Summary

Recently, the TU/e Strategic Plan 2020, which was published in 2011, has been recalibrated. This process made clear that we should not just articulate our ambitions up to 2020, but that we should also look beyond the 2020 horizon to respond promptly to external developments such as digitization, global innovation hubs and the increased need for scientific and innovation impact.

TU/expedition

In the next 18 months, TU/e will embark on the TU/expedition 2030: deciding on the course for the university for the next decade. This process will have four phases: outline and take-off (until June 2017), study phase (until November 2017), integration and support (until May 2018) and decision and presentation (until September 2018). The entire TU/expedition process will be organized by the Executive Board and supported by a project team.

Starting point

The starting point of TU/expedition 2030 will be our leading principles: integrity, international excellence, small scale, integration of education and research, high student/teacher interaction, on-campus, close collaboration with industry, and where people matter.

Drivers of change

The framework for developing TU/e toward 2030 includes the following drivers of change:

- TU/education: digital technology and 21st century skills
- TU/excellence: global mobility and convergence of disciplines
- TU/e innovation and impact: global innovation hubs and impact

Questions for the future

From these drivers for change, we identified five questions for the future. These questions will be addressed by five study groups:

- Education in 2030: on-campus, online, bundled or unbundled?
- Systems thinking and multidisciplinary collaboration?
- What should be our focus areas in 2030?
- TU/eindhoven engine
- Technology impact

These groups will spend the time from June to November 2017 to look at these questions in depth and gather input from TU/e and external stakeholders. Based on the advice of these study groups, we will formulate an integral concept strategy, which will be discussed TU/e-wide and with external stakeholders from February 2018 onwards.

Share your insight!

During the entire process, all members of the TU/e community are very welcome to share their opinions and insight. All information about the process will be published online, and you can weigh in both online and in meetings.
I. Introduction

In 2010, TU/e set a course for the years until 2020 in our Strategic Plan 2020. At that time, the most important challenges were achieving a substantial growth in student numbers and strengthening our international research position.

This strategy for 2020 has recently been re-examined, which showed that we must recalibrate and update it for certain topics: growth, excellence, international impact, partnerships, where people matters and a strong financial basis. These ambitions were set out in the Institutional Plan 2017-2020, published in May 2017.

Recalibrating the Strategic Plan 2020 also made clear that we must look beyond the 2020 horizon toward how we want to develop as university in the period up to 2030. By then, our growth will have stabilized and the large-scale development of the Campus will have been accomplished, but important trends such as digitization will continue to make themselves felt and the global competition for talent will be even stronger. This long-term perspective is needed to start making timely and collaborative progress toward the desired profile in 2030, in the Netherlands and internationally.

Developing a strategy for the year 2030 mostly means determining the direction in which we want to develop as a university. We will explore our options and possibilities for the year 2030 in our TU/expedition, culminating in a new Strategy 2030 in September 2018.

This exploration is not just starting today: many of these topics have already been looked at and discussed. In this starting statement, we will introduce the most important questions for the future, based on our drivers of change. Our leading principles will inform the starting point for the TU/expedition 2030.

- Leading principles as starting point
- Drivers of change
- Questions for the future
- TU/expedition 2030
II. Leading principles as starting point

Our university’s core values are an important starting point for every strategic exploration. They indicate what the university considers important in their primary processes of education and research. In the Strategic Plan 2020, these core values were mentioned:

- Scientific independence and integrity
- Excellence, based on curiosity-driven research and academic freedom
- International excellence within disciplines, to enable inter- and multidisciplinarity
- Relatively small-scale university, to facilitate collaboration and a personal atmosphere
- Intertwinement of education, research and knowledge valorization
- Open stance toward society and strong ties with the high-tech industry and local and national governments

From the discussion about how to successfully integrate the increased student numbers, we defined several leading principles that build on the core values in the Strategic Plan 2020:

- Excellence in research and education
- Intertwinement of research and education
- Small scale
- High student/teacher interaction
- On-campus
- T-shaped profile of our engineers of the future
- Close collaboration with industry
- Where people matter

These leading principles also serve as starting point for the TU/expedition 2030: with each topic, we will explore how we can give these values concrete form, for instance in digital education and establishing a global innovation hub.
III. Drivers of change

As starting point for Strategy 2030, we identified a number of drivers of change: important trends that TU/e will have to deal with in the next decade.

**Digitization**

Developments in and availability of digital technology and information generation and dissemination pose a number of challenges to universities: educational materials and subject-matter knowledge can be obtained and accessed from anywhere in the world and students can take courses at other universities without ever setting foot outside of Eindhoven. Education will have to become much more varied, from cohesive curricula to unbundled curricula and stand-alone subjects.

The digitization of society and technology requires our students to have excellent digital skills, which will have to become an integral part of education.

In addition, these new digital technologies mean that teaching methods themselves will change, see for example the rise of online Course Management Systems over the past 15 years. Virtual reality will make its debut in education. In research, data science approaches will lead to new research methodologies.

**21st-century skills**

The profile of engineers is changing. Our students need to know how technology is embedded in society (USE), have soft skills in addition to hard knowledge and need to be at home in multidisciplinary teams: the 21st century skills that every student will need. In addition, the growing complexity of technology means that engineers need to be able to manage and improve complex operations on a systems level.

**Global mobility**

In higher education, like everywhere else, the world has become a smaller place. We can now speak of an international talent pool and global university brands. Earlier emerging economies such as China and India are investing heavily in science & engineering, changing the position of European universities. The ‘war for talent’ will escalate, which means that our university needs to have an excellent range of offerings based on a well-defined profile.
Convergence of disciplines
Research is now more multidisciplinary than ever. In science & engineering, too, technology forces an approach where disciplines work together. Digital disciplines, physics, materials sciences, life sciences - all need to work together to achieve appealing research results. As a result, there will be strong cross-pollination and a boom in new subdisciplines.

Global innovations hubs
It is already becoming clear that universities will be formative players in mostly regional ecosystems with a strong international position, such as the Brainport high-tech ecosystem. Think global, act local. Our focus will continue to shift to entrepreneurship: by students, scientists and graduates, resulting in many start-ups and spin-offs. It is clear that we need to accelerate technological development from technology readiness level (TRL) 3 to 7. The university and our partner companies will address these acceleration challenges together. This will lead to more intense and different forms of public-private partnerships.

Impact
The influence of technology on society can be felt everywhere, and people are looking to new technologies to help solve the challenges society is facing. An important question is how the university can turn its potential impact - on societal challenges, industrial developments, new business and policy - into actual impact.

These trends arise from education and science itself, from increasing technological partibilities and from a changing demand from industry and society. For this reason, the trends in industry and society and the way companies and governments view higher education and science must be included in our exploration of our path to 2030.
IV. Questions for the future

Based on these drivers of change, we formulated five important questions that need to be answered to help TU/e determine its direction for 2030.

1. Education in 2030: on-campus, online, bundled or unbundled?

Digital technologies have a strong impact on higher education. How should the university develop in terms of education – online vs on-campus, bundled or unbundled?

In our discussion about growth, TU/e made a clear choice for on-campus, hands-on education. This is compatible with the concept of blended learning, and the first initiatives in that direction have been started. At the same time, we know that the new generations of students - Generation Z and Generation Alpha - are ‘digital natives’ with different educational needs. To what extent will they choose bundled or unbundled educational programs? Which mix of online and on-campus education meets their needs? And which mix matches the profile of our TU/e engineers in 2030?

2. Systems thinking and multidisciplinary collaboration?

Companies are looking for engineers with systems thinking competence, which is also increasingly important in research. Concepts such as ‘complexity’ and ‘interdisciplinarity’ are closely related ideas. Should systems thinking become a distinguishing characteristic of TU/e engineers and researchers? How would that translate to education and research itself, especially if the university is becoming more active in TRL 4-6?

The first discussions around this topic show that systems thinking is definitely an important characteristic of the engineers of today and tomorrow, but also that this concept is very broad: different disciplines can interpret it differently. It has also become clear that companies want ‘systems thinkers’, who can control a process or product from component to customer. To what extent are we talking about a generic skill, and to what extent is inter- or multidisciplinarity essential here? What role does the increasing complexity of technology and systems play? How is this reflected in academic technological research, and how will Eindhoven-trained engineers distinguish themselves on these points in 2030?

3. What should be our focus areas in 2030?

What are the hot trends in science and technology, or the promising trends in engineering science & technology? What do these trends mean for education and research at TU/e? Where can and should we focus in 2030? In addition: what is the role of systems thinking and interdisciplinarity?

Technology has become essential in almost every research field and industry sector, and the crossovers between the natural sciences, technology, business, life sciences and agri-food are resulting in many surprising new research challenges and application potential. We also see that - given the enormous investment in engineering & technology in Asia - we will have to choose our focus areas with care, as a medium-sized, specialized university. Which challenges and opportunities can we see arise, and which new engineering & technology challenges should TU/e pick up in the next 10 years?
4. **TU/eindhoven engine**

TU/e aims to accelerate innovation through a new type of public-private partnership, which includes a physical place to land: the TU/eindhoven engine. What might this new collaboration and physical innovation hub look like?

The life cycle of products is becoming shorter, and disruptive technologies can turn entire markets upside down. This means that companies have to reduce their time and budget to develop new technologies, and that the distance between university research and industry product development is increasing. At the same time, the speed of innovation must increase. TU/e is exploring new possibilities for collaboration between researchers, students, entrepreneurs and R&D professionals. Our partnership approach with flagship projects plays an important role in this collaboration, which will take shape in the physical landing space.

An intensive collaboration like this has the potential to be very fruitful. Companies will send their R&D professionals, who will have access to new solutions and highly educated potential employees. University students and researchers will participate in the projects, gain insight into industry challenges and obtain research funding from companies and governments. Entrepreneurs will get access to knowledge and experience, giving them an excellent foundation for growth. Governments will invest in this collaboration, generating an innovation fast track for societal solutions and economic value.

In the recent National Action Plan Brainport, this idea has already been included (see below). For the 2030 TU/e strategy, we will investigate how this new collaboration can take shape, and how the physical landing space can work best.

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Let’s build a new engine together, to bring knowledge to the market more quickly

In recent decades, new industrial products have become much more complex, often requiring multidisciplinary efforts. In addition, success increasingly depends on fast development from idea to prototype and product. The collaboration between fundamental research in universities and research at knowledge institutes and companies is functioning well, but we think it could be much better. We are developing a new way of working together, to bring knowledge to the market much more quickly. To do so, we need a physical landing space. A dynamic environment where R&D professionals, students and entrepreneurs can combine forces and form knowledge alliances to generate breakthroughs together. This game-changing approach is something we would like to build together with the Dutch government. To do so, we need an initial investment and a joint willingness to pursue organizational changes in our knowledge infrastructure.

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EINDHOVEN ENGINE OM KENNIS SNELDER NAAR DE MARKT TE BRENGEN

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**Global innovation hubs**
- Eco-system
- Entrepreneurial
- Clustering of public and private R&D

**Impact**
- Societal challenges
- Integration with industry
- Entrepreneurial
- Policy debate

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EINDHOVEN ENGINE OM KENNIS SNELDER NAAR DE MARKT TE BRENGEN
5. Technology impact
Technology has a huge impact on society and the ways people interact. TU/e has an eye for both the opportunities and the effects of technology. Which trends and challenges will we see in the next 10 years, and how can TU/e shape this part of our mission in our educational and research profile in a way that is entirely our own and that matches our other strategic choices?

Technology impact is familiar ground for TU/e, but it is clear that society is envisioning a much stronger role for universities in generating that impact. Technology is both lauded and mistrusted. The question is: how can we make sure that technology has a positive effect on quality of life, wealth and sustainability? Research financing is increasingly dependent on the impact generated by research in industry and society. TU/e, with our motto ‘dream, dare, do’, is perfectly positioned to make sure these technological opportunities and effects are made real.

Mandate of the study groups
These five questions will be explored by five study groups. They will advise about the choices TU/e can make in setting course for 2030. They will also investigate, for each question, what role three important themes play within their topic. The concrete mandate for the study groups is:
- Investigate the opportunities (through trends and SWOT analysis) within each topic, and create some scenarios
- Advise about the best options and approach
- Substantiate this advice

The three themes each group should keep in mind when exploring their topic:
- **Where people matter**: what do choices in this topic mean for our way of working and the alignment between supporting and scientific staff?
- **Organization and means**: what do choices in this topic mean for the TU/e organization, our departments and services, and the ‘business case’ for the university (income/expenditure)?
- **Partnerships**: how can partnerships (with knowledge institutes, companies, governments and societal organizations) help TU/e on this topic?
V. TU/expedition 2030

In the next year, TU/expedition will take place in several phases. This starting statement marks the start of phase one, which establishes the outline of the strategy - our ‘thinking arena’. This phase will conclude with the first dialog sessions, taking place on 7 June (in English) and 19 June (in Dutch).

In the second phase, the study phase, the five study groups will dive into the five questions for the future. They will each request input from TU/e in their own way, and in November 2017 they will publish their advice regarding the possible choices for TU/e when it comes to the topic they looked at. Everyone is very welcome to offer their input to these groups. How you can do this and who will take part in these groups will be published on our website in mid-June.

Of course, the five questions are very much interlinked. In the time until November, the five groups will meet regularly to discuss common elements.

From November 2017 to February 2018, the insights gained by the groups will be combined into a draft strategy. This draft will be discussed with the departments, scientific staff and supporting staff in several sessions. Of course, TU/e participation bodies will play a large role in this.

In May and June 2018, TU/expedition will come to an end. The final strategy will be presented in September 2018.

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Outline & take-off
Study phase
Integration & support
Decision & presentation

*Input and information*

During the entire process, all members of the TU/e community are very welcome to share their opinions and insight. Of course, this will be done in the various dialog sessions. The study groups, too, will gather input. You can also visit our website to read all information about this process, ask questions and leave comments.

To support the TU/expedition, a supporting project team has been set up, including the following people: Renee Westenbrink (project leader); Rianne van Eerd, Lilian Halsema and Clement Goossens (all from the General Affairs Department); and Femke Beijer (CEC).