

# Positioning TU Wien for 2023+

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The mission statement *technology for people* is the guiding principle and foundation of research and teaching at TUW. As we are facing increasingly complex challenges affecting our society, each epoch requires new interpretations in order to meet the aims of our mission statement. Currently, the bilateral relationship of mankind and technology falls short without proper consideration of the environment and societal needs.

## 1. STATE-OF-THE-ART

TU Wien is among Austria's largest universities and educational institutions with significant reputation in the MINT sector. Based on its portfolio of curricula, for many decades TUW has educated experts with exceptional job perspectives in industry and research. TUW is highly successful in securing excellence grants from national and EU funding agencies and obtaining highest levels of project funds based on the high motivation and competence of its researchers. TUW is also a strong and reliable partner of the Austrian industrial sector for joint developments. Major progress has been achieved in recent years by drafting transparent processes for internal decision-making.

However, based on its role at the national level, TUW is lagging behind in international recognition due to several reasons, many of which are intrinsic to the Austrian academic system (see SWOT analysis). Still, careful analysis of the current potential of TUW's human and infrastructure resources indicates substantial future assets. Building on such activities, the introduction of additional guiding principles is expected to streamline future developments and generate impact towards enhanced recognition in the European and international scientific biotope.

Today's highly volatile geopolitical situation, further impeded by the global pandemic and recently escalated in view of the Ukraine war, not only caused global humanitarian hardship but may as well steer future budgetary developments in most uncertain directions.

### SWOT analysis

#### Strengths

- Strong local / national networks
- High national reputation
- Process-guided decision making
- Staff motivation / performance

#### Weaknesses

- Limited international impact
- Partly incongruent research profile
- Exploiting internal synergies
- Limited personnel & infrastructure capacities
- Communication culture

#### Opportunities

- Cross-cutting areas of expertise
- Cutting-edge instrumentation & core centers
- Campus expansion opportunities

#### Threats

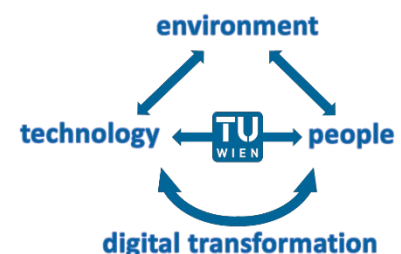
- Budget developments
- Geopolitical situation

## 2. FUTURE DIRECTIONS

### 2.1 CREATING A VISION

Recent disruptive events in combination with upcoming transition processes in particular in Europe (climate action plan, renewable energy plan) will have substantial consequences on the scientific and industrial landscape in Austria and the CEE region. Technological and digital transformations will influence the next generations of engineers to determine the conversion from a resource-consuming society to a future circular, self-sustaining, and smart economy. While this process will require holistic reforms in behavioral aspects of society, general acceptance can only be ensured when the optimization by technological means is fully exploited; this will smoothen the process of change and favorably contribute to a sustainable development agenda by minimizing societal sacrifices.

Technology oriented universities are natural contributors and multipliers in this effort. We educate decision-makers of the future based on top-of-the-art expertise in fields of relevant scientific and technological progress. In addition, we are enabling the evolution of curiosity-driven research to prospective application for the benefit of humankind. This



requires early stage trend-setting by proactive identification of scientific and technological domains with the potential to deliver game-changing developments.

We are currently at the onset of two such mega-trends of disruptive effects on all aspects of our daily life. While we obtain a first understanding of the impact of digital technologies with an increasing amount of virtual and physical applications, measures to combat climate change, sustainability, and the green deal are presently mere concepts awaiting full-scale technical assessment, before even considering global implementation. Consequently, *this* is the time to adopt these areas as strategical long-term goals by harnessing the available expertise at TUW and amalgamating it in a synergistic fashion. The initiative **ADDED ENVISIONEERING** aims at interpreting TUW's mission statement *technology for people* for the next generation of engineers similar to the revolution provided by added manufacturing; future engineering trends are envisioned by the symbiosis of previously unconnected areas.

## 2.2 GUIDING PRINCIPLES

Taking advantage of previous and ongoing vision drafting initiatives, **ADDED ENVISIONEERING** aims at benchmarking such bottom-up processes to identify activities that have sufficiently matured to enter implementation directed by **five guiding principles** (TU 5.0). These address the main development dimensions of TUW in research, teaching & student affairs, career development, internationalization, external perception and outreach, as well as administration.

The strength in basic and applied research represents a major asset at TUW enabling curiosity-driven science and concomitantly providing expertise and experience to pursue application rigorously and exploitation whenever feasible. In order to cover such a broad research agenda, it is crucial to attract and promote talents at all levels from student to principal investigator on a strict equal opportunities' basis. In view of scientific challenges ahead beyond the boundaries of classic disciplines, cooperation in an environment operating close to optimum is essential. This is especially relevant within in-house and external collaboration in order to build robust bridges for prolonged exchange. Apart from scientific dissemination the explanation of complex scientific content to the interested society in a comprehensible way becomes increasingly an art to be fostered and enhanced (vis-à-vis the inflation of alternative facts and an alarming increase in science skepticism).

**Excellence in research,  
perfection in application**

**Equal opportunities,  
identify talent & enable career**

**Enhance efficiency,  
enable synergies**

**Trigger discourse, explain facts,  
establish a position**

**Unity in diversity,  
competitive by collaboration**

The ultimate motivation for employing these guiding principles is to stimulate curiosity-driven and ground-breaking research in a bottom-up approach. The generation of scientific knowledge creates a self-sustained dynamics, where the spark spreads out to society by outreach activities that emphasize the public relevance of science and research. This requires motivated and passionate experts willing to act as testimonials and to represent the essential topics at TUW.

## 2.3 ENVIRONMENTAL TECHNOLOGIES / SUSTAINABILITY

Moreover, the **ADDED ENVISIONEERING** initiative aims at fostering strategic cooperation along critical mega-trends in research and society. The initiated transformation process in climate change offers a unique opportunity to converge and pool previously segregated research activities at TUW under a common thematic umbrella. Research activities in environmental technologies in the broadest perceivable sense have been carried out at TUW since many years ranging from architecture (urban planning, sustainable architecture) via civil engineering to geodesy & geoinformation (Earth & climate surveillance), and chemistry (atmospheric chemistry, green chemistry). Similar to the sustainable development goals (SDGs) or the XII green chemistry principles, such efforts only generate effect when implemented in a comprehensive fashion. In recent years the *research center for energy and environment* (and other bottom-up initiatives) stimulated fruitful cooperation in research; likely, teaching cooperations by faculties were formed in interdisciplinary curricula such as environmental engineering, chemical engineering, and green chemistry (with two partnering universities). However, many such initiatives, predominantly in context of research, have remained isolated. Although other research institutions in Austria also adopt sustainability as development goal, TUW is in the unique position to cover the topic at unprecedented scale at the national level and form a research stronghold in the CEE area.

- It is the specific aim to enforce cooperation between faculties with a clear connection to sustainability under the umbrella of an **environmental technologies strategy** (application-oriented research affecting our environment). Already existing consortia (e.g. from the FWF Cluster of Excellence applications) and previously segregated research activities (e.g. TU PhD school programs, research clusters) will be assessed for synergistic interaction.

- Establishing a **sustainability assessment hub** to determine impact and lifecycle of processes and products, esp. to propose guidelines for the transition to a bio-based circular economy with impact on several research areas at TUW as well as immediate effect on university operations.
- The development of a TUW-wide **sustainability strategy** is proposed; this will include immediately effective measures from every-day office life to leveraging activities in cooperation with partners (esp. from industry) implementing developments originating from TUW and ultimately supporting the goal of CO<sub>2</sub> footprint reduction.

## 2.4 DIGITAL TRANSFORMATION

We are in the middle of the digital transformation process affecting a multitude of aspects of every-day life, but also of our work-life at the university. TUW has been and undoubtedly remains to be a trend-setter in this area for both societal questions (e.g. by introducing the terminology *digital humanism*) and technological challenges (e.g. cybersecurity). In order to adopt a leading role on national level, a tailored clustering of activities in combination with pooling of expertise is required to overcome the current fragmentation of digital transformation at TUW.

The **development of tools and processes** for the digital transformation represents a dynamic research area, offering strong entrepreneurial potential. It is no coincidence that the entrepreneurship incubator i<sup>2</sup>c has its origin within the faculty of informatics at TUW. Still, substantial room for development is remaining to harvest the full potential of application-oriented research ongoing in various units at TUW. This is particularly true for **first-tier adopters** of already commercialized tools, however, repurposing applications and venturing onto new grounds; classic examples are represented by machine-learning applications in engineering contexts, digital twinning, big-data analysis etc. At this level, research is usually highly application-oriented but still of innovative nature to allow for ground-breaking discoveries. Ultimately, digital transformation is only reluctantly entering our routine workflows, very often in a fragmented fashion leading to inefficient processes; **routine users** are often handicapped by repeatedly switching from digital work-threads to paper-operations and back.

- Pooling of expertise is required to enhance the pace of digital transformation at TUW. In addition to central support units, **task force teams** will be identified in order to contribute to large-scale project clusters. This is not intended to compromise the bottom-up research approach, but to provide core expertise to complementary research teams from various areas of application.
- The digital transformation strategy of TUW will be streamlined to provide **tool-boxes for routine** users as a priority approach, considering the requirements by both central units and faculties equally. This requires closer interaction of IT-related services, usability of solutions as benchmark, and quick feed-back loops regarding adjustments.
- Assessment of an Austrian-wide harmonized **strategy on digital transformation** from the view-point of the academic landscape and outlining prospects of interaction with industrial partners.

## 3. FUTURE AIMS & TARGET AREAS

The following sections identify key target areas in university operations which require specific attention in order to improve the overall performance of TUW; general goals are set and high-priority indicative activities are outlined.

### 3.1 RESEARCH

Excellence in research remains one of the core aspects to define the international standing of a university. TUW is among the top research institutions in Austria manifested by its success in securing excellence grants (ERC, FWF-START). In addition, our university is a competitive and reliable partner for companies and industry. Consequently, also CD-laboratory initiatives are considered as excellence activities at TUW. In general, feedback received from graduates and external employers indicate strong reputation of the institution together with high competitiveness and expertise of students entering the local job market. This can be summarized as a classic **local champion** situation.

- Meet global challenges: address the key research questions of our times
- Aim at top-quality research
- Become a leading partner in interdisciplinary cooperative research programs
- Balanced distribution between basic and applied research
- Create a stimulating environment to attract bright minds

Still, the performance of TUW in international rankings lags behind expectations of coworkers and leadership personnel. The deviation between the university's own perception and international reception has been long known and has contributing factors, of which only a few have been addressed in recent efforts. This limits competitiveness of scientists and students on the international level. Applying the principles of **ADDED ENVISIONEERING** provides refined guidelines by focusing research efforts towards larger-scale longer-runtime endeavors instead of multiple of short-term applications.

As a consequence, more resources can be generated and provided, ultimately to foster high quality research and its dissemination on a sustainable time-line. In return, this will attract bright and motivated future scientists.

TUW has been participating in a large number of broader and cooperative research programs (FWF-SFB, DKs, EU-MSCA etc.). Likewise, the presently ongoing first stage of the FWF *excellent=Austria* initiative resulted in substantial planning at top research level with unclear perspectives for implementation; the following stages of this FWF initiative are expected to trigger similar efforts. Also, in-house initiatives such as TU-DKs contributed to performance increases, but lacked appreciable impact on strategic planning, and hence, failed to develop sustainable effects.

In a similar context this assessment also applies to the stakeholder portfolio of TUW with competence centers and similar research entities. TUW also entertains a remarkable service unit to support entrepreneurs and spin-offs with limited connection to strategic development goals.

- A new **ranking strategy** will be developed focusing on optimal utilization of assets in the current research portfolio of TUW and identifying “sweet spots” for affecting rapid improvements.
- Identification of **long-term development goals** derived from successful bottom-up collaborative programs representing a constant source of progressive input into strategic planning.
- A comprehensive **assessment of the stakeholder / asset portfolio** will be conducted with the aim to identify synergies for university development in the broadest sense and to foster entrepreneurial activities.

### 3.2 TEACHING & STUDENT AFFAIRS

The Covid-pandemic had a disruptive effect on teaching activities at universities in general and at TUW, especially. Long-pending reforms and changes to present-day didactics were implemented within a minimum period of time ensuring continued teaching operations. Creativity of teaching personnel has been extraordinary, generating and adopting a multitude of novel tools and reaching a new level. While it has become evident that TUW will operate in the future as a teaching environment based on campus presence, broad distribution of best-practice virtual teaching elements seems advantageous.

- Excellent in campus teaching complemented by best-practice (virtual) tools
- High quality education
- Improving study success
- Increased competitiveness of graduates on the job market
- Innovative curricula to meet current requirements and challenges of our society

With the current indicator-based system for university budgeting by BM:BWF, success depends on a large ratio of students with high exam activity over the entire student “life-cycle”. In view of limited capacities for supervision and mentoring, additional guidance is required for freshmen’s optimum choice of suitable study programs and their prospect to enter routine studying.

TU Academy offers the prospect of synergistic utilization of innovative programs and curricula for additional continuing education as well as meeting individual requirements of students with substantial potential for further development.

- Comprehensive **collection and assessment of digital teaching elements** adopted during the pandemic for general application in TUW teaching environments (e.g. TUWEL).
- Development of a **comprehensive strategy for the student onboarding process** in order to accompany the shift from the secondary (high school) to the tertiary (academic institution) educational level with the aim to facilitate proper selection of study programs and to ensure rapid and successful integration into academic teaching life.
- Harmonization of the **fellowship programs** at TUW with special emphasis on financial support during *STEOP*.
- Enforced change to **English MSc programs** in order to ensure top employment chances internationally and to level the playground for international students in view of equal opportunities (no “native speaker bonus”).

### 3.3 CAREER DEVELOPMENT

At its core, the essence of TUW is its staff – it is imperative to foster an inspiring but also amiable work environment. Ensuring equal opportunities is paramount and still requires constructive changes in corporate culture to finally ban (unconscious) bias, discrimination, or harassment. Identifying talent, exploiting potential, and enabling career development lays the foundation of recognition and competitiveness of TUW at all levels of the people involved, from student to postdoc, from technician to administrator, from assistant to professor. Mentoring is crucial to ensure young talents to evolve towards high-profile career; accompanying training facilitating this process. A broad diversity of characters working and flourishing at TUW guarantee for a vast pool of thoughts, opinions, and ideas.

- Equal opportunities, gender equality
- Family-work balance
- Appreciation of diversity
- Company culture & branding
- From talent to career by mentoring and training

Equal involvement of women at all levels of university operations has been achieved at varying levels with remarkable differences between faculties. While trends lead towards gender-equality, velocities may still vary largely. To harness the full potential of staff and students, efforts need to focus on finally overcoming any gender bias at TUW premises.

Career development after obtaining permanent positions offers highly variable perspectives depending on the employment level and type. Incentives and promotions represent instruments of employee motivation and, hence, require further development at all levels for the benefit of the individual affected as well as the whole organization along a pro-active company culture.

Assuming leadership responsibility represents proper responsibility for the assigned duties. A modern university structure requires proactive decision-making rather than mere administration. Readiness and careful preparation are eminent virtues within the responsibility of the employer.

- Best-practice approaches in **female scientist support** plans of successful faculties will be carefully adopted to areas requiring further improvements.
- **Family-work balance issues** will be analyzed in the case of perceived development limitations and solutions will be developed for identified general obstacles.
- Current **promotion options and fringe benefit** need to be assessed by drafting a global implementation strategy in order to ensure motivational development perspectives to employees.
- Training programs for leadership roles need adjusting to ensure preemptive **preparation for decision-making** tasks.

### 3.4 INTERNATIONALIZATION

TUW's internationalization strategy dates back to 2013 and addresses teaching and research aspects alike. Currently, about one third of students comes from outside Austria, generating a very international campus life. Together with significant outgoing Erasmus activities, teaching has already reached a high level of internationalization.

With the currently ongoing application process of the EULIST consortium, TUW is deviating in part from the previous rather bottom-up approach in making international contacts, towards a structured consortium procedure. This paradigm shift clearly requires a careful adjustment of the internationalization strategy. In any case, bilateral research cooperation from scientist to scientist will clearly remain the backbone of external collaboration. But on a sustainable basis, scientifically successful and resilient contacts may offer a prospect for future enforcement and added value.

- Focus at & adopt from the best
- Empower the weaker
- Develop lighthouse activities
- Enforce strong connections
- Exploring new pitch-grounds

- The **internationalization strategy in research cooperation** requires reconsideration: a clear separation into high-profile vs. "developmental" contacts seems appropriate; the prior group offers a clear benefit of know-how transfer towards TUW or providing access to exceptional facilities for TUW-scientists; the latter group offers largely different benefits to TUW, mainly by attracting research coworkers and guest scientists. Substantially different aims and strategies need to be applied in context of a comprehensive strategic re-positioning.
- Already established strategically crucial connections (CERN, ESA, etc.) should receive higher **visibility** and better explanation in context of societal recognition.
- The **geographical target areas** also require a differentiated approach, in light of the rapid development of Asian scientific communities. In addition, the strategic dimension of the **CEE area** for TUW needs to be emphasized.

### 3.5 SCIENCE COMMUNICATION, THIRD MISSION & BRANDING

TUW has initiated first steps to adopt **community relations** activities inspired by the American university system. Such actions include an Alumni culture (TU Alumni Club) as well as connections to philanthropy (TU Foundation).

Mainly driven by researchers, TUW has also established third mission initiatives with an emphasis on MINT topics and focusing on cooperation with schools. The *Science Buster team* goes back to an initial cooperation by scientists from TUW and University of Vienna and represents an "anomaly" in so far, as adults are the main audience for this program.

By establishing the *Center for Technology & Society* TUW recognized the necessity of a strategic outreach initiative in third mission activities. Together with a growing number of partners, this center aims at fostering vivid exchange along the triangle science – society - education.

- All **outreach activities** will be compiled to identify synergism in future developments. Best practice concepts will be developed towards blueprints to expand coverage and impact. As a collateral effect, a pool of experts will be identified and can be trained for testimonial activities aiming at the science-interested society.

- Together with environmental technologies & sustainability as well as with digital transformation as main overarching research frames, a **branding strategy** will be developed for TUW with the purpose to embed a clearer profile among the general public.

### 3.6 ADMINISTRATION

The introduction of clear procedural protocols in administrative processes at TUW during the past 10+ years was a major leap forward in transparency and reliability of the operational system. TUW's administrative units are generally well set up, but deficiencies in efficiency may be apparent. In addition, rapidly changing circumstances during recent years often required quick adjustments in the administrative organizational structure, eventually leading to a certain degree of redundancy and / or overlapping task profiles.

In view of the current crisis scenarios and considering already looming budgetary obstacles that recently led to a consolidation budget path, future budget negotiations with the BM:BWF can be expected to yield only minor monetary increase. Consequently, efficiency and further optimization of administrative operations seems mandatory in combination with accelerated digital transformation in particular in central and faculty administrations. Simplification of workflows to speed-up processing timeframes offers substantial room for improvement.

- **Improve communication** within administration and between central units and faculties on all management levels.
- Forwarding the concept of **zero-paper/all-digital workflows** in all administrative processes by employing enhanced digital tools for authentication and authorization under the prime auspices of user-friendliness.
- **Streamlining allocated tasks** and organizational structure of central administration during enforced digital transformation in workflows; analysis of Core Facilities for efficiency of service implementation.
- Refining **operations of GUT** to optimize and secure activities in construction, adaptation, and facility management.

## 4. EXECUTIVE IMPLEMENTATION

### 4.1 ORGANIZATIONAL STRUCTURE

Certain adaptations are required along department portfolios upon implementation of the outlined concept. Refinements are expected upon interaction with the university council and university senate in the process of identifying suitable candidates for the positions as vice-rectors based on expertise, experience and diversity. Consequently, indicative directions are proposed for vice-rectorates at this stage.

#### Rectorate

#### Vice-Rectorate for Research and Internationalization

#### Vice-Rectorate for Teaching and Student Affairs

#### Vice-Rectorate for Central Operations, Human Resources & Digital Transformation

#### Vice-Rectorate for Infrastructure & Sustainable Transformation

### 4.2 LEADERSHIP APPROACH

In all my leadership positions I have always embraced working in teams, above all in the decision-making process. Collecting suitable ideas to resolve a given challenge irrespective of its origin became a passion; prioritizing identified options and implementing decisions by executive action became a mission. The agility to actively respond to changing circumstances was mandatory in crisis-management during the pandemic. In addition, it is of utmost importance, to constantly monitor the effect of decisions and adjust if required. This all requires efficient communication at all levels and in all directions.

- Define a course (goal), optimize the approach (process)
- Analyze your position, adjust your bearing
- Keep moving to maintain momentum
- See the situation through the eyes of everyone involved
- Collect ideas, identify feasibility, enable implementation, motivate participation

Loyalty and dedication to the cause are highly appreciated virtues; under these circumstances it is easy for me to compose, direct, and lead a team to maximum performance. Based on my ability to recognize talent in people, it has always been my goal to enable new and expand existing capacities, hence enhancing performance. It is equally easy for me to identify optimization potential in situations and processes, which qualified me for previous change-campaigns.

As a passionate (but amateur) sailor I adopted the necessity to constantly adjust course in order to reach the destination for my management approach, and also to get along with the resources available on your boat. It would be my honor to apply my skills in view of previous achievements to plot the course of TUW for the coming years.