technology as laid out in the present document. The Founding Convention is expected to do substantial work, which will require much time and a significant effort. Members should therefore receive appropriate remuneration.

The following tasks are considered particularly important from the point of view of the concept group:

- Selection of the Founding President of the University of Technology to be appointed by the Federal Ministry of Education, Science and Research (see below).
- Further implementation of the strategic principles and the scientific concept of the University of Technology with special regard to its relationship to other universities and scientific and cultural institutions.

We, the Scientific Concept Group, would be pleased to provide close communication and exchange with the members of the Founding Convention and offer our cooperation in the future.

9.3 Founding President

The Scientific Concept Group recommends criteria regarding the appointment of the President of the University of Technology (see below) and recommends the rapid appointment of a founding management to professionally and efficiently handle all administrative processes. The President is first and foremost responsible for leading the initial faculty, strategy, communication, and infrastructure.

The first President of the University of Technology is crucial for the successful implementation of the proposed concepts and vision. Far from being merely an administrator, this individual is a member of the faculty of the University of Technology in the rank of a full professor, or alternatively is a qualified person who can prove equivalent expertise in the fields of digitalisation, digital transformation, and higher education. The President is therefore expected to:

- Understand, agree, and engage with the vision, goals, and proposals for the University of Technology. They will nurture, broaden, and complement this vision and proposals with their own visionary ideas and proposals.

- Have a strong research profile in the digitalisation field. The individual needs to be appointable as a full professor but also be acquainted with interdisciplinary research and cooperation in industrial or other practical settings.
- Have excellent international connections both to academia and to the industry.
- Have excellent leadership and communication skills both for internal communication and for representing the University of Technology to the outside. They must be able to communicate well with different types of stakeholders.
- Candidates with experience from abroad are highly welcome.

The initial duties of the Founding President will include composing the administration team, initiating cooperation, and selecting the initial faculty. In order to launch the operational scientific activities of the university, an initial faculty of approximately 10–15 members needs to be elected. These initial faculty members will play a crucial role in establishing the university and its international reputation. Therefore, the initial faculty must essentially embrace the vision. The different types of faculty (cf. Section 5.6) should reflect the diversity and interdisciplinarity for which this university stands.

Together with the Founding Convention the President will be responsible for developing the curricula of the doctoral, bachelor's, and master's programmes. The implementation of the Common Core will be of particular importance in this regard. In order to address new target groups, the studies must also be advertised and the job profiles must be specified (cf. Section 4.7). An early communication and outreach strategy will be key. Meanwhile, the faculty will continuously expand and more staff will be required.

Besides these academic aspects, the university administration and collaborations will have to be established step by step. The Founding President will be called upon to establish infrastructure—for example, virtual infrastructure or the clarification of partnerships with companies—and institutions such as the shared labs or grant office mentioned in this paper. The President should set the strategic direction on all of these issues and assemble a team of project managers for operational implementation.

9.4 Finding a Suitable Name

The Scientific Concept Group considers the current working title 'University of Technology for Digitalisation and Digital Transformation' to be an unsuitable name for the new university. On the one hand, the term 'Technische Universität' stands for a specific type of university, which cannot be translated literally. 'University of Technology' is more common in the German speaking world and therefore used in this paper. However, names like 'Institute of Technology' are more common internationally and should be considered. On the other hand, the word 'digitalisation' has connotations to the process of converting information into a digital format and therefore seems misleading. The uniqueness of

the new university in dealing with the whole chain of digital transformation should be clearly expressed in its name.

The task of finding a name—one which is internationally attractive, timeless, and distinct—should be given high attention in the subsequent founding process. The name should express as clearly as possible the innovative approach and spirit of the university. It is therefore highly advisable to have the name chosen by PR-professionals in consultation with the Founding Convention.

10 Making Of

In summer 2020, the former Chancellor of the Republic of Austria and the Governor of Upper Austria announced their intention to establish a new University of Technology with a focus on digitalisation and digital transformation in Upper Austria. In autumn, a preparatory group chaired by the former Federal Minister Heinz Faßmann and Governor of Upper Austria Thomas Stelzer was constituted. Together with national and international experts, a framework plan was drawn up that describes the main features of the University of Technology. In addition, Meinhard Lukas, the Rector of the 'Johannes Kepler University Linz' and Gerfried Stocker, the Co-CEO and Artistic Director of 'Ars Electronica', defined their visions for a university in the twenty-first century.

On this basis, the independent Scientific Concept Group was established as an expert group in spring 2021. Its task was to design the scientific concept and to work out more detailed considerations for the structure of the university. The following people were members of the Scientific Concept Group:

- *Martin Bergsmann* is CEO at HUECK FOLIEN and currently technology spokesman for the Industry Division in the Upper Austrian Chamber of Commerce.
- *Roderick Bloem* is Professor of Computer Science and Dean of the Department of Computer Science and Biomedical Engineering at Graz University of Technology.
- *Gerhard Eschelbeck* is former Vice President Security and Privacy Engineering at Google Inc., advisor and investor (Chair).
- *Christian Federspiel* is the co-founder of the software company Cloudflight (former Catalysts), CEO of Findus Venture, and investor in start-ups active in NewSpace, CleanMobility, AI and Quantum Technology.
- *Georg Gottlob* is Professor of Informatics at Oxford University and the Vienna University of Technology. He serves as a member of the Austrian Academy of Sciences.
- *Alois Reitbauer* (on behalf of Bernd Greifeneder) is Chief Technology Strategist of the software company dynaTrace Software GmbH.
- *Martina Mara* is Professor of Robopsychology at the Linz Institute of Technology (LIT) at Johannes Kepler University Linz and heads the LIT Robopsychology Lab.
- *Simon Mayer* is Professor of Interaction- and Communication-based Systems at the University of St.Gallen.
- *Valerie Mocker* is the founder and CEO of Wingwomen and an internationally renowned entrepreneur, board member, tech-for-good investor, and speaker.
- *Barbara Weber* is Professor of Software Systems Programming and Development and Dean of the School of Computer Science at the University of St.Gallen (Co-Chair).

- *Robert Wille* is Professor and head of the Institute for Integrated Circuits at Johannes Kepler University Linz, and the Chief Scientific Officer of the Software Competence Center Hagenberg GmbH.

In twenty online meetings during six months, the concept group has intensively discussed this proposal and prepared the current document. In addition, two two-day physical meetings were held in Linz and Vienna. The Federal Ministry of Education, Science, and Research and the province of Upper Austria supported the group operationally.

The Scientific Concept Group is very grateful to Anna Schinwald (Federal Ministry of Education, Science and Research) and Johann Lefenda (State of Upper Austria / Upper Austria Future Academy) for the invaluable support they provided in the discussion and document creation.

In addition, the expert group has continuously communicated with the connecting group consisting of Provincial Councilor Markus Achleitner, Meinhard Lukas, Maximilian Richter (Federal Ministry of Education, Science and Research), and Gerfried Stocker, as well as with the working group ‘Law’.

Appendices

Appendix 1: Short Version in German (Deutsche Kurzversion)

Mit diesem Bericht legen wir, die eingesetzte wissenschaftliche Konzeptgruppe, unsere Vision und unsere strategischen und operativen Empfehlungen für die neue Technische Universität für Digitalisierung und digitale Transformation in Oberösterreich vor. Entsprechend unserem Auftrag, beschreibt dieser Bericht die wichtigsten Eckpunkte, wie die neue Technische Universität konzipiert werden könnte. Wir wollen damit die Grundlage für alle weiteren Schritte bezüglich der thematischen Ausrichtung und der Organisation schaffen.

Die Technische Universität in Kürze

Mit interdisziplinärer Innovation den großen Herausforderungen der Zukunft begegnen

Die neue Technische Universität bietet Exzellenz in der Lehre, Forschung sowie im Bereich des Wissenstransfers, um ihren Beitrag zu interdisziplinären, technologiebasierten Lösungen und Prozessen für eine nachhaltige Wirtschaft, eine resiliente europäische Industrie und einen menschenzentrierten gesellschaftlichen Fortschritt zu leisten. Durch die Bündelung von interdisziplinärem Fachwissen und die Erforschung bereichsübergreifender Synergien zur Bewältigung aktueller und zukünftiger Herausforderungen im Zusammenhang mit der Digitalisierung und der digitalen Transformation, ergänzt die Universität die bestehenden Hochschulen. Technologischer Fortschritt durch die fokussierte Auseinandersetzung mit Aspekten in diesen Bereichen und deren Auswirkungen auf andere Disziplinen, bildet so die Grundlage für einen transversalen Ansatz auf höchstem internationalen Niveau.

Erschließung neuer Zielgruppen durch neue Curricula

Die Technische Universität wendet sich an Studierende, die sich für die Auswirkungen von Technik und ihre Wechselwirkung mit der Gesellschaft sowie Wirtschaft und Industrie interessieren. In Ergänzung zu bestehenden Universitäten zieht sie Studierende an, die sich sonst gegen ein rein technisches Studium entscheiden würden. Das Besondere am Studium an der neuen Technischen Universität ist aber auch, dass sie Studierende vom ersten Tag an in praxisnahe, anwendungsorientierte Projekte involviert, in denen sie fachübergreifend arbeiten. Sie versteht die Digitalisierung immer als Mittel zum Zweck.

In den ersten drei Semestern besuchen alle Studierenden die gleichen Kurse und arbeiten in fächerübergreifenden Teams, um die Grundlagen der Digitalisierung und der digitalen Transformation zu erlernen. Danach spezialisieren sie sich in separaten Bereichen, die digitale Technologien mit einer zweiten Disziplin kombinieren.

Ausbildung neuer Fachkräfte

Die Studierenden der Technischen Universität können sich für Bachelor-, Master- und PhD-Studien einschreiben. Sie werden zu Expert:innen der digitalen Transformation und als solche als führende Ingenieur:innen, digitale Gestalter:innen oder Unternehmer:innen arbeiten und die digitale Transformation von Wirtschaft, Industrie und Gesellschaft verwirklichen. Durch Projekte während des Studiums mit Wirtschaft und Industrie und einem engen gesellschaftlichen Dialog über die Vorteile und Grenzen der Digitalisierung entwickeln sich Studierende zu Fachleuten für die europäische Hightech-Sphäre. Dadurch entsteht ein innovatives Ökosystem aus hochqualifizierten Talenten, Unternehmen und Forschungseinrichtungen.

Synergetische Forschung und wirkungsvoller Technologietransfer durch eine agile Fakultät

Die Forschungsaktivitäten der Technischen Universität spiegeln die wichtigsten Grundsätze (siehe unten) der Universität wider und ergänzen sie. Labore werden interdisziplinär und gemeinsam genutzt. Die Fakultät ist agil und hierarchisch flach organisiert. Gemäß einer breiten und modernen Definition von wissenschaftlicher Exzellenz, gehören der Fakultät auch externe Expert:innen, Praktiker:innen oder Quereinsteiger:innen ohne typischen wissenschaftlichen Lebenslauf an. Alle Fakultätsmitglieder verbindet die gemeinsame Geisteshaltung „the next big thing“ zu realisieren. Eine offene und flexible Personalpolitik wird die Grundlage für die Rekrutierung und Beschäftigung exzellenter Lehrkräfte bilden. So kann die Universität als Inkubator für neue, synergetische Ideen und als zentraler, aktiver Knotenpunkt für Zusammenarbeit und Wissenstransfer dienen. Das Ziel der Universität ist es, wissenschaftliche Exzellenz zu erreichen und – diese nutzend – mit der Entwicklung neuer, innovativer Prozesse und Start-ups, die vielleicht die Welt verändern können, einen wirkungsvollen Beitrag in Gesellschaft, Wirtschaft und Industrie zu leisten.

Wichtigste Grundsätze

Die Gründung einer Technischen Universität bietet die Chance, sowohl inhaltlich als auch organisatorisch neue Strukturen zu etablieren und neue Wege zu gehen. Aus Sicht der wissenschaftlichen Konzeptgruppe sollten die folgenden Prinzipien die Konzeption, die Entwicklung und die Umsetzung der Technischen Universität leiten:

1. **Eine breite Perspektive auf Digitalisierung und digitale Transformation:** Die Digitalisierung verknüpft Technik mit vielen anderen Bereichen unseres beruflichen und privaten Lebens. Aufbauend auf einem digitalen technischen Kern soll die Technische Universität die Anwendung, die Auswirkungen und das Potenzial digitaler Lösungen in den Mittelpunkt von Lehre und Forschung stellen und einen Beitrag zu Österreichs technologischer Souveränität in der digitalen Transformation leisten.

2. **Interdisziplinarität:** Um die Digitalisierung in Lehre und Forschung wirklich verstehen zu können, überwindet die Technische Universität die traditionellen, disziplinären Grenzen. Die Angehörigen der Technischen Universität denken und arbeiten in allen Bereichen interdisziplinär. Ausgehend vom Grundkurs „Common Core" im Bachelor-Studium bilden Studierende, Wissenschaftler:innen und externe Expert:innen eine interdisziplinäre Forschungsgemeinschaft. Die Forschungsgebiete der Technischen Universität erstrecken sich über alle Bereiche, die für digitalisierte Organisationen und eine digitalisierte Gesellschaft relevant sind.

3. **Missionsorientierung:** Technologischer Fortschritt ist kein Selbstzweck, sondern Digitalisierung soll als mächtiges Werkzeug genutzt werden, um die großen gesellschaftlichen, wirtschaftlichen und ökologischen Herausforderungen unserer Zeit zu bewältigen. Deshalb sind Lehre, Forschung und die Interaktion mit Wirtschaft und Gesellschaft an der Technischen Universität auf breitere gesellschaftliche Missionen (die Österreich und Europa verfolgen wollen) ausgerichtet. In diesem Zusammenhang will die Technische Universität auch das so genannte „Europäische Paradoxon" überwinden, d. h. das vermeintliche Versagen der europäischen Länder bei der Umsetzung wissenschaftlicher Fortschritte in marktfähige Innovationen und gesellschaftlichen Nutzen. Die Technische Universität wird neue Wege beschreiten, um Europa noch stärker in die Lage zu versetzen, den digitalen Wandel zu gestalten und sein Know-how in Produkte und Dienstleistungen umzusetzen. Daher wird der Erfolg der neuen Technischen Universität nicht nur an ihrer wissenschaftlichen Exzellenz, sondern insbesondere auch aufgrund ihrer Kooperationen, ihrer Leistungen im Wissenstransfer und dem Ausmaß der gesellschaftlichen Öffnung gemessen.
   Mit diesem neuen Ansatz und den neuen Kompetenzen der Absolvent:innen wird die Technische Universität die Wirtschaft in Oberösterreich, Österreich und Europa durch innovative Prozesse und Technologien nachhaltig stärken, insbesondere durch die Verbindung neuester wissenschaftlicher Forschungsergebnisse der digitalen Transformation mit den Ingenieurwissenschaften.

4. **Neue Zielgruppen ansprechen**: Heute nutzt praktisch jeder Mensch digitale Technologien. Doch nur wenige Personen entscheiden sich für ein technisches Studium. Indem sie die Anwendung in den Vordergrund stellt und die Digi-

talisierung als Mittel zum Zweck positioniert, wird die Technische Universität Schüler:innen mit neuen Ansätzen und Methoden für die Digitalisierung begeistern und Absolvent:innen von weiterführenden Schulen zu technikorientierte Studiengänge anregen. Im Bereich der Zusammenarbeit mit Wirtschaft und Gesellschaft wird die Technische Universität Brücken bauen und neue Dialogplattformen erschließen. Auf diese Weise kann die Technische Universität nicht nur einen breiteren Kreis von Studieninteressierten ansprechen, sondern ergänzt auch andere (etablierte) Technische Universitäten, anstatt mit ihnen in Konkurrenz zu treten.

5. **Common Core und praxisorientierte Lehre:** Vom ersten Tag an sind die Studierenden in reale Projekte eingebunden. Sie lernen in einem „Common Core"-Modul über drei Semester die Grundlagen der Digitalisierung und der digitalen Transformation und vertiefen danach ihr Wissen in spezifischen Bereichen. Darüber hinaus erlernen sie in kleinen Projektgruppen Zukunftskompetenzen und stärken ihre Kreativität. Bei all dem kommen moderne Lehr- und Lernmethoden in interdisziplinären Labs zum Einsatz.

6. **Twin transition:** Unsere Gesellschaft steht derzeit vor zwei großen Transformationsprozessen: der digitalen und der ökologischen Transformation. Nach dem Prinzip „digital first" erwerben die Studierenden technologische Grundkompetenzen, die sie in Folge mit Wissen in den Bereichen Nachhaltigkeit, Technik und Unternehmertum kombinieren und anreichen. So wird die transformative Dimension der Digitalisierung mit der Bewältigung technologischer, sozialer und ökologischer Herausforderungen verknüpft.

7. **Netzwerk und Partnerschaften:** Die Technische Universität wird als komplementäre Ergänzung zur österreichischen Wissenschaftslandschaft gegründet und soll einen Inkubator für Synergien und Chancen darstellen. Dies erfordert ein enges Netzwerk von Partner:innen innerhalb und außerhalb der Technischen Universität. Dazu gehören selbstverständlich auch andere (österreichische und internationale) Universitäten sowie Forschungseinrichtungen, Unternehmen, NGOs etc. Die Technische Universität versteht sich als Drehscheibe und Initiatorin von Kooperationen und Wissenstransfer. Die Kapitalisierung von Wissen durch Start-ups wird praktisch unterstützt und der Zugang zu wichtigen Kapitalmarktnetzwerken ermöglicht.

8. **Diversität und Internationalität:** Diversität bereichert uns. Die Technische Universität ist in Oberösterreich verwurzelt, aber ihr Netzwerk reicht in die Welt hinaus. Internationalität wird in allen Bereichen gelebt, Englisch ist die Arbeitssprache. Die Fakultät ist heterogen, ebenso die Studierenden, sowohl was ihre Herkunft als auch ihre Interessen betrifft. Diese Mischung macht die Technische Universität auch für breitere Zielgruppen attraktiv.

9. **Flexibilität und agile Strukturen:** Die Digitalisierung bringt ein hohes Maß an Dynamik mit sich. Will die Technische Universität in diesem Kontext am Puls der Zeit bleiben, muss sie sich schnell anpassen können. Sie braucht flexible und schlanke Strukturen, flache Hierarchien, wenige Regeln, schnelle Entscheidungen und eine effektive Forschungsunterstützung, nach dem Motto: „Don't kill speed!".

10. **Open Mindset:** Der kritische Erfolgsfaktor des gesamten Konzepts sind die Lehrenden. Gerade in der ersten Phase wird viel davon abhängen, ob es gelingt, die „richtigen" Leute für die Technische Universität zu gewinnen. Es werden Forscher:innen, Visionär:innen, Brückenbauer:innen und Gestalter:innen des digitalen Wandels gebraucht – Menschen mit einer offenen Geisteshaltung, die sich für Innovationen in der Hochschulbildung und in der Forschung begeistern.

Appendix 2: Results of the Working Group 'Law'

The legal framework for the new University of Technology:
The new University of Technology in Upper Austria is to be established on the basis of the constitutional provisions for universities in accordance to Art. 81c. Para. 1 B-VG (Federal Constitutional Law). This ought to ensure that the new University of Technology has the same constitutional basis as the (public) universities according to the UG (Universities Act) and that certain constitutionally guaranteed rights are also granted to this university.

The new university shall therefore be established as a **legal person** under public law with its **own legal personality,** which shall fulfil its tasks **without being subject to directives** within the framework of the law and ordinances and shall adopt its **own statutes** within the framework of the laws in accordance with Art. 81c para. 1 B-VG.

As an institution with its own legal personality, the new university will also be entitled, among other things, to establish **companies, foundations and associations,** as well as to participate in companies and be a member of associations.

While preserving the autonomy guaranteed by the constitution, a lean and efficient **system of university management** and **academic self-administration** is to be realised. The **management of the university** should be assumed by a **rector** (possibly a president) together with a (rather small) rectorate (possibly a praesidium) and the **faculty** (organ of self-administration) and together with a **supervisory board** and a **scientific board.** Furthermore, a modern administration with a corresponding management structure will be established by **a management board.**

Organisation

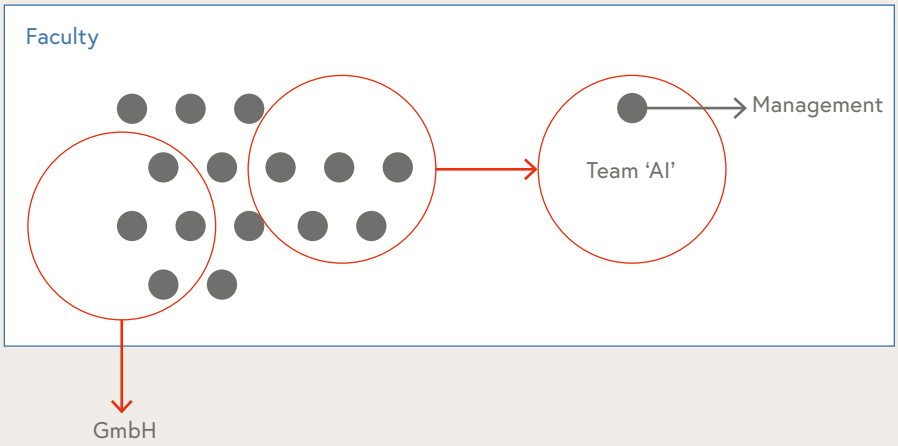
University of Technology for Digitalisation and Digital Transformation (University according to Art 81c B-VG)			
Rector Vice-Rectors	Supervisory Board (6 + 1 members)	Scientific Board (6 + 1 members)	Faculty (all scientific staff as of Post Doc, students, general staff)[14]
appointed by the Supervisory Board, involvement of the Faculty	*appointed by Faculty, Federal Republic, University of Technology-Research Fund*	*appointed by Faculty, University of Technology-Research Fund*	*including processes of digital participation*

14 The concept of 'faculty' applied by the Working Group 'Law' uses a broader understanding of the term faculty. The Scientific Concept Group does not include holders of post-doc positions in its definition of 'faculty'.

- Lean organisational structure (small supervisory board)
- Separation into the supervisory board (mainly in charge of financial affairs) and the scientific board (interdisciplinary composition)
- Modern administration with appropriate management structure
- Guarantee of the constitutionally required self-administration

The pace of innovation in digitalisation requires institutional structures that can quickly take up new developments. Accordingly, new types of **organisational structures** that ensure corresponding flexibility are to be introduced and tested. **Organisational units** and their management are therefore not to be established on a permanent basis, but will follow current focal points in research and teaching. The permanent staff of the new university will work on the new research questions in cooperation with external researchers and will be supported by a **central service organisation.**

University of Technology for Digitalisation and Digital Transformation (University according to Art 81c B-VG)



- Faculty-model
- Lean structure ('permanent staff')
- General labour law (supplemented by recruitment and qualification regulations)
- Agile structure (no institutes etc.) with flexible units for teaching and research. Consolidation (for a fixed duration) and financing through performance agreements

In **teaching,** too, agile structures with flexible units will enable innovative curricular developments. In the area of the **law governing matters of study,** new paths are to be taken, which are to be structured in accordance with **private law**, following the example of universities of applied sciences and private universities, and should therefore become more modern, open and thus more flexible. The provisions of the law governing matters of study are to be kept to a minimum.

As an institution of the federal government, the new University of Technology is to be subject to **federal supervision**—like the universities according to the UG—but only with regard to compliance with laws and ordinances (legal supervision).

The **financing** of the new university still has to be clarified politically; financing by the federal **government and the province of Upper Austria** is under discussion (within the framework of an Art. 15a B-VG agreement), the federal funds would be made available within the framework of **a performance agreement** with the new university.

For the staff of the university, the general labour law applies; the **Collective Agreement for University Employees (KV)** does not apply to the staff of the new university.

As an essential element of a modern **administration, a GmbH** (limited liability company) is to take over the organisation and implementation of the university's administrative processes. This GmbH will support all organisational units with regard to the necessary organisational measures. The **managing director** of the service GmbH will at the same time exercise the function of the **administrative director of the university.**

The question of **IPR,** which was discussed very intensively in the concept group, is very essential from the point of view of the **Working Group 'Law',** but is of little relevance to logistics in the foundation phase. The necessary modalities, sample contracts, etc. will have to be worked out by the new University of Technology with its **experts.**

Detailed specifications do not make sense at this point in time and would unnecessarily restrict the new institution.

Special attention in the founding phase of the new University of Technology will be paid to the **transitional provisions.** These will primarily be contained in **founding law** and envisage that a **founding convention** will take the first necessary actions, **such as the earliest possible appointment** of the founding president, the enactment of a statute and the establishment of the new University of Technology.

The transitional provisions are of particular importance. These will primarily contain a **founding law** and provide for a **founding convention** to take the first necessary actions, such as the earliest possible **appointment of the founding president,** the enactment of a **provisional statute,** the enactment of a **provisional organisational plan,** the definition of the provisional range of studies and the establishment of these studies, as well as the enactment of the **provisional curricula.**

The **Founding Act** is to come into force on 1 May 2022 and be superseded by the **Establishment Act** in autumn 2022, so that the start of the **operation of the new Upper Austrian University of Technology** is ensured at the beginning of the academic year **2023/24.**

Appendix 3: General Terms and Conditions for Cooperation—Input by Industry Representatives

Cooperation of the University of Technology with industry is critical to success, and a basic necessity. To enable fast project starts and fair conditions for the cooperating partners, the industry proposes the following practical principles for patent handling:

If a patent is generated by the University of Technology alone:

- All inventions generated by employees, guest researchers, and industrial part-time professors at the University of Technology connected to their research work at the university not carried out in cooperation with external partners shall be fully owned by the University of Technology and must be offered to the University of Technology by them for utilization. This shall be part of their employment contract.
- All inventions created by students who are co-workers in a project of the University of Technology or a project using relevant resources of the University of Technology (such as, for example, laboratory space, computing resources, travel money, data sets, etc.) under a user agreement are fully owned by the University of Technology and must be offered to the University of Technology by them for utilization.
- Where reasonable and appropriate and all inventors accept patent application, the University of Technology will try at their own cost to obtain patents for inventions or utility models for protectable designs. The inventor staff members are required to help with the patenting process. If the University of Technology decides not to apply for a patent for an invention the right will revert to the inventors.

If the patent is generated in a collaborative project:

- The patent generated by a collaborative project with industry belongs to the company partner if the company finances 100 % of the research project. The University of Technology receives a free license on the generated patent for research purposes (the right to use but not to grant sublicenses).
- The patent generated by a collaborative project with industry belongs to all partners together, if every partner finances a part of the project (directly or via funding). Every partner can use the patent for free.

- Where the patent generated depends on background patents of one or more partners, the partner must make the background patents available to the other partners against a license fee. The license fee for background patents is defined in the General Terms and therefore known before the start of cooperation.
- License on common patents to third parties outside the project consortium can only be granted if agreed upon by all partners.
- The inventor's remuneration is regulated by Austrian patent law. At the University of Technology, any students involved shall be treated as equal employees of the university.
- Every project partner is responsible for the inventor's remuneration for their employees.
- The inventor's remuneration for students is regulated in the project working contract or the user agreement. In collaborative projects all partners pay the inventor's remuneration for students according to their share of the project budget.
- The University of Technology may publish inventions not yet patented in scientific publications only if approved by all project partners in advance.

If a start-up is founded on basis of patents of the University of Technology:

- Start-ups spun out of the University of Technology receive a free license on the patents owned by the University of Technology which are necessary for their business model as long as the turnover is less than €1m.
- Start-ups pay license fees to the University of Technology from the day on which their turnover exceeds €1m. Instead of receiving a license fee the University of Technology could receive minority shares in the start-up. The number of shares will be determined based on the amount of resources the University of Technology has invested in advance.