CvB stukken voor agenda Universiteitsraad

Overlegvergadering d.d. : 13 december 2017
Commissievergadering : **SI/OOS/FPB**
Agendapunt : Instituutsplannen (IDS, TechMed.Research, MESA)

Bijgevoegde stukken : **Instituutsplannen IDS, TechMed.Research, MESA**

Betrokken dienst: Programma UT2020 paraaf:

Secretaris: ir. R. Mazier paraaf:

Portefeuillehouder: prof. dr. T.T.M. Palstra paraaf:

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1. **Status agendapunt:**
   Rol URaad:
   - o Ter informatie
   - o Ter advisering
   - X Ter instemming
   - o Anders:

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2. **Eerder behandeld in:**
   Naam gremium:
   Datum behandeling:
   Naam agendapunt:
   Conclusie toen:

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3. **Toelichting/samenvatting:**
   Referring to and following the accompanying letter to the reorganization plan UT2020 part 2, Institutes New Style and SBD (CvB UIT 2941), the attached Institute Plans (exl. financial paragraph) are presented to the UC for accordance, to be discussed in the meeting of 13 December 2017. Because it concerns the start of new institutes, even though they partly originate from the repositioning of existing institutes, the Executive Board values the UC's consent to these plans.

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4. **(Voorgenomen) besluit CvB**:
   Gezien
   Gehoord
   Overwegende
   Besluit het CvB

GRIFFIE URaad: (door griffie UR in te vullen)
Eerder in URaad aan de orde geweest?

- o Nee.
- o Ja, op

Conclusie toen:

Nadere toelichting: (Voor als presidium/griffier vindt dat één van bovengenoemde punten nadere toelichting behoeft)

.....

.....

UNIVERSITEIT TWENTE.

Aan de Universiteitsraad

COLLEGE VAN BESTUUR

VAN
Drs. V.J.M. Veenhof
v.j.m.veenhof@utwente.nl

DATUM
8 November 2017

ONS KENMERK
CvB UIT - 2998

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ONDERWERP
Instituutsplannen Instituten-Nieuwe-Stijl

Geachte leden van de UR,

Onder verwijzing naar en in vervolg op het begeleidend schrijven bij de aanbieding van het reorganisatieplan dl2, Instituten-Nieuwe-Stijl en SBD (CvB UIT- 2941) worden bijgaande instituutsplannen (excl. financiële paragraaf) ter instemming voorgelegd aan de UR ter behandeling in de overlegvergadering van 13 december 2017. Omdat het gaat om de start van nieuwe instituten, ook al komen deze deels voort uit de herpositionering van bestaande instituten, hecht het college eraan dat de UR haar instemming verleent aan de plannen.

Namens het College van Bestuur,

Ir. R. Mazier
Secretaris van de Universiteit a.i.

Bijgevoegde stukken:
INS Plannen IDS, MESA, en TechMed.Research

UNIVERSITY OF TWENTE.

EXECUTIVE BOARD

HANDLED BY
Drs. V.J.M. Veenhof
v.j.m.veenhof@utwente.nl

DATE
8 November 2017
OUR REF.
CvB UIT - 2998

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SUBJECT
Institute Plans Institutes New Style

Dear members of the University Council,

Referring to and following the accompanying letter to the reorganization plan UT2020 part 2, Institutes New Style and SBD (CvB UIT 2941), the attached Institute Plans (excluding the financial paragraphs) are presented to the UC for accordance, to be discussed in the meeting of 13 December 2017. Because it concerns the start of new institutes, even though they partly originate from the repositioning of existing institutes, the Executive Board values the UC's consent to these plans.

On behalf of the Executive Board

Ir. R. Mazier
Secretary to University a.i.

Attachments:
INS Plans IDS, MESA, and TechMed.Research

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7500 AE Enschede, The Netherlands
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INSTITUTE ON THE DIGITAL SOCIETY

(working title)

1. Our vision: Digitalization everywhere 2
2. Our mission: Engineering the digitalization of society 2
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1. OUR VISION: DIGITALIZATION EVERYWHERE

The digital society of today is just a first step toward what we can expect in the near future. Today, we are connected, our surroundings are connected. We are more than just consumers of digitalization, we are also suppliers of the data that drives much of the digitalization. We welcome technology that makes autonomous decisions about our lives, yet also fear loss of control.

The current trend in digitalization in which data science, autonomous decision making, and artificial intelligence play essential roles, will continue, often beyond our imagination. As individuals, we will be confronted with a seamless integration with a digital environment consisting of a myriad of devices many of which their existence we are often barely aware of. This environment will sense our behavior and act upon it. As a society, we will be witnessing many decisions by autonomous processes that have largely replaced the human experts of today. Diagnostics, regardless in which domain, will be based on massive amounts of data and advanced analytics, often operated as a black box to corporate management and governmental policy-makers. Robots, be they hard or soft, will have invaded our societies in all its appearances and variations.

In the digital society, simply keeping up with developments may often be close to impossible. Individuals, organizations, industry, goverments and the like will have developed new skills to rapidly adopt new digital technologies, and use new technologies to develop and adopt new skills. At the same time, a much sharper awareness of what we want and deem acceptable will be shaping the technologies we are effectively willing to adopt, in turn steering and crafting the development of those digital technologies in and by everyday life.

2. OUR MISSION: ENGINEERING THE DIGITALIZATION OF SOCIETY

In going digital we also become more vulnerable. Vulnerable to losing privacy, vulnerable to manipulation, vulnerable to losing fundamental rights, and vulnerable to unknown risks. On the other hand, technology may also provide new ways of defining identities, protecting privacy, promoting human rights, conduct technology-based diplomacy or humanitarian aid. It is clear that digitalization is more than just introducing or adopting digital technology. Proper digitalization requires taking actions that shape the process of digitalization itself such that new technologies will indeed lead to improved well-being.

At IDS, we pay specific attention to contributing to a human-centered digital society that is safe, inclusive, and includes responsibility to the natural environment. Our *mission* is to further **digitalize society** by doing scientific research (1) in technology that is essential for digitalization, (2) on methods and techniques for integrating digital technology in our environments, and (3) in how we can come to intelligent, well-informed decision-making. An important aspect of our mission is to conduct research that has an impact on society. Digitalization stretches out from creating, innovating, and developing digital technologies, to adopting and crafting digital technologies to our everyday needs, desires and habits, thus shaping technologies by adding value and imposing what we can and are willing to adopt and use for our desires and the challenges we face.

We take natural, societal and industrial challenges as starting points, and engineer digitalization as an iterative process in close cooperation with all its stakeholders. We call this way of working **open engineering**. The world is one of our two playing fields, notably including low-urbanized and rural regions (including agriculture), but also nature itself. Industry is the other one, in particular where automation in all its facets is shaping the future.

Our *goal* is to bring the University of Twente to a position in which it will act and is widely recognized as the expert research and educational institute on digitalization of, for, and by society.

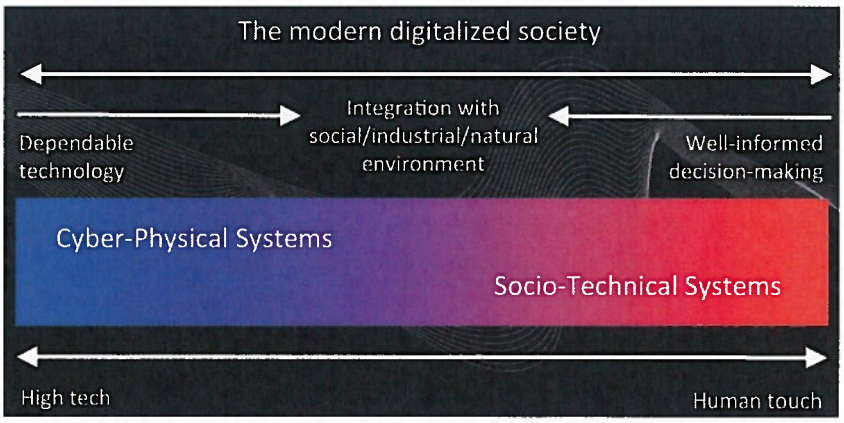
3. THE GRAND CHALLENGES

Engineering digitalization requires that at least the following challenges are tackled, forming the pillars of our research:

1. Considering that digitalization is ultimately used to drive many of the decisions we make as members of the digital society, we need to ensure that our engineering efforts lead to **well-informed decision-making**, measured by generally accepted societal values. This has deep technical implications as well as novel capacity-development challenges.
2. We need to pay increasingly more attention to **integrating digital solutions in specific environments**. For example, for social environments, the results of digitalization should be perceived as being a natural part of our environment and society. Analogously, this holds also when blending digitalization into an industrial environment, or when integrating digitalization into our natural environments.
3. We need to **develop digital technologies**, in particular technologies that one can *effortlessly use* and *justifiably rely upon*. Digitalization should thus lead to *safe, trusted* and *resilient* systems.

An important aspect of our engineering approach is that we continuously **measure** our environments (which includes humans, animals, etc.) in order to effectively digitalize, or to understand the effects of digitalization. Sensing, data analysis, and actuation form essential elements of our approach.

The three challenges are linked to each other as illustrated in the following:



In IDS we ultimately strive to engineer digitalization toward systems that allow for well-informed, even accountable decision-making. Simply put, well-informed means that decisions based on the use of digitalized systems can be explained; we understand where those decisions come from. Well-informedness puts a demand on digitalization itself: the systems we use should be trusted while at the same time should be assistive. Indeed, they should form an integral part of our environment, be it in a social, industrial, or natural setting. Trustworthiness, in turn, puts demands on technology itself. First, the technology should be usable with little to no special efforts by its users. Secondly, the technology should justifiably reliable: it does what it is supposed to do and we can show this to be the case.

Important note: *In these plans, we have deliberately excluded activities related to health technology that naturally form part of the mission and challenges of engineering digitalization. This choice allows us to bundle all health-related activities into a single institute, which we perceive as being important for reasons of consistency. Institutional programs will, however, cross the boundaries of institutes so that the relation between health technology and digitalization society can be assured.*

CHALLENGE #1: DIGITALIZATION FOR WELL-INFORMED DECISION-MAKING

Digitalization takes place at a pace that even experts may find it difficult to keep up. In general, it is becoming increasingly difficult to have complete, or sometimes even sufficient knowledge of the technical ins and outs of digitalization. The gap between a general understanding of digitalization and expert knowledge that is needed to move forward will only further increase. At the same time, we will see many people make decisions based on information that comes from digitalized systems. Those decisions will be based on some form of misplaced trust, or a false understanding why that information makes sense. The result is that the quality of those decisions is at stake. There are at least two issues that need to be addressed.

INCLUSIVENESS

First, in an increasingly digitalized society, we need to pay attention to the fact that digitalization will not lead to a divide between those who do not, and those who do understand how to value the information provided by our digital systems. A challenge lies in ensuring that users understand what a digital system means to them. Efforts may range from developing new models that capture the essence of digitalized systems to developing new skills to handle digital technology to complete new capacity-development methods de-emphasizing knowledge transfer and focusing on learning abilities for yet unknown aspects of digitalization. The target group ranges from ordinary end users to board-room decision-makers.

EXPLAINABILITY

Second, we need to make sure that when using a digitalized system, people indeed make the right decisions often even to the extent that they can be held accountable. Likewise, also the digitalized systems themselves should be held accountable. How can we get to that point? How can we ensure that nonexperts, such as many politicians, managers, governors, administrators, but also normal users, etc. and who make use of digitalized systems are informed well enough? These are tough questions with no easy answers. For example, providing (digitalized) support for well-informed decision making may involve a myriad of modern artificial-intelligence techniques, advanced information-systems solutions, and continuous processing of streams of data, rendering understanding specific output as challenging. Nevertheless, new European law dictates that when an information system produces a result, we should be able to ask that system how it came to its answer. In the case of autonomous systems, and perhaps even more so when complex interactions between humans and intelligent systems have taken place, it is often unclear how such explanations can be given[1].

CHALLENGE #2: DIGITALIZATION INTEGRATED INTO OUR ENVIRONMENTS

Digitalization is not a stand-alone process independent from the context or environment in which it takes place. Digitalization involves the integration into our environments, often even to the extent that we deliberately want to change those enviornments. We distinguish social, industrial, and natural environments.

SOCIAL ENVIRONMENT

A big challenge for the Digital Society of today and tomorrow is to blend the digital technology that we develop, and that is already there, into our lives such that we perceive it as being natural. It is indeed safe to use, our privacy is protected, it feels familiar, we understand what it's for, how to use it, and why it behaves

[1] This phenomenon is best illustrated by so-called neural networks: an often-used gray-box technique in which a system is first **trained** on known input-output relations, after which it is put to use by observing output from new, unknown input data. There are inherently no steps that will explain why specific output was produced.

the way it does. We recognize that a simple technology push is not going to make this blending happen. New digital technology often imposes new interactions between humans and digital systems.

In fact, the mere question of adoption leads to new scientific challenges with respect to what extent technology can be pushed to ensure preserving our rights as members of society, and when, where, and how nontechnological solutions are needed for the blending of digital solutions into our lives. Taking context into account is essential: solutions for one community may not work for another (just think of the penetration of cell phones in less developed countries). In other words, we need to thoroughly understand the technical and social conditions that are needed for integration to take place, and make sure that digital technology meets those conditions.

INDUSTRIAL ENVIRONMENT

When focusing on industrial environments we see similar issues, yet the blending is into the world of mechatronics and we see important roles for the sensors and actuators that make up the Industrial Internet of Things (IIOT). Most importantly is that digitalization is taking place in the form of complete data-driven feedback loops with artificial intelligence at the core of analytics and control. Analogous to modern cars that can increasingly be viewed as autonomous mobile computers, we are now witnessing an industrial revolution in which hardware and software jointly form a huge networked cyber-physical system.

NATURAL ENVIRONMENTS

There is consensus on the fact that we need to better understand our natural environment in order to act properly, whether this concerns climate changes or improve food production. Large monitoring systems are set up, e.g. on the quality of air, water, and soil; on the whereabouts of animals; of the quality of our crops, etc. Monitoring systems range from traditional sensors, to the use of drones, to statellite-based Earth observations. The amounts of data that these monitoring systems generate lead to challenges in data science: what are the correct interpretations, what are the appropriate models for capturing observed phenomena, should be improve on the sensing system itself?

CHALLENGE #3: DIGITALIZATION THAT CAN BE EFFORTLESSLY USED AND JUSTIFIABLY RELIED UPON

Justifiably relied upon not only means that a technology *seems* to be doing what it's supposed to do, but that this is indeed the case. Making it also effortless to use then essentially means you don't have to pay any further attention to it. Sensors will operate for years after their installation, wireless communication is always there when we need it, electronic devices are so small, reliable, and energy-savvy that we think it's normal. But how do we get to this point of effortless use; when do we know for sure that our digital systems will never fail unexpectedly; and how do we know that the information we are getting is correct?

The difficulty of effortless usage and justifiable reliability has at least three facets: taming the effects that the natural environment has on our digital systems, preventing and tolerating faults caused by the inherent errors in man-made systems, and coming to correct interpretations of data. The first facet leads to research with a strong connection to electrical engineering and natural sciences, such as chip design, energy, communication, and various forms of sensing. The second facet brings us research concentrating on making our digital systems robust in the face of the errors we introduce during development and maintenance, but also ensure that they are protected against deliberate attacks: in all circumstances, they need to be safe to use. The third facet leads to reliable data science, ranging from making sure that we understand what the data sources are giving us to developing robust methods for data analysis and interpretation. Taking spatial-temporal features into account repeatedly turns out to be crucial.

4. STRENGTHS UT

RESEARCH GROUPS AT UT

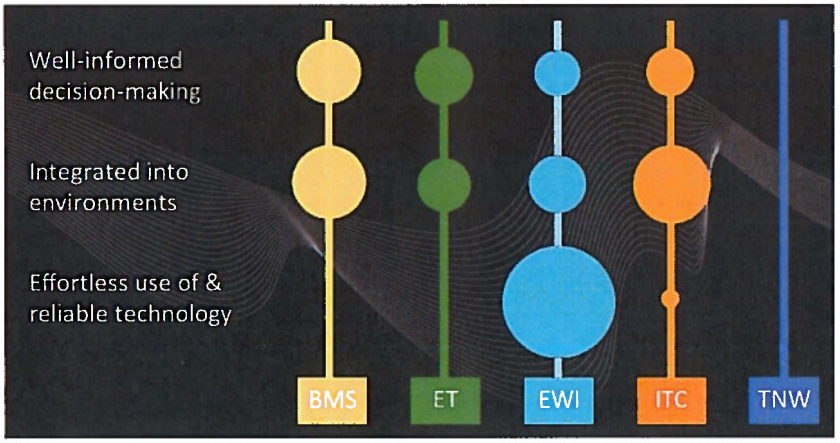
The challenges need to be addressed in various research programs. In the following table, we map the research programs of the faculties to the three challenges of the institute, naming the main topics in a program and their associated Pis when there is a clear contribution to make.

Research theme	Well-informed decision-making	Integrated social, industrial, natural environments	Effortless use of and justifiably reliable digital technology
BMS			
Health (covered by TechMed Research Plan)			
Industry	• Decision support systems (v Hillegersberg, Iacob)	• Cybersecurity & business continuity (Junger)	
Learning	• Neural methods of cognition (vd Velde) • Philosophy of Science in Practice (Boon) • Data analytics (Veldkamp, Fox)	• Motor-skill learning (Verwey) • Ethics & technology (Verbeek, Brey)	
Resilience	• Agent based modelling (Filatova) • Acces to information in the digital age (Van Deursen) • Teamwork, risky decisions (Schraagen) • Digital means for conflict management; Risk and crisis communication (Giebels/Stel)	• Effects of ICT on organizations and society (M. de Jong, v Dijk) • Effective learning (T. de Jong) • Technology, law, governance (Heldeweg) • Movement patterns and governance systems (Pelizza)	
ET			
Biorobotics (covered by TechMed Research Plan)			
Maintenance of capital-intensive infrastructure	• Building Information Modelling and subsurface infrastructures (Adriaanse, Doree) • Predictive maintenance (Tinga)		
Personalized smart solutions	• Smart transport systems (v Berkum, Geurs)	• Human-centered & interaction design (vd Voort)	
Smart factories for personalized products		• Smart industry (vd Boogaard) • Additive manufacturing (Vaneker)	
Materials and recycling	*Computational science efforts (Luding, Thornton) are covered by MESA+*	• Remote sensing coastal waters (Wijnberg)	

EEMCS / EWI			
Dependable networked systems		• Smart industry (Haverkort) • Privacy engineering (Peter)	• Sensing systems & IoT (Havinga, Meratnia, v Steen) • (Secure) networks (Pras, Heijenk) • Formal methods (vd Pol, Huisman, Stoelinga, Rensink, Fehnker) • Performance modeling & evaluation (Haverkort)
Data science	• Data science foundations (Litvak, Veldhuis, vacancy)		• Data systems (v Keulen, Hiemstra)
Human-centered computing		• Human-media interaction (Heylen) • Social Robotics (Evers)	
Operations research		• Smart Grids (Hurink) • *Health logistics (Boucherie) See TechMed Research Plan*	• Optimizations (Uetz, Zwart) • Programmable nanosystems (Broersma)
Computational Science (Covered by MESA+ and TechMed research)			
Electronic Systems			• IC design (Nauta, Annema, Klumperink)
Elec. Sys. Appl. (Wireless, Health, Robotics)			• Robotics (Stramigioli, Broenink) • Radio systems (Alayón Glazunov)
ITC			
Acquisition and quality of geo-spatial information	• Spatial Statistics and Image Analysis (Stein) • Geo-information Extraction with Sensor Systems (Vosselman) • Geodata Science (Kraak)	• Water availability and crop damage from disasters (Jetten; Su)	• Drone development (Vosselman)
Forest agriculture and environment in the spatial sciences	• Spatial environment resource dynamics (Skidmore)	• Food security and environment (Nelson)	
People, land and urban systems		• Geo-information management & infrastructuring (Zevenbergen, Pfeffer) • Sustainable Cities and Communities (v Maarseveen) • Geo-information for Governance (Georgiadou)	
Spatio-temporal analytics, maps, and processing	• Geovisual analytics (Kraak) • Geo health (Stein)	• Spatio-temporal systems modelling (Stein, Jetten)	

4D Earth	• Geohazards analysis and disaster risk reduction (Jetten)	• Geo thermal and clean energy (vd Meer)	
Water cycle and climate	Floods and droughts forecasting (Su, Jetten, vd Steenhoven)	• Retrieval of surface parameters (Su) • Climate change and disaster) (vd Steenhoven, Su) • Water security and environment (Su)	
S&T / TNW			
There is a link between S&T/TNW and Computational Science efforts, which are classified as MESA+ activities			

The contributions per faculty are summarized as follows:



STRATEGIC PARTNERSHIPS

Institutes do not operate as complete stand-alone entities but instead co-operate with a number of strategically important partners: industrial partners, specific organizations, governmental bodies, other universities and research institutes, etc. Partners can be regional, national, international. A partnership is aimed toward joint talent and program development and is based on long-term trusted relationships.

The Institute aims at increasing societal impact. This means that much of its research will be aimed toward projects and experiments that involve third parties, including businesses, government, and societal organizations. In a number of cases, we will need to operate as member of a legal entity that is allowed to submit funding proposals. To this end, the Institute will play an active role with respect to Novel-T.

ENSCHEDE

An important strategic regional partner for the Institute is the Municipality of Enschede, notably in the collaboration with Saxion and ROC Twente. There are two major, and related subjects for which this partnership is important.

First, in the context of Internet-of-Things, and more specifically Smart Cities, Enschede operates as the "problem owner." With three different and distinctive locations (Techbase, UT Campus, Enschede City), the partnership is in an excellent position to act as a living lab for a variety of Smart City topics related to sensing, analyzing, and acting in the physical domain. Participation in Space53 (with a focus on drones) and Twente47 (with a focus on Internet-of-Things) fit into these efforts.

Second, Enschede has proven to be able to take the lead in innovative projects in the social domain in which they run data-driven experiments to improve self-sustainability of their citizens. In these experiments we see a mixture of typical social-related problems, novel applications of data science, and issues profoundly related to privacy, all relating to the key challenges of the Institute.

THALES

Thales Netherlands has always been a long-standing partner for many groups at the UT. For the Institute, we wish to continue the formal partnership with Thales through a follow-up to the T-Xchange lab, which officially ends in 2017. There are at least two subjects that lend themselves well for strategic collaboration:

- Security and privacy, including cybersecurity
- Smart industry, more specifically predictive maintenance

The exact form of the strategic partnership is currently being explored, and a plan of action will become available in 2018. Note that collaboration with Thales extends beyond the activities in Hengelo.

OTHER PARTNERS

Enschede and Thales are two obvious strategic partners. The Institute aims at establishing other partnerships as well, including with academic institutes as well as with (inter)nationally operating businesses. To this end, relationships through EIT Digital as well as those through other strategic EU bodies in which we participate will be explored.

5. EXTERNAL ACTIVITITIES

GENERAL DESCRIPTION

FUND RAISING

We take the standpoint that institutions have a primary role in **fund raising on behalf of research programs**. In contrast, acquisition activities of research programs, be they within or across faculties, are aimed toward **developing an effective portfolio of externally funded project proposals**. Faculties have a primary role in **supporting** acquired **projects**, be they cross-disciplinary or not. For this reason, many activities supported by an institute are aimed at directly raising funds, shaping external granting programs, and support for project acquisition.

For the successful positioning of the (scientific topics of the) research groups, it is crucial to participate actively in the discussions, formulation and shaping of (inter)national research & innovation agendas relevant to the UT. Our strategy is to determine, together with relevant partners, the Dutch research agenda and to influence the European research & innovation agendas, to provide the best access to research funding for the UT researchers. When the research & innovation programs are defined and the calls are open, the individual researchers are challenged to apply their project proposals.

Institutes: Fund-raising and agenda-setting activities
Research programs: Portfolio of project proposals
Faculties: Project support

Institutes and faculties operate in close collaboration with each other. From a research programmatic perspective, an institute can be characterized by a set of cross-disciplinary programs, whereas a faculty can be characterized as a set of (inter)disciplinary programs.

Many fund-raising activities will be linked with approved institutional programs, yet we also need to reserve capacity for setting up or investigating new programs, as well as general project acquisition to help sustain current and new programs. We distinguish the following general activities.

- *Setting up and maintaining strategic partnerships, aimed at developing joint activities toward project proposals at national and EU level.*

  This work is typically done by the Scientific Director on behalf of all participants in an Institute, and when necessary in collaboration with specific experts.

- *Having a network of research fellows and program advisors aimed at long-term and short-term project acquisition.*

  An important activity is to have senior scientific experts (from the various faculties) participate at the strategic level in national and international initiatives. To this end, IDS will have a group of some 5-8 **research fellows**. A fellow operates on behalf of the institute and takes part in shaping its strategy. An important criterion is that a research fellow operates in national or international agenda-setting bodies or committees. Being a research fellow is an honary position for which no additional funding is granted.

  Research fellows are supported by a team of **program advisors** whose primary aim is to spot opportunities at various funding agencies, assist in writing research proposals, and accompanying research fellows where necessary (we expect to appoint program advisors from the current pool of staff members). Program advisors are linked to the institutional programs coordinated by the institute.

- *Representing the institute and UT at national and international levels by participating in various (advisory) committees.*

  Again, this is typically done by the Scientific Director, but also research fellows.

PROGRAM DEVELOPMENT

We anticipate that overall, there will be some 8-12 institutional programs in which cross-disciplinary research is carried out. These programs have a clear external focus and are meant to boost knowledge and expertise in a focused area of research during a timespan of 3-5 years. A program is headed by a **program director**, recruited from the senior scientific staff of the UT, and assisted by a **program manager** (also recruited from existing staff). An institute coordinates a handful of such programs. The type of activities we foresee are the following:

- *Actively identifying relevant calls for proposals and organizing preparations for project proposals.*

  This work is mainly done by a program director, but requires close collaboration with other senior scientists and program advisors.

- *Identifying and initiating new institutional programs.*

  At the moment, the first institutional programs have been initiated from within the university. This should not be the norm. Instead, there should be a strong sense that a program is and can be supported by external strategic partners. An important activity is to initiate new programs together with external parties. A scientific director will play an important role, together with SBD in the case of involvement of industry.

PLAN EXTERNAL ACTIVITIES 2018

- *Set up network of research fellows and program advisors (category: executive power).*

  As mentioned, we propose to appoint **research fellows**, a stature which is attractive for its exclusiveness. Research fellows need to be supported by a team of **program advisors**. We aim to recruit a total of 4 program advisors, one from each of the primary participating faculties (BMS, EEMCS, ET, ITC), and each for 0,5 FTE.

  In addition, research fellows and program advisors, together with members of SBD, jointly form a team that also assists in making the institutional programs coordinated by IDS a success.

- *Develop/initiate new institutional programs (category: executive power).*

  During 2018, we aim at setting up at least two new institutional programs, bearing in mind that the guidelines and procedures for coming to such programs still needs to be detailed. The two programs we will set up (with tentative titles):

  - *Smart Industry*. There are currently many activities and initiatives in BMS, EEMCS, and ET related to a wide range of smart-industry aspects. In addition, there is considerable industrial interest in this area. In 2017, CTIT is investigating possibilities for joint activities including external partners, of which the results will be taken as a starting point for further program development in 2018. A plan of work will be developed and, if approved, executed in 2018.
  - *Data Science*. There are many data-science activities across all faculties, ranging from data gathering and interpretation (EEMCS, ITC, S&T), to data analytics (BMS, EEMCS, ET, ITC) to data visualization (ITC, S&T). In contrast to many other Dutch universities, our university does not have the equivalent of a data-science center. This gives us a unique opportunity to clearly delineate our own position, which seems to roughly concentrate on data sensing and interpretation, but is also strongly oriented toward spatio-temporal systems and having a strong domain-specific imaging and visualization component[2]. In 2018, we will further investigate this position, aimed at setting up a data-science program to start in mid-2018 or 2019.

- *Operationalize programs set up in 2017 (category: impulse scientific staff).*

  In 2017, four institutional programs have been initiated:

  - Robotics (coordinated by CTIT)
  - Personalized eHealth (coordinated by MIRA)
  - Sensing Science and Technology (coordinated by MESA+)
  - Smart Materials (coordinated by MESA+)

  Each of these programs needs to be operationalized in 2018, for which purpose we propose to reserve the following funds. For each program coordinated by CTIT, we reserve 1 FTE for a postdoctoral researcher (PD). For each other program, we reserve 0,5 FTE for a PD, assuming that this scheme is also maintained by the other new institutes. In this way, each of the four programs will get support for 2 FTE PDs.

- *Further integration of Living Lab environment (category: matching large-scale infrastructure)*

  One of the unique selling points of MESA+ is their physical, impressive labs. Along these lines, one can expect that the renewed TechMed building will form a big attractor for activities around health

[2] This is a very rough characterization that does not do just to many related activities in this field.

technology. The digital society is by definition less visible. Nevertheless, there are already many smaller and larger labs that illustrate our activities in this field. Likewise, the UT campus as a whole is intended to operate as a huge living lab. What is needed are coordinated activities toward establishing a *physical, literally visible digital-society infrastructure*. In 2018, we plan to enhance the visibility, openness, and connectivity of existing labs that are related to IDS. We propose to do so through open calls that are subject to strict requirements (notably addressing the visibility and connectivity of existing labs, as well as expressing a longer term vision beyond 2018).

Special attention is required for our activities in the field of Internet-of-Things, which are partly organized by means of the IoT accelerator Twente47[3]. We plan to establish the region as a strong IoT hub for which specific activities will be carried out, much along the line of fund raising.

Part of these activities further consist of setting up new labs, or extending existing ones. In particular, when looking at the institutional Robotics research program, we believe it to be crucial to provide enhanced lab facilities, in combination with our support for research and business development in the context of Space53.

Space53 is a collaboration between the municipality of Enschede, Saxion, ROC Twente, UT, and several companies. The strategic position of Space53 as encapsulating *all* drone activities in Twente is crucial, and if done well by all its partners will boost research and development of drones, alongside the development of business activities. A proposal is currently being formulated to guarantee enough seed money for activities that will strengthen this position. For the UT, this will amount to an annual contribution of 50 kEuro. Our participation in Space53 aligns with developing the UT campus as a Living Lab (in particular for allowing drone activities).

Summarizing, we propose the following activities for 2018.

Activity	Description
Setting up network of research fellows and program advisors	Appoint 2 FTE from existing (faculty) staff as program advisors (scale: 10-11)
Support for EU project acquisition	Appoint 1 FTE from existing SDB staff as program advisor (scale: 10-11)
Support for promotional activities	Appoint 1 FTE from existing M&C staff for all IDS-related activities (including those in the faculties). Appoint 0,2 FTE from existing M&C staff for maintaining various IDS-related portals and sites.
Develop/initiate new institutional programs	Plan activities by (potentially) external members for a total of 0,4 FTE (scale 10-12)
Operationalize 2017 programs	Recruit 2,5 FTE postdoctoral researchers (scale: 10)
Further integration of Living Lab environment	Open call for proposals, participation in Space53, fund-raising activities.

6. INTERNAL ACTIVITIES

COMMUNITY DEVELOPMENT

An important goal of the institute is to create *internal* and *external* visibility on the various research efforts related to the digital society. This means that we should empower affiliated researchers so that they can use the institute as a platform to show their work and attract attention. At the same time, it is important that we

[3] See www.twente47.online

facilitate researchers in joint efforts to learn about each others work and to initiate and stimulate collaborations (big and small). Typical internal activities include:

- *Facilitate internal platform meetings that aim toward a common goal.*

  An example are current efforts to bring together researchers in Internet-of-Things, and to come to a joint repository of sensor data. This activity takes place across several faculties and is done in collaboration with LISA. Likewise, there is a security & privacy community with members from BMS, EWI and ITC.

- *Provide support for organizing workshops, symposia, and other meetings*

  Meetings can be internal, but also aimed at attracting external attention.

7. GOVERNANCE AND ORGANIZATION

We aim at a *lean-and-mean* governance of the institute, and is based on the following observations and assumptions.

- **Assumption**: Faculty portfolio holders research mainly concentrate on *internal research* and *talent development in a faculty*. A dean is expected to handle relations concerning *external research*.
- **Observation**: An institute has an associated **Business Director**, who is directly linked to Strategic Business Development (SBD). The Business Director reports to the Scientific Director.
- **Observation**: The Scientific Director is member of the UC-OZ committee in which all scientific directors, faculty portfolio holders research, and UT rector participate.
- **Assumption**: There is a team of research fellows and program advisors associated with the institute.
- **Assumption**: Each institutional program has a **program director** and a **program manager**.
- **Assumption**: SBD organizes its own meetings to discuss strategic affairs, in which the Scientific Director and Business Director participate.
- **Assumption**: Management of an institute regularly consults supporting services like M&C and LISA as appropriate.

Given these observations and assumptions, we propose the following governance.

It is important to note that we do not aim at extending the current workforce, but instead want to concentrate and distribute existing efforts such that we become much more effective in acquiring funds and projects. A positive side-effect should be that more time is freed up for actual research and education.

- The institute has a **management team** consisting of:
  - Scientific Director (chair)
  - Business Director

  The management team handles all day-to-day business for running the institute, and is supported by 1 FTE (senior) secretary. The management team meets on a weekly basis.

- The institute has a **strategic council** consisting of:
  - Scientific Director (chair)
  - Business Director
  - All associated research fellows (max 5-8)
  - All program directors of associated institutional programs (max 2-3)

  The strategic council is responsible for laying down the strategic plans for the institute given its mission and goals, and based on information exchanged between its members (note that each research fellow is

assumed to be member of an external agenda-setting body or committee). The council initially meets on a monthly basis, but this may change as needed. The business director is assumed to be the linking pin to SBD.

- The institute has a **program council** consisting of:
  - Business director (chair)
  - All associated program advisors (max 4)
  - Program managers of associated institutional programs (max 2-3)

  The program council is responsible for ensuring that associated programs run smoothly when it comes to, for example, acquiring external funds.

- The institute has an (informal) **institute council** consisting of:
  - Scientific Director (chair)
  - Business Director
  - Max 2 members from each **faculty** (max 10)

  The purpose of the institute council is to assure linkage to the faculties parallel to the assurance through research fellows and participants in associated institutional programs. The institutional council meets 2-3 times per year.

- The institute has an **external societal advisory board**, as well as an **external scientific advisory board**.

8. EVALUATION CRITERIA

The success of an institute is measured along the following criteria, of which we realize that it often overlaps with performance indicators of associated institutional programs and faculties.

A. The joint societal impact of its PIs, expressed in terms of acquired funding from NWO, EU and other sources, excluding personal grants.
B. The joint scientific impact of its PIs, expressed in terms of a system based on citations and publications in selected key journals and conferences, as well as acquired personal grants.
C. The economic impact, expressed in terms of business development.

Indicator A is relatively easy to quantify. For B, a system will be set up in which *progress* in impact based on citations can be measured relative to a benchmark measurement at the end of 2017. A proposal will be made for the set of key journals and conferences that are used for performance measurement. Measuring personal grants (in terms of type and size) is already done. Indicator C will need to be quantified as well, but this is done after consultation with SBD.

MESA+ Institute of Nanotechnology

(November 2017 - v 1.3)

Meeting Future Challenges

Strategic plan 2018-2022

Management summary

Developments in the Key Enabling Technologies lead to disruptive innovations in the domains of most Societal Challenges. In order to successfully achieve these innovations, technological developments must be driven further, and are often based on excellent (fundamental) research; the MESA+ Institute on Nanotechnology is a world-leading institute that focuses on exactly these challenging developments.

The *mission* of MESA+ is to bridge disciplines in order to realize nanotechnology driven solutions for societal challenges.

MESA+ combines research from different faculties and external partners around the Key Enabling Technologies, its present inter-faculty research is organized along the lines of:

- Sensing Science & Technology
- Unconventional Electronics / Green ICT
- Energy Storage and Conversion;

each aiming at applications in several Societal Challenges.

The institute will further develop and extend its excellent research infrastructure and large existing national and international networks. The primary role of the institute is to determine and execute strategy thereby maintaining focus on the scientific, business and societal goals as they relate to the Societal Challenges.
As part of this strategy, the institute will instigate and coordinate research and funding initiatives, public private partnerships and project acquisition.

The Scientific Director and core PIs will represent the University of Twente in setting the research agenda, promoting the institute, creating and maintaining partnerships, and seeking positions of influence. These activities will be complemented by efforts of principle investigators with specific expertise to represent the UT, supported by the support staff of the institute and EU-Office and SBD advisors.

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1 Introduction

The world and society around us change more rapidly than ever. Grand Societal Challenges and developments put an increasing demand on research & innovation to come up with innovative solutions. In this period of increasing impact of key enabling technologies, often leading to disruptive innovations and to face a challenging future, the University of Twente developed the UT2020 programme. By increasing the organization's flexibility and by strengthening the external focus, an impact on society at large is expected. A first step has been made by basing all scientific staff in the 5 faculties and setting up institutes to increase societal and scientific impact by initiating and running interfaculty collaboration and programmes. The MESA+ Institute for Nanotechnology, a leading centre of expertise, delivering high-quality, competitive and frequently ground-breaking research and technology solutions, is such a research institute.

2 Background

The MESA+ Institute on Nanotechnology was founded as MESA in the early 90's as the first interfaculty institute of the UT, with a focus on sensors, actuators and microsystems. Responding to government strategy at the time, to expand the breadth of fundamental research, MESA was supplemented by electronics, optics and materials. This became MESA+ in 1999, an institute that has proven to be very successful over the last 20 years, exceling in science and funding.

MESA+ is internationally highly respected and recognized, which is marked by its outstanding scientific infrastructure, its stewardship over two national research programmes NanoNed and NanoNextNL and the fact that a significant number of European Research Council (ERC) grants have been awarded to its scientists.

2.1 Prizes / Awards

2015		2016		2017 (Jan-Sep)	
Alvaro Marin	ERC Starting Grant	Wiebe de Vos	ERC Starting Grant	Han Gardeniers	ERC Advanced Grant
Sonia Garcia Blanco	ERC Consolidator Grant	Rob Lammertink	VICI	Detlef Lohse	ERC Advanced Grant (2nd)
Albert van den Berg	ERC Advanced Grant	Richard Stevens	VIDI	Detlef Lohse	APS Fluid Dynamics Prize
Allard Mosk	VICI	Wiebe de Vos	VIDI	Alexander Brinkman	VICI
Floris Zwanenburg	VIDI			Chuan Li	VENI
				Lyuba Amitonova	VENI
				Nathalie Katsonis	KNCV Goldmedal
				David Reinhoudt	Gutsche Award

2.2 Characteristics

MESA+ is one of the world's leading research institutes on nanostructures, nanomaterials, nano-systems, and nanodevices; delivering high-quality, competitive and ground-breaking research and technologies. This is enabled by embracing a multi-disciplinary approach: combining physics, electrical engineering, chemistry, mathematics, materials science and engineering, and engaging social sciences and humanities. The institute counts over 80 principle investigators all focussed on furthering the science on nanotechnology in order to help meet the societal and industrial challenges of tomorrow. Solutions to these challenges are typically developed from Technology Readiness Level (TRL[1]) *1* through to level *5*.

2.2.1 Key tasks

- Initiate and strengthen Strategic Partnerships (industry, small and medium-sized enterprises
- and academia) and multidisciplinary PPP.
- Stimulate Entrepreneurship.
- Provide open access, research & innovation infrastructure such as NanoLab, specialized group labs, High Tech Factory and High Tech Fund.

2.2.2 Facts & Figures

- Annual turnover of € 50 million- 60% from external sources.
- The Nanolab comprises 1250 m^2 of cleanroom space and state of the art research equipment.
- 55 high-tech spin-offs to date.
- MESA+ is a research school, designated by the Royal Dutch Academy of Science.
- PhDs are a member of the MESA+ School for Nanotechnology, part of the Twente Graduate School.
- Cleanroom facilities are open to Master students from different educational programmes including those from the Saxion University of Applied Sciences.

2.2.3 Key Strategic Partnerships & Programmes

- Saxion University of Applied Sciences
- NanoNextNL
- NanoLabNL
- HDMT organ-on-chip
- Max Planck Centre
- Fraunhofer [collaboration ET, production of MEMS devices]
- Photon Delta/DOC [includes EU digital hub]
- Fieldlab Microfluidic systems and devices [i.e. Micronit, Bronkhorst]
- TS Chemie [ARC 'Evidence based Sensing', ARC 'Soft Advanced Materials']
- 'Made in Holland' Materials programme

[1] https://en.wikipedia.org/wiki/Technology_readiness_level

3 Strengths

MESA+ is an international and national strong brand (excellence, infrastructure). The field of nanotechnology in The Netherlands and outside is predominantly organized in Institutes. Mesa+ is internationally recognized and can be benchmarked[2] against: Zernike, QuTech, AMOLF and CNSI at UCLA.

	Research area	Research groups	Core PI's:	Spin offs	Programme's/ collaborations:
1	**Advanced Materials Science & Technology**	Nano electronics; Nano devices; Functional Thin Films; MEMs & NEMs technology; Computational Materials Science.	Rijnders; Hilgenkamp; Van der Wiel; Zandvliet; Brinkman; Kelly;	Soulmates, TSST, Eurekite, ...	Fraunhofer; Quantum Nanoroute; 'Made-in-Holland' .....
2	**Bio-(inspired), Organic and Soft Materials**	BioNanotechnology; Self-Assembly; BioMolecular Science; Polymer Science; (Non)Covalent Synthesis.	Katsonis; Huskens; Cornelissen; Vancso; De Vos; Jonkheijm; Lemay; Claessens	LipoCoat, ...	MCEC Research Center; NWA Origins of Life, ...
3	**Applied NanoPhotonics**	Photonics; Optical Devices; Laser Physics.	Vos; Boller; Pinkse; Garcia Blanco;	LioniX; SATRAX; PhoeniX Software; XiO Photonicx;	Photon Delta & DOC; HTSM roadmap Photonics;
4	**Micro systems and lab-on-chip**	Micro nanoreactors; Lab-on-a-chip; Micro- & Nanoreactors; Membranes; Organ-on-a-chip.	Gardeniers; Van den Berg; Odijk; Wiegerink; Segerink;	Micronit; U-needle; Medspray; Convertance; NX filtration;	MCEC; Zwaartekracht programma;
5	**Fluidics**	Physics of Fluids; Nanofluidics	Lohse; Versluis; Snoeijer;	BuBclean; Tide Microfluidics;	MCEC; Zwaartekracht programmema; Max Planck Center
6	**Responsible research, innovation, nanotechnology**	Philosophy of Technology; Social science, Science communication And Innovation management	Kuhlmann; Konrad; Verbeek; Boon; Dijkstra;		Risk and technology assessment NanonextNL

[2] The WYSS (Harvard) model is attractive for its governance, but does not compare as a benchmark due to the differences in financial incentive.

4 Societal Challenges

Mesa+ endeavours to meet the societal challenges as prescribed the European Union and shared by the United Nations.

Nanotechnology, being one of the important key enabling technologies, provides the basis for research and innovation in a wide range of industries such as automotive, food, chemicals, electronics, energy, pharmaceuticals, construction, and telecommunications. Nanotechnology is used in emerging and traditional sectors, and is an important technology in addressing societal challenges, amongst others:

- Health, Demographic Change and Wellbeing.
- Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bio-economy.
- Secure, Clean and Efficient Energy.
- Smart, Green & Integrated Transport.
- Climate Action, Environment, Resource Efficiency and Raw Materials.
- Secure Societies- Protecting freedom and security (Europe and its citizens).
- Industry, Innovation & Infrastructure.
- Decent work and economic growth.

See also 6.2 - contribution of Key Enabling Technologies connected to Social Challenges.

5 Trends in public funding

In the past years, it has become significantly more difficult to obtain funding for primarily research-oriented projects. Since Horizon 2020, we have experienced a growing trend on embedment of scientific research in projects that cover a chain of technology-ready levels[3]. This trend can be expected to continue; the future EU framework programme after Horizon 2020 will be targeted at achieving the highest societal impact. The national funding opportunities are not dissimilar in focus. This implies that a wide range of stakeholders, including citizens and industry, are most likely to have to join efforts and collaborate. Another observable trend in EU funding is an increase in focus on the potential for disruptive technology and innovation. On a national level funding opportunities specifically for spin-off companies and large scale infrastructure are becoming more loan based than subsidy based.

On the national level funding landscape is also changing, resources by the national funding agency NWO have decreased over the last years. In particular the disappearance of the FEZ funding has great consequences, while the impact from the financial impulse for research proposed by Rutte III, remains to be seen. Moreover, NWO has changed and it is of utmost importance that the UT is well represented in the NWO governance; MESA+ can and will take a role in positioning its researchers there in order to initiate new programs and emphasize the importance of multi-disciplinary research.
This multi-disciplinary approach by MESA+ is also reflected in its contributions to the different Dutch top sectors. In particular in "Chemie", "HTSM" and "Energy" the institute has been represented in the last 2 years and the aim is to further strengthen this, in particular as there is a strong case for trans-sector programs (as for example the Building Blocks of Life program).

Aligning with these trends and expected changes will be crucial for successful EU funding acquisition. Connecting with - and being proactive within - relevant lobby and stakeholder groups provide a means to keeping abreast of relevant developments and actually be influential. Groups include European Innovation Partnerships (EIP), European Technology Platforms (ETP), and Joint Programming Initiatives (JPI).

[3] https://en.wikipedia.org/wiki/Technology_readiness_level

Finally, the INS will continue to support and shape the 'National Science Agenda'. At present MESA+ participates in 2 routes that received pre-funding (Quantum/Nano & Origins of Life) and has a prominent role in the route Materials: Made in Holland.

Keeping the excellent scientific level of the PI's in the Institute, a joint effort with the faculties, is key in maintaining (or increasing) the representation of the UT in the above (and other) funding bodies!

Please see Appendix for more information.

6 UT 2020 - "Towards a Challenging Future"

6.1 Mission

MESA+ bridges disciplines to realize nanotechnology driven solutions for societal challenges.

6.2 Vision "In Search of Greater Impact"

The convergence of Key Enabling Technologies (KETs) like nanotechnology, micro- and nano-electronics, advanced materials and photonics will be the driving technological forces that will genuinely impact society and industry in the upcoming years until 2050. The knowledge that is generated by the global nanotechnology-community leads to unprecedented innovations in the domains of all Societal Challenges. Innovations in diagnostics and treatments disrupt established healthcare-chains with developments in lab-on-a-chip applications and drug delivery. Food production and preservation will be improved with applications of nanotechnology that allow for faster analysis and detection. Nano electronics will change the way we build day-to-day devices such as cars and phones, setting the scene for the digitization of society and significant energy reductions.

The innovations resulting from the KETs are likely to be disruptive. Production systems cannot simply be upgraded, but need to be redesigned from scratch. New business models will be needed for products that disrupt current economic chains. Legislation for customer- and environmental safety must be adapted to accommodate the unique characteristics of materials at the Nano scale. And all this must be done considering the (ethical) considerations of citizens and politicians.

Excellent infrastructure is key to research, education and collaboration with industry (large companies as well as SMEs, incl. MESA+ spin-off). Smart investments in facilities will reinforce the knowledge and technology transfer strategy by consolidating the ability to work towards proof-of-concept, demonstration or supporting pilot line activities. The competitive open-access facilities are part of the regional eco-system and require long-term commitment.

Focusing on excellence in research will consolidate the position of MESA+ as preferred partner in research and innovation projects and programmes. It will also improve the capacity for further obtaining grants and prestigious prizes. New research areas will be explored that create novel opportunities. Moreover, excellent research attracts outstanding students and staff, who are continuously supported in the broad spectrum of career development.

7 "On the Path to Greater Impact"

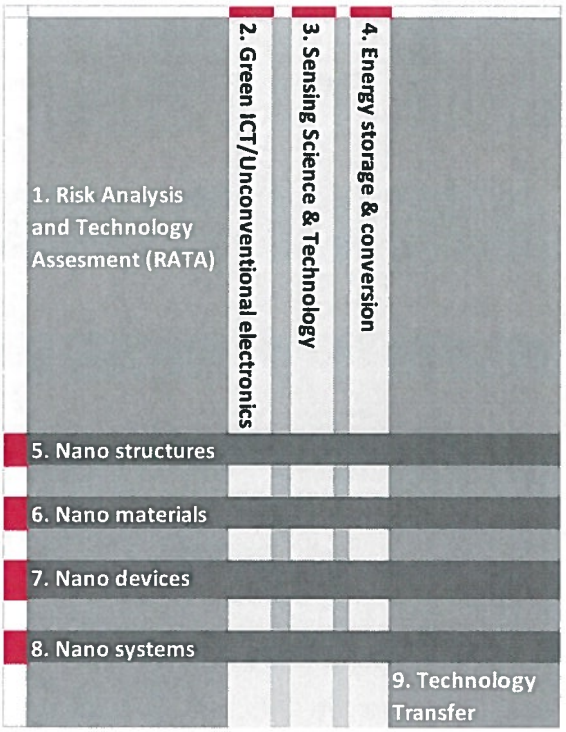
7.1 Themes and Programmes

In line with the later formulated UT2020 strategy, MESA+ started to transform the Institute towards the future in 2016.

During this process of re-orientation, an analysis on strengths | weaknesses | opportunities| threats, in relation to the scientific and societal challenges- was conducted. In turn, this lead to a translational effort into technology application domains with a focus on building collaborations. The end result was 3 main MESA+ programmes or themes incubated from the bottom up:

2. Green ICT/Unconventional Electronics
3. Sensing Science & Technology
4. Energy Storage and Conversion

These themes address and impact the societal challenges in varying magnitudes. Pioneering a key enabling technology, Mesa+ makes direct fundamental and potentially disruptive contributions to end solutions, and as such indirectly impacts the societal challenges in a meaningful way.



Mesa+ programme matrix

On the back-end, Mesa+ identifies areas of expertise that intersect with these themes:

5. Nano structures
6. Nano materials
7. Nano devices
8. Nano systems

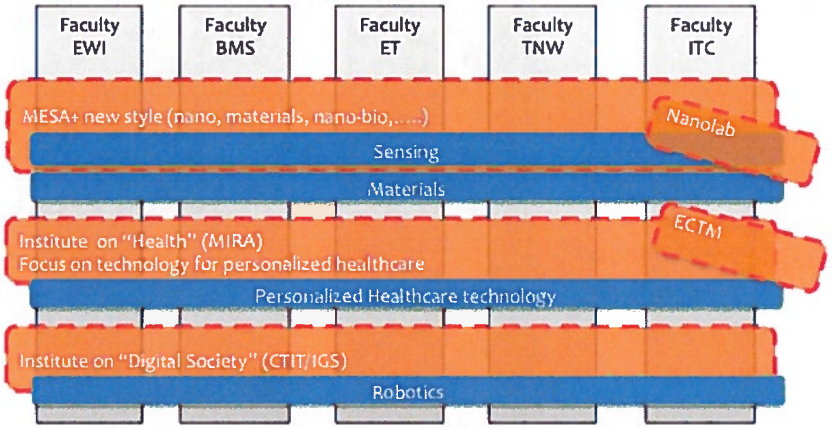
Programme design is performed at the intersections of the matrix.

Flanking and embedded in the main programmes are:

1. Risk Analysis and Technology Assessment (RATA)
9. Technology Transfer

7.2 Defining role in UT Programmes

The following figure highlights 2 UT-wide-programs, *Sensing* and *Materials*, that are chaired by Mesa+ and carry University wide support. In terms of content, these programmes align with the Institute's own programmes.



Please see Appendix for more detail regarding the Programmes.

7.3 Internal Activities

7.3.1 Programme Office

Although support structures are in place by means of the EU office and SBD, an integral part of realising greater impact for the UT|MESA+ is to have an institute programme support office. This office would be involved with activities such as:

- Projects;
- Outreach | Communication;
- IP Policy;
- Funding support;
- Administrative support;
- ...

Roles to be considered are:

- Management Assistant;
- Project management;
- Communication;
- IP Policy Officer;
- Business Intelligence Officer;
- Interconnecting (Funding) Officer;
- Business Developer and Lobbyist.

These persons would ideally liaise with the corporate support offices for more effective policy execution.

Adjacent to Mesa+ core activities, it is envisioned that the programme office could also provide support for initiatives such as NanoNextNL *Next Steps*.

7.3.2 NanoLab

Mesa+ is renowned for its infrastructure. The NanoLab is state-of-the-art, and should remain so. This requires a reliance on continuous funding and expertise to keep the NanoLab operating at the highest standards. One of the immediate tasks is to draft a multi-year strategic plan to future-proof the NanoLab. One of the challenges is to improve utilization of capacity with industry but not at the expense of research and education.

7.3.3 Community building & Talent Development

Although still a tight knit community, there is a call to action to invigorate the Mesa+ community and further strengthen the ties to achieve greater coherence and foster cooperation. Activities over the next year will focus on organising:

- colloquia, workshops, MESA+ annual meeting;
- Tenure Track lunches;
- 'Funding, Awards and 'Prizes' lunches.

Talent is a core resource for UT | Mesa+ and as such must be nourished and cherished. Activities will focus on set a plan in motion encompassing:

- personal grants for excellence;
- personal development and CV building;
- talent recognition- active scouting and nomination of talent at the institute level;
- talent reward strategy through: nominations, memberships, prizes, awards.

Initiatives and activities will preferably be developed together with Faculties and institutes. MESA+ specific (or pilot) initiatives that have proven to be successful will be shared with Faculties and Institutes.

7.3.4 Intra-UT cooperation

In order to optimise the use of resources and fully align goals and efforts of Mesa+ and UT as a whole, active cooperation with other departments within UT will be initiated. Over the course 6 months, processes and workflows will be put into place that actively engage the EU office, SBD and NovelT.

This effort is geared towards improving the grant hit rate in order to secure more funding. Another goal is to improve the Business Development efforts yielding increased activity in contract research, spin-off | scale-up companies and licencing agreements

Improving public funding performance is also one of the main goals. This requires adequate support structures and interdepartmental workflows to effectively exploit funding opportunities. Also, greater incentive for research staff will be considered.

7.4 External Activities

7.4.1 Strategic partnerships

NanoNextNL *NextSteps*

A national joint research collaboration comprising universities and companies focused on expanding and accelerating research in the field of nanotechnology that is geared towards solving the Societal Challenges. This programme started in 2011 and had a budget of € 250 million. It was finalized in 2016 and met with great success. MESA+ has recently been granted stewardship over the original programme presenting the unique opportunity to consolidate research efforts in the field of nanotechnology, thus ensuring greater impact and awareness. Efforts are geared towards *settling* NanoNextNL in UTwente, redefining the focus and securing funding for the future.

NanoLabNL

A national joint nano-infrastructure collaboration comprising the universities in this field. Efforts are geared towards consolidating efforts to secure and manage large scale investments in infrastructure. Present and immediate future focus lies with the *Toekomst Ontwikkelings Fonds* (TOF) call which should help revitalize and expand the Mesa+ nanolab.

Misc.

Continued support will provided to partnerships with:

- Photon Delta;
- HdMT, lab-on-chip;
- Fieldlab microfluidic devices;
- ARC Evidence Based Sensing.

New partnerships will be actively sought and initiated. Within the next 12 months an additional 2 partnerships are envisioned, a likely candidate being SRON.

7.4.2 Business Strategy

Business Development

The plans for a new Mesa+ call for more business development that focuses on:

- Consortia building of Project and Programs with industry;
- Generating contract research;
- Knowledge and technology transfer strategy, IP policy;
- Accelerating business cases;
- Attracting | coaching entrepreneurs;
- Non-academic talent development PhDs;
- Stimulating cross over collaboration.

Considering that NovelT's primary focus is Tech Transfer (IP), that they are severely restricted in capacity (passive) and do not have a specific MESA+ focus, it is imperative that MESA create its own Business Development services for a more active approach.

The next 12 months will focus on policy initiation and organising capacity for this endeavour.

Influencers

As part of the strategy of realizing greater impact, attention is called to wielding greater influence on policy makers, funding mechanisms, academia and industry. As such the immediate and future activities are geared towards:

- improving tactical representation through memberships in influential national and international boards and evaluator panels.
- Involvement in research & innovation policy- setting the agenda.

This requires conception of a strategy based and taking inventory of the present situation, i.e. what is the current status involvement of PI's. Subsequently the necessary incentives need to be identified and lobbying activities will be set in motion.

Marketing

Efforts for immediate future in the area of Marketing will focus on drafting a plan and setting the timetable for executions. Elements to include are:

- Marketing strategy and profiling institute and academic strength;
- Co-branding MESA+ and UT;
- Participation, co-organizing, and acquisition of conferences | symposia;
- Revitalizing the International Advisory Board. Expanding the board with new talent.
- ...

8 Governance

MESA+ aims to be an inspiring and dynamic Institute that easily can anticipate on new trends, developments, societal challenges, etc.

The core of the institute consists of the Management Team: Scientific Director, Business Director and MT members representing the expertise areas (Nano materials, Nano devices, Nano systems, Nano structures).

Execution power:
In order to speed up impact, increase visibility, develop political networks, better influence science agendas, strengthen and develop communities and networks MESA+ will temporarily add additional workforce. This staff will, as will the Management Assistants do, work in the MESA+ Program Office. The Program Office staff will work closely connected with SBD, EU Office, SB, Marketing, Communications and other Central Services.

MESA+ will also reinstall its International Advisory Board and reconsider the constellation of this Board.

Appendices

A. UT wide Programme 'Materials'

Program manager: tbd
Leading scientists: Guus Rijnders
Institute as overall coordinator: MESA+

We are on the eve of an extremely important development which enriches us with the tools to create customized new material. Materials scientists at UT are in an ideal position to implement solutions for the major challenges known to man in the field of energy, raw materials, health and prosperity. UT is able to develop new materials and thereby to achieve breakthroughs in the areas of:

- Climate: a completely sustainable energy from the sun;
- Sustainability: a closed circuit for the usage of materials;
- Health: artificial tissues and medical sensors for an aging population;
- Economy: a new manufacturing industry makes smart products - made in Holland.

The aim is to develop a UT roadmap for Smart and advanced Materials by bringing together researchers (composites, polymer science, Bioinspired materials, advanced thin film materials, nanomaterials etc.), establishing a link to existing UT initiatives (FPC @ UT, TPRC, MESA + materials research etc), and the realization of new initiatives.

UT topics in the field of materials are very diverse and have different embodiments. The aim of the UT roadmap is a common approach which includes current UT themes such as green ICT / unconventional electronics, energy, sustainability, advanced manufacturing, smart coatings, designer materials, and smart textile. The focus in the roadmap will be placed on:

1. Sensing
2. Energy (conversion & storage)
3. Advanced Manufacturing

Materials Research at UT includes nanotechnology, applied physics and chemistry, electrical engineering, engineering science and extends to disciplines such as design engineering and industrial medicine. It is directly intertwined with our energy, medical care, food technology, building and landscape infrastructure, economics, behavioral and social sciences, the environment, etc. Some material applications lead to questions in the field of safety, risk analysis, geopolitics, (medical) ethics and certification and become disciplines such as the humanities, social sciences and management sciences. With better alignment of the material research in a UT encompassing roadmap profiling will strengthened to the degree that we can claim a national leadership role and be an international leader.

The National Scientific Agenda route 'Materials - Made in Holland' is partly made possible by UT researchers from very different disciplines (TNW, EWI, ET). Important areas of interest in this NSA route are:

- 3D-printing, designer materials and composites
- Biomaterials and self-assembly: inspiration from nature
- Materials for sustainable energy
- High-tech systems and smart materials
- Smart coatings, smart skins

Sustainable cycles of materials

B. UT wide Programme 'Sensing'

Program manager: Henne van Heeren
Leading scientist: Jeroen Cornelisse
Institute as overall coordinator: MESA+

The University of Twente offers a comprehensive spectrum of research activities in the domain of Sensing Science & Technology. Sensors that are smarter, cheaper, and more reliable are required in various application domains like smart industry, health, environment and agro-food. They are needed to develop advanced robots. We are at the forefront of developing the next generation innovative sensing platforms and accelerate their introduction into the growing sensors market. Platforms will often be (wirelessly) networked, forming the basis for a next generation of the Internet of Things and the foundation for many Smart Society agenda's.
Development of innovative sensing platforms requires a cross-disciplinary approach, uniting scientific disciplines in developing new sensing functionalities, design and engineering of sensing systems/devices, communication networks, product design and development (incl. manufacturability), data management, interaction, and societal, ethical and governance aspects. As such it not only involves different research disciplines, but also links the related educational programs, e.g. by providing internship positions with the involved industries or MSc assignments with the research groups.

Developments in micro- and nanotechnology (at MESA+) have led to innovative physical, chemical, and biological sensing systems with new functionalities, improved sensitivity and specificity. Together with research in secure and dependable next-generation Internet and sensor networks (CTIT) allows us to move to an Internet of advanced, connected sensor systems. Further UT-wide integration of sensing science and technology activities, and facilitating translational work into application domains like health and smart industry, allows the UT to move into a world-wide leading position in this field.

"Smart materials, structures and devices, capable of detecting a stimulus from the environment or activating a response, are key to the 4th industrial revolution. These are expected to have applications in most industrial sectors, such as healthcare, manufacturing, transport, energy, infrastructure, consumer goods and security." (EU scoping paper NMBP 2018-2020)

A collaborative and integrative approach towards regional, national and European research entities is needed. Regional collaboration is established with companies like Bronkhorst, Micronit, and Lionix, and initiatives like AMMON and High Tech Factory. Nationally the topsectors 'Chemie' and 'HTSM' are involved; the program matches the ICT topsector roadmap. The ARC aligns with European policy of R&I of Key Enabling Technology platforms in Industrial Challenges and their application in the Societal Challenges.

Activities for 2017 consist of roadmapping (research, innovation and infra) with regional and national stakeholders (public and private), UT-wide involvement groups, establishment of national PPP consortium (ARC), visibility, workshops/round tables, students challenge, support project development, etc.

C. EU Funding

Upcoming funding opportunities and next EU Framework Programme:

Horizon 2020 Work Programme 2018-2020 (last Horizon 2020 period; work programme publication expected on October 27th, 2017):

- Excellent Science – programmes Marie Slodwska-Curie Actions, European Research Council, Future and Emerging Technologies, Research Infrastructures: for fundamental research (collaborative and individual grants); bottom-up (no prescription of topics); Research Infrastructure mainly for connecting related infrastructure/ communities and promoting access of researchers to infrastructure/ equipment.
- Industrial Leadership – namely NMBP, ICT: collaborative projects on topics that aim mainly at at technology developments (priorities steered by industry); include specific call topics on Photonics, advanced/smart materials, micro-nanoelectronics, and more.
- Societal Challenges – programmes include addressing solutions for Health, Food, Energy, Transport, and Security.

FP9 (post-Horizon 2020) expected developments:

- Focus on Excellence and Impact (on both society- and policy-levels) will be main evaluation criteria
- Geographical distribution will NOT be considered as evaluation criterion ---> R&I funds are NOT aimed at cohesion
- Mission-oriented initiatives ---> involving stakeholders and society, short-measured (4 y max)
- Fundamental research is likely to be funded through specific instruments, equivalent to the current ERC and FET programmes.

Various stakeholder groups have already put forward recommendations for the post-Horizon 2020 framework programme. Amongst other recommendations, the "Report of the independent High Level Group on maximizing the impact of EU Research & Innovation Programmes" gives a good insight of what is coming our way.

Some of the outlined recommendations:

- Build a true EU innovation policy that creates future markets: Foster ecosystems for researchers, innovators, industries and governments; promote and invest in innovative ideas with rapid scale-up potential through a European Innovation Council
- Educate for the future and invest in people who will make the change: modernize, reward and resource the education and training of people for a creative and innovative Europe.
- Design the EU R&I programme for greater impact: make the future programme's pillars driven by purpose and impact, fine-tune the proposal evaluation system and increase flexibility.
- Adopt a mission-oriented, impact focused approach to address global challenges
- Mobilise and involve citizens: stimulate co-design and co-creation through citizen involvement
- Capture and better communicate impact: brand EU research and innovation and ensure wide communication of its results and impacts.

TechMed Research

Research on Healthcare by Personalized Technology

1 Introduction

The University of Twente reorganizes all its research to be embedded within the Faculties. Some of this research, however, crosses the boundaries of the faculties. To stimulate multidisciplinary research, the University has decided to develop new institutes that facilitate this. Health is such a multidisciplinary area where a large number of research groups, technical as well as social sciences, have research applications. By combining the disciplinary expertise from different groups we can define new research areas, learn from each other and have a larger impact on society.

The objective of this document is to sketch the outlines of the new institute on health. One of the goals of the institute is to reach outside of the University and to create excellent working relations with clinical partners, industry and funding agencies. Together with the already existing disciplinary expertise, this will then be the backbone for the ultimate goal of the institute, which is to stimulate the generation of new, successful, externally funded, research projects.

The new Technohal building will form the heart of the new Technical Medical Centre, in which the majority of the health related activities of the University of Twente will be embedded. This Technohal includes most of the TechMed.Centres educational facilities and some of the research laboratories and will host the support for specific issues related to medical research and education. The TechMed.Centre is the portal and public face to society of health related research at the University, it has a coordinating role in this and it will serve as a meeting place for students, teachers, researchers and external partners. The new institute, with the provisional name TechMed.Research, will be part of this. It is emphasized that TechMed.Research can benefit from the various opportunities in the TechMed.Centre, the educational programs in Health (TechMed.edu) and its facilities (TechMed.infra).

To the reader: This document addresses a number of issues related to the primary goals of the institute and the embedding in the University. Essentially, this is a design process, and this document reflects the outcome of that process, given the severe time restrictions. Usually, a design process takes several iterations, so this document should be considered as work in progress. Even after implementation, experience may require adaptation of the original plan, which should be made clear in regular evaluations.

1.1 Background, trends in global healthcare

> "Europe faces rising and potentially unsustainable health and care costs, mainly due to the increasing prevalence of chronic diseases, to an ageing population requiring more diversified care and to increasing societal demands. Health research and innovation also face new challenges as a result of new research paradigms and methodologies in line with increasingly complex medical and health challenges, including increasing awareness of the influence of external environmental factors."
>
> *European Commission, Horizon 2020, Work Programme 2018-2020*

The proportion of global population aged above 65 years old is increasing more rapidly than other age groups and its growth is expected to accelerate in the coming decades. Such demographic changes pose several challenges to the healthcare systems, for example, as the labour force might not suffice to respond to the demands of the aging population. For example, it is estimated that the proportion of population in EU-27 aged between 15 and 64 will decline from 67% in 2010 to 56% in

2060. Additionally, the share of the population aged above 65 is expected to increase from 17% to almost 26% in 2030, and almost 30% in 2060. Improved prevention, diagnosis and treatment of diseases is one of the main drivers for life expectancy.

With aging come inherent biological changes that often lead to functional impairments or chronic diseases. On the other hand new treatments improve the survival rate of specific diseases such as cancer or cardiovascular diseases, but is not always curing the patient, as a result of which more diseases end up as a chronic disease. The systematic review from Marengoni and colleagues suggests that at least 55% of the older population suffers from 2 or more chronic diseases simultaneously, and this proportion can even reach 98%. These numbers are increasing: in the Netherlands, the proportion of people aged above 55 with four or more chronic diseases increased 300% between 1985 and 2005. In 2015 more than 50% of the total population in the Netherlands had at least 1 chronic disease.

The World Health Organization defines 4 key strategies to cope with the burden of chronic diseases: (1) promotion of healthy behaviours, (2) prevention of premature deaths and avoidance of unnecessary disability, (3) treatment with the available knowledge, and (4) provide appropriate care to every individual in need. Healthy lifestyles, such as physical activity and healthy eating, are key factors in all the steps abovementioned, in both prevention and management of chronic diseases.

The costs related to healthcare are rising rapidly on a global scale. Recently, the Dutch RIVM predicted in their 'Volksgezondheid Toekomst Verkenning" that the total healthcare spending will double between 2015 and 2040. Two-third of this increase is caused by developments in medical technology and growth of welfare, by which life expectancy is increased, but with more (chronical) diseases to be treated and thus increased healthcare costs. One-third is caused by a greying and growing population.

In the western world, we see a number of trends in the perception of how the healthcare system should function. People would like to be in control when dealing with their health situation, preferably in their home environment with growing emphasis on quality of life instead of life duration. They like to be treated and diagnosed as individuals and are willing to invest in their health (i.e. adapt their life style) in order to prevent health issues (Table 1). People want to stay independent longer, and the government stimulates this because it helps reducing the costs of healthcare when people are less hospitalized.

Table 1. Trends in Healthcare

Personalized **Prevention** **Quality** **Local** **Empowered**	*Instead of*	**One size fits all** **Cure** **Quantity** **Centralized** **Paternalistic**

Technology plays a major role in personalizing the healthcare system. For example, better instruments allow for a more accurate, individual diagnosis. Miniaturization allows us to develop sensors that monitor the patient's condition and disease progression, often from a distance in

eHealth applications. Targeted drug delivery reduces the patient's burden and increases effectiveness in various chronic diseases. Robotic support systems enhance people's capacities and compensate for reduced functionality. 'Big data' techniques allow to include environmental issues for even more personalized diagnosis and treatment. The technological expertise, present at the University of Twente, together with the social, organizational and environmental knowledge gives us the opportunity to address scientific healthcare problems from a nano scale to a global scale and everything in between. Ideally, new personalized solutions will lead to actual prevention or cure of diseases, improving quality of life and reducing healthcare costs.

1.2 Vision

TechMed.Research focuses on technological solutions that improve personalized healthcare related to a clinical perspective. Some issues related to that may be purely technical or scientific in nature, but we explicitly want to make an impact in society. We aim at applications that eventually are applicable in a hospital or a home care situation improving healthcare and boosting the economy. This essentially translational research will be an important aspect of the institute (and does not exclude fundamental research), which matches the increasing requirement for valorisation from funding agencies.

For this reason, it is clear that we have to build on strong relations with clinical partners, industry and funding agencies, which often take years before they pay off. We need to involve them in our decision process when defining new projects, to monitor running projects and to stimulate spin-off activity. In this vision, technology is a tool to reach a better healthcare system. In order to make it a success, we need to understand its effect on people, organizations and society before we implement it. Similarly, we need to understand the role of the environment in the personal health.

The technical faculties will be able to provide the technological basis (although not exclusively) for the research at the institute. Most research is already in place and there is no need to make large shifts in this respect. The organizational and societal basis will be provided by the faculties BMS and ITC. In principle, the institute is open for any research group that is willing to contribute significantly and willing to work on the goals of the institute.

(Note: ITC was previously not involved within MIRA, but is working to develop a research chair for global health systems. This is an important contribution to understand the impact of the (global) environment on one's personal health and how techniques for big data can contribute to analyse an individual situation.)

The vision is

> Improving healthcare by personalized technology
>
> Technology is a tool to enable high-quality health care. Not only for diagnosis and treatment, but also for improving the quality of life and to stimulate independent living.
>
> We strive to have a significant impact on society, both by scientific excellence as well as by linking fundamental research to clinical applications, from the nano to the global scale. Ultimately, we bring our technology to the clinic or to the home environment. For this purpose, it is imperative to have close working relations with clinical and industrial partners.

1.3 Mission

TechMed.Research

We innovate personalized healthcare by technological solutions

2 Outlines TechMed.Research

2.1 Grand Challenges

Health plays a prominent role in various plans for shaping the future. To mention a few:

- UN global goals: Good Health and Well-being (3rd position)
- H2020 Goals: Health, Demographic change and Well-being
- Bohemia Rapport on Health Goals (future H2020):
  - *Better care: Improved disease prevention, control and patient care delivered*
  - *Better health: Planet and lifelong human health delivered*
- OECD technology and innovation outlook: Health, inequality and well-being
- WEF: 4th industrial revolution – maximizing human wellbeing by fusing physical, digital and biological worlds

Technology plays an evident role in keeping healthcare assessable and affordable. The mission of the institute implies strong relations with healthcare providers and industry. The University of Twente has an advantage here, because we are strong in several technological areas and we have the expertise to evaluate its impact at the personal, organizational and societal level.

2.2 Strengths

The expertise of TechMed.Research is spread over the disciplines and faculties and combined in different research domains as in figure 1. There already are a lot of initiatives crossing faculties. The predecessor of TechMed.Research, MIRA, consisted of roughly the same technological groups. These are extended with additional contributions from the faculties BMS and ITC to cover the entire range of the translational research.

Some facts and figures for MIRA:

- 275 fte, turnover 25 M€.
- Scientific output 2016: 43 PhD theses; 431 articles with average impact factor of 4,6; Over 3000 citations.
- Awards in the past 6 years: 3ERC advanced, 1 ERC consolidator, 2 ERC starting; 10 Veni, 5 Vidi, 2 Vici.

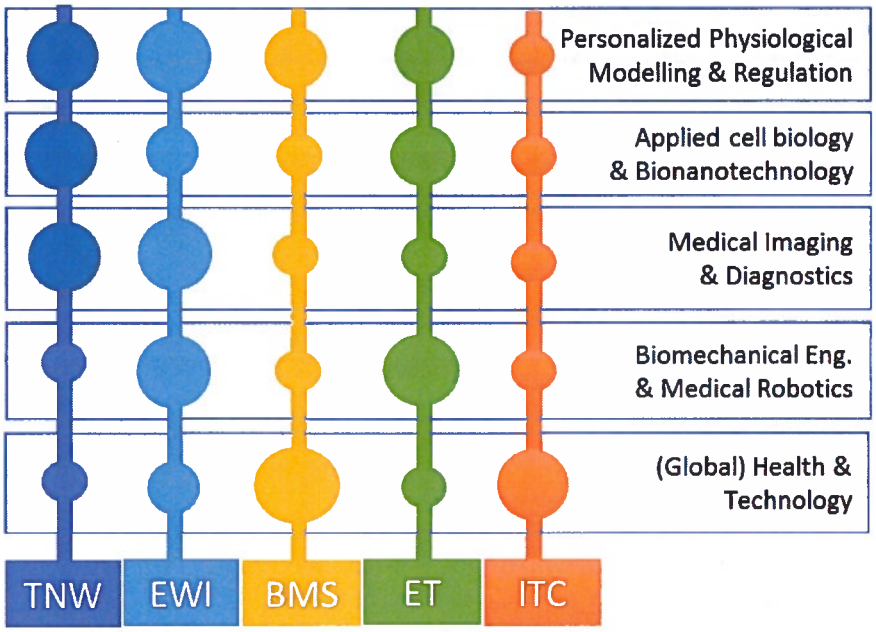


Figure 1. Research domains in TechMed.Research, with a hint of the contribution of each faculty to each of the domains.

Table 2 shows the expected PI's involved, based on past involvement and expressed interest. A PI is defined here as a full or associate professor allocated to one of the TechMed.Research groups. Some clustering of groups may still take place, depending on faculty policy. Also, clustering may exist between faculties, as is the case in the Centre for Healthcare Operations Improvement and Research (CHOIR) on health logistics. The adjunct and full professors with an appointment larger than 0,5 fte are counted here in the core team. This is the basic group from which the senior PI's should be selected (in a Wyss-like structure of the institute). The clinical professors in general have an appointment smaller than 0.4 fte, but provide essential links to the outside medical world.

Table 2. PI's in TechMed.Research

Faculty	Group	# PI	core team	# PIclin
TNW	AMIA, AST, BMPI, BST, CNPH,CRPH, DBE, MCBP, MNF, NBP, NIM, POF	28	12	5
EWI	AA, BIOS, BSS, MMS, RAM, SOR	15	7	2
BMS	IEBIS, HTSR, PHT	10	4	2
ET	BE, EFD	9	4	1
ITC	Vacancy Global Health			
		62	27	10

It is stressed that participation in the new institute is not limited to these groups. Again, the institute is open for any research group that is willing to contribute significantly and willing to work on the goals of the institute.

2.3 External Partners

Extensive collaboration with external partners is key for boosting innovation in healthcare. The University of Twente already has a strong network and track record of successful collaborations with a wide diversity of external partners and organization. These partners vary from SME's to the big medtech industry, from regional hospitals to international university medical centres, from local to

national governments or advisory boards and from funding organizations and scientific societies to charities and patient organizations.

The University has established long relations with all University Medical Centres and with several large hospitals in The Netherlands. Collaboration within this clinical network is strongly supported by the numerous clinical internships of the Technical Medicine program (see figure 2). All internship projects are supervised by clinicians and scientific staff from the UT. In addition to this internship network, formal research partnership are in place with the academic medical centres RadboudUMC, UMCU and UMCG, the regional top clinical centres MST and ZGT and with rehabilitation Centre het Roessingh. Next to that, there are (formalized) collaborations with more specialized hospitals, like centres for rehabilitation and the Dutch cancer institute. In order to stimulate new connections with the strategic partners, the UT launched several seed funds / voucher programs the previous years such as Pioneers in Healthcare (with MST, ZGT, Menzis and as of 2017 also Deventer ziekenhuizen and Saxion), Turbo (with RadboudUMC) and a postdoc program with UMCU/UU. The goal of these programs is the stimulated collaboration and the increase the capabilities to attract future funding for these research lines.

Figure 2. Clinical internship partners of the University.

Besides the collaboration with clinical sites, partnerships with medtech companies is crucial for bringing real solutions to the international healthcare market. The list of industrial partners is already large and includes large to very large companies (Philips, Siemens, Medtronic, GE, etc.), a lot of regional companies (ten Cate, Demcon, Baat, Hankamp, Panton, Holland Innovative, Unitron, UNeedle, etc.). But perhaps the real strength is in working with the numerous start-ups and SME's, of which a lot of them originate from the University (currently about 50% of the new spinoffs is in medtech).

The UT also collaborates with a lot of other research institutes and -centres. Examples are the strong representation within the Dutch IMDI Cores where the UT is leading or participating in CMI, SPRINT, Neurocontrol and CCTR. On the regional level a good example of collaboration between a broad

range of partners is the recently launched initiative called 'Vitaal Twente'. As we are living in a growing internationally oriented environment, the UT could be proud of its international partnerships with renowned institutes such as IRCAD/IHU in Strasburg, the Wyss institute and the MGH hospital in Boston, and a wide range of strong research connection with top research groups at MIT, Yale, Sunnybrook, Kings College, etc.

As a knowledge institute the UT has a pivotal role in the Ecosystem of the region Twente and Eastern-NL (Gelderland + Overijssel). Is has tight connection with organization such as Novel-T, Health Valley, OOSTNL, HIP, WTC Twente. Novel-T is considered as the central meeting place for the industrial ecosystem in the region Twente, where Health Valley has the role to stimulate (inter)national visibility for the entire region of Eastern Netherlands.

Last but not least, there are a lot of connections to regional and national governments, national and European funding agencies, health care funds / charities focusing in a wide variety of diseases and/or organs and of course with the Dutch topsectors LSH & HTSM.

Although the network is already strong and a key asset of the UT, a structured approach and policy to maximize the value that can be captured from this network and the numerous partnerships could be improved. This will be one of the priorities of the new TechMed.Research Institute support office.

2.4 The acquisition engine[1]

In consideration of the increasing importance of external opportunities for funding, the expertise and quality of the TechMed.Research groups and the variety of possible external partners, an important mechanism in the institute is the so-called *acquisition engine* tool – which in the long term should justify the institute. This bottom-up tool is additional to the initiatives the institute employs, which are more top-down.

The acquisition engine aims at providing support to the researchers in their external funding endeavours, covering the entire acquisition chain: from identification of the relevant funding initiative to support on the Grant Agreement preparation phase.

A leading scenario that we intend to realize with the acquisition engine is the following:

An UT ambassador attends meetings, workshops and has due to his excellent network a lot of incoming information on upcoming calls, programs and policies. In many, he participates himself contributing to roadmaps. When home, he discusses the information with the acquisition engine support staff (AMS), who will then look at the concrete possibilities and find out details.

Then a call to the partners is sent out about the call by AMS and a meeting is set-up. At this meeting, the call is discussed in detail and reflected towards the offer the partners can jointly make. A decision is made whether to start a proposal making and who will be involved, as well as a schedule when what has to be finished. The writing team will be actively supported by AMS with advices, reading material, a database with old proposals for inspiration, etcetera.

Some important principles in this trajectory are "no free ride" meaning that the participants have to be active and comply with the scheme made. A second principle is to "share efforts and rewards".

[1] Based on ideas and documents written by H. Hermens and M.L. Carosso

As the TechMed.Research institute has no hierarchical connection to its researchers, it must seduce the scientific staff to connect and external parties to collaborate and provide funding. In other words: the new institute should provide added value for the researchers within the TechMed.Centre's research domains. So, the acquisition engine will consist of a comprehensive approach to the external funding, that combines ad hoc events and workshops, format meetings, database and internal support from the UT, as described in the following:

- Ad hoc events and workshops: funding acquisition requires awareness on the existing possibilities, specific skills on writing proposals, addressing the challenges of the calls and knowing the strategy of funding institutions.
    - Proposal writing workshops. These events will provide researchers with the capability to improve their participation in funding initiative, share their experience and expand their knowledge on funding initiatives and strategic positioning groups, as described in section . Experts from relevant institutions (i.e. National Contact Points for H2020) will be invited to also provide their guidance, advice and training for specific funding programmes.
    - Proposal development workshops.

- Database(s) with project examples: list of successful submissions by PI's, evaluation reports and reviewers' s remarks are a precious source of information for improving existing proposals and/or inspiring new or follow-up ones. Detailed information should be retrieved by contacting the PI's (no full proposals in database).
    - The Database will therefore collect and organize all available information of granted projects that belong to the researchers involved in the program, taking into account the IP of the authors.

- Internal support:
    - TechMed Office: general support office for the TechMed.Research institute.
    - SBD & EU Office: support on the acquisition chain and project management.
    - Novel T: support on Exploitation, IP, Patents and innovation/opportunity recognition and valorisation.
    - LISA : support on the Data Management.

2.5 How to link to the grand challenges

Several organizations are working on calls for research proposals to solve aspects of the grand challenges. One of the tasks of the new institute will be to decide where to hook up, and to identify which PI should be involved in this. We are too small to cover all initiatives, so a priority list should be made. A first selection is made in table 3 (the short list). It should be noted that this list is not inclusive, there are several other initiatives, for example related to NWO, charity funds etc.

The combined strategic council of the institute will prioritize this list, and define actions to be taken to improve representation of the institute in these organizations.

Table 3. Organizations defining the agenda on the grand challenges (short list)

	ETP (European Technology Platform)
1	NanoMedicine
2	Robotics
	NWA (Nationale Wetenschaps Agenda)
3	Regeneratieve geneeskunde: game changer op weg naar brede toepassing
4	Gezondheidszorgonderzoek: preventie en behandeling
5	NeuroLabNL: dè werkplaats voor hersencognitie- en gedragsonderzoek
6	Personalized medicine: uitgaan van het individu
	EIP (European Innovation Partnership)
7	Active and Healthy Ageing
	JPI (Joint Programming Initiative)
8	More Years, Better Lives
9	Alzheimer and other Neurodegenerative Diseases

3 Strategic Programs

The technological expertise is linked to societal challenges at three levels (figure 3):

- **Technology for early detection of diseases**
  - Molecular diagnostics
  - Medical Imaging
  - Personalized Medicine & big data
- **Technology for targeted treatment of diseases**
  - Image Guided Treatment & Robotics
  - Molecular Therapeutics (e.g. organ-on-a-chip, regenerative medicine, targeted nano medicine)
- **Technology for improved independency & remote care**
  - Personalized eHealth technology
  - Wearable technology (e.g. sensors, robotics, bio artificial organs)

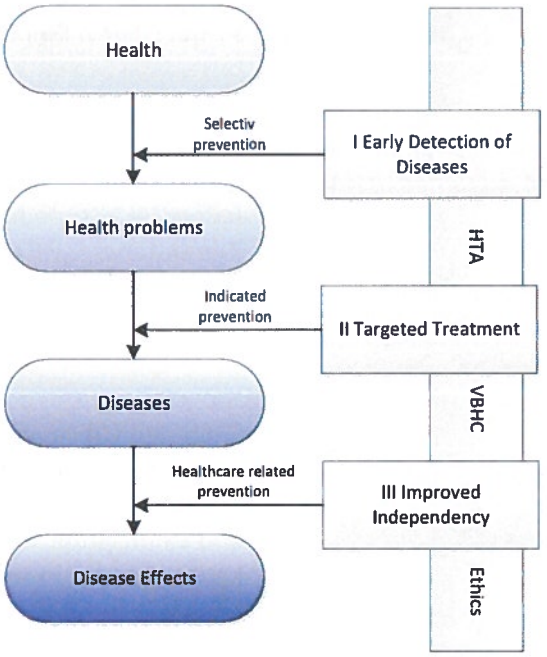


Figure 3. Strategic programs

In each level, strategic programs are being developed. It is evident that in order to make impact in society, the input from research on health technology assessment, value based health care and ethics should be included at each level.

3.1 Program initiatives 2017-2021

In table 4 a general outline for the program initiatives is presented. The main initiatives and activities for 2019 and further will be defined in 2018 by the strategic council of TechMed.Research. The future outlook will always be a rolling forecast of activities and budgets, as this should be based on actual and relevant developments both internally (scientific successes, new talents, etc.) and externally (new opportunities or programs, new collaborations, etc.). In principle, from any research domain new program initiatives can be developed.

Table 4. Program initiatives 2017-2021

1. Community Building	1.0	TechMed office costs: Event(s), workshops, Magazine, PR (website & documentation), stands/sponsoring *
	1.1	Samenwerkingsverbanden, lidmaatschappen en subsidies *
	1.2	EFRO project activities (HTKT & TechMed proeftuin). Organizing thematic (network) events and symposia aligned with strategic programs and focus area's to enhance visibility and improve internal & external collaboration
2. Executing Power	2.0	Scientific Director, Business Director, Medical Director, TechMed Office staff, incl offices & overhead costs *
	2.1	*TOPFIT program*: development of a broad TechMed program covering the biggest part of the focus areas, initiated by UT and RadboudUMC. Goal is to develop a strong TechMed program based in Eastern NL supported by the provinces of Overijssel & Gelderland (and ultimately also the german border region) and get it on the priority lists of the topsectors LSH, HTSM
	2.2	*Personalized eHealth Technology* plan (Hermens), further development & implementation
	2.3	*Image Guided Treatment & Robotics* (vd Kooij, Stramigioli, Misra): considerable potential for growth, strong EU position & highly relevant upcoming calls, strong UT knowledge base, industry is pushing. Province is willing to co-invest in a business developer → attract support capacity a.s.a.p. and start with developing program and prepare for big EU calls (digital hubs, lighthouse healthcare).
	2.4	Initiate first activities for focus areas of the strategic program '*technology for early detection of diseases*', preparing them to kickstart end of 2018/early 2019.
	2.5	Targeting Non-Dilutive US funds: e.g. NIH, DoD, NSF, private foundation. The UT hardly uses the opportunity to attract US funds for its research. Figures demonstrate that about 1000 projects worth 1.4B$ are funded annualy in non US countries based on scientific quality. Plan: approaching a consultancy organization specialized in attracting US funds (e.g. Freemind group) that can help attracting funds and by doing so developing own UT knowledge & expertise.
	2.6	Specific targeting of Dutch health care funds: e.g. KWF, Hartstichting, longfonds, hersenstichting.
	2.7	Improving insight in national & EU funding opportunities and relevant calls.
	2.8	Improving lobby & relevant network of UT researchers, especially related to bigger EU programs
	2.9	Support Kwartiermaker INS Health (Koopman)
	2.10	Stimulating/supporting ERC Synergy grant Bioartificial Organs (Stamatialis)
	2.11	Development & (virtual) positioning of TechMed.Infra as the primary Strategic Research Infrastructure of the UT's TechMed Centre. Attracting external users, improving facility sharing and enhancing visibility to target future funds from NWO (middel)groot roadmaps and relevant EU funds.
3. Impuls for Scientific Staff	3.1	Sustaining and further developing (strategic) partnerships with hospitals, running & monitoring seed fund programs Pioneers in Healthcare/TURBO/UMCU, improving UT's capability to attract external funds from these partnerships
	3.2	*Personalized eHealth Technology*
	3.3	*Image Guided Treatment & Robotics*
	3.4	*technology for early detection of diseases*
4. Big instruments	4.1	*TOPFIT*, matching budget, ~10 PhD's
	4.2	Continuous stimulation of (new) strategic programs and focus areas

4 Governance

We aim at a *lean-and-mean* governance of the institute, well embedded in the TechMed.Centre. The institute should be externally oriented, focused on the contents of the research, with a primary task to generate external funding. The TechMed.Centre is responsible for facilitating and stimulating the general day to day research & education in the disciplines of biomedical engineering, technical medicine and health sciences.

4.1 Governance of the institute

Given these observations and assumptions, we propose the following governance:

- The institute has a **management team** consisting of:
  - Scientific Director (chair)
  - Business Director

  The management team handles all day-to-day business for running the institute, and is supported by 1 FTE (senior) secretary. The management team meets on a weekly basis.

- The institute has a **strategic council** consisting of:
  - Scientific Director (chair)
  - Business Director
  - Medical Director
  - Research domain leaders/representatives (5x)
  - All program leaders of the institutional strategic programs (2-3x)

  The strategic council is responsible for defining the strategic plans for the institute given its mission and goals, and based on information exchanged between its members (note that each research fellow is assumed to be member of an external agenda-setting body or committee). The research domain leaders/representatives represent the five core TechMed.Research domains (fig. 1), preferably representing all faculties. The council initially meets on a two-monthly basis, this may change as needed. The business director is assumed to be the linking pin to SBD.

- The institute has a **program council** consisting of:
  - Business director (chair)
  - Program leaders or -managers of the institutional strategic programs (2-3x)

  The program council is responsible for ensuring that associated programs run smoothly when it comes to, for example, acquiring external funds.

- The institute is represented in the Management Team of the TechMed Centre by:
  - Scientific Director
  - Business Director

4.2 Embedding in the TechMed.Centre

The TechMed.Centre combines all activities of the University on health related subjects. It is responsible for facilitating and stimulating the general day to day research & education in the

disciplines of biomedical engineering, technical medicine and health sciences. This includes shared lab facilities, post-graduate courses, discipline specific support on medical ethical issues, health research data management, valorisation of both research and education, portal functions to external parties and coordinating the general partnerships with hospitals and companies etc.

UNIVERSITEIT TWENTE.

Aan de Universiteitsraad

COLLEGE VAN BESTUUR

VAN
P.G. Mulder-Deelen
Tel: 053 489 1001
petra.mulder@utwente.nl

DATUM
15 november 2017

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CvB UIT- 3022

BIJLAGE(N)
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ONDERWERP
Richtlijnen toetsing financiële middelen m.b.t. Instituutsplannen Instituten-Nieuwe-Stijl

Geachte leden van de UR,

Bijgaand treft u als achtergrondinformatie bij de instemmingsvraag met betrekking tot de Instituutsplannen Instituten-Nieuwe-Stijl de richtlijnen aan voor de financiële sturing binnen de UT. De financiële richtlijnen betreffen financiële werkafspraken rondom instituten en strategische onderzoeksgelden. Dit document is door FEZ opgesteld en reeds in verschillende gremia besproken (Stuurgroep, CvB en SB).

Wij gaan er vanuit dat deze richtlijnen in combinatie met het instemmingsmandaat van de UR op de hoofdlijnen van de begroting (op basis van art. 9.33 lid 2 WHW) inzicht geeft in de financiële sturing binnen de UT. Op basis hiervan verwachten we de UR voldoende te hebben geïnformeerd om instemming te kunnen verlenen op de aangeboden plannen van de Instituten-Nieuwe-Stijl.

Namens het College van Bestuur

Ir. R Mazier
Secretaris Universiteit a.i.

UNIVERSITEIT TWENTE.

UT2020 EN BEGROTING 2018

VASTGESTELDE UITGANGSPUNTEN ONDERZOEKSBEKOSTIGING, UPDATE BUDGETTEN EN SPELREGELS MIDDELEN INS EN CSB

DOEL VAN DEZE PRESENTATIE

- Totaal overzicht geven van uitgangspunten inzake de onderzoeksbekostiging en de wijze waarop deze uitgangspunten zijn weerslag hebben gevonden in de kaderstelling 2018-2021.
- Update geven van uitnutting en ruimte in strategische middelen per 31 augustus 2017
- Geven van spelregels inzake beschikbare middelen voor INS en CSB

AANPASSING FINANCIEEL MODEL ALS ONDERDEEL VAN UT2020

WHY, WHAT & HOW

WHY

1. ondersteunen doelen onderzoek (en onderwijs): excellentie en impact
2. anticiperen op financiële ontwikkeling op sectorniveau (incl. daling relatieve omzet UT)
3. reductie complexiteit en borgen stabiliteit (administratie en transacties)

WHAT & planning HOW

1. basisbekostiging en strategische stimulering (uitgangspunten) - Q1 17 (Q4 16)
2. capaciteitsbekostiging
3. business case benadering grootschalige onderzoeksinfrastructuur

UITGANGSPUNTEN ONDERZOEKSBEKOSTIGING (1)

- **Planningshorizon** — tijdelijke toekenningen binnen UT onderzoeksstrategie/ onderzoeksbeleidskader met looptijd van 5 jaar
- **Strategische stimulering** — stimulering faculteit overstijgend profilerend en strategisch onderzoek, basis in profileringsbudget OCW, prestaties in 2de en 3de geldstroom programma's
- **Basisbekostiging** — kwaliteit en stabiliteit, capaciteitsbekostiging clusterniveau, facultaire budget blijft uitgedrukt in geld
- **UT verdeling** — basisbekostiging en strategische stimulering 2018 beleidsarm in nota kaderstelling, beleidsrijk zodra UT onderzoeksstrategie/ onderzoeksbeleidskader duidelijk is (uiterlijk einde 2018)

UITGANGSPUNTEN ONDERZOEKSBEKOSTIGING (2)

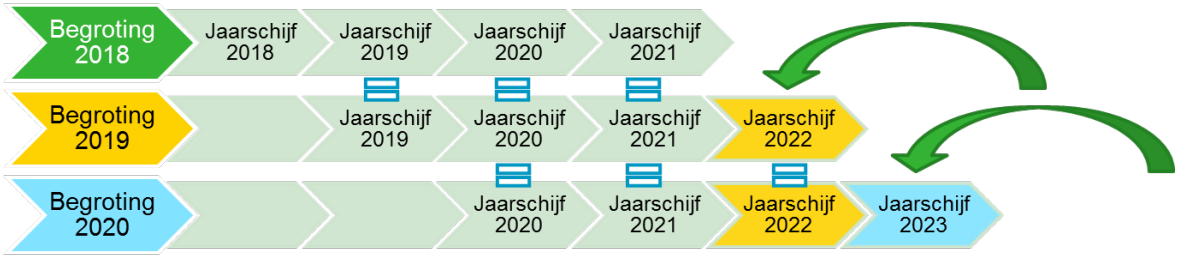
Strategische stimulering onderzoek

- Samenvoeging in Centraal Strategisch Budget: budgetten Centrale Stimulering en Profileringsmiddelen OZ; middelen zwaartepuntvorming OW toevoegen aan OW-verdeelmodel.
- Beleid op inzet instituuts- en vakgroep reserves
- Tijdelijke toekenningen (5 jaar), tijdig indalingsdiscussie
- Vanuit externe oriëntatie op interfacultaire kansen, binnen onderzoeksstrategie/onderzoeksbeleidskader - missie INS

Modelmatige basisbekostiging onderzoek

- O&O-component: ongewijzigd
- Promotiepremiëring: ongewijzigd (profileringsbudget, aftopping = rijksbekostiging m.i.v. 2016)
- Basisbekostiging onderzoek: verdeling voormalige instituutsmiddelen o.b.v. procentuele verdeling van de basisfinanciering onderzoek over de faculteiten.
- Vanuit externe oriëntatie op facultaire kansen, binnen onderzoeksstrategie/onderzoeksbeleidskader - missie FNS

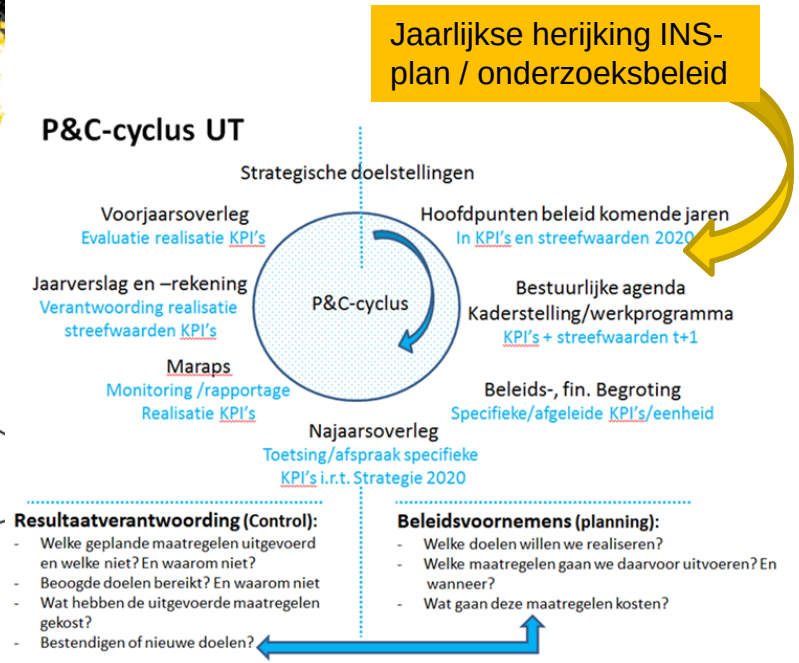
UITGANGSPUNTEN CYCLUS BASISBEKOSTIGING



Herijking begroting 2019-2022 geldt vanaf 2022, etc.

- de sturing van het onderzoek binnen de **faculteiten-nieuwe-stijl** rust bij een meerhoofdig bestuur met decaan als vz, PH Ow, PH Oz en PH BV. De PH Oz is verantwoordelijk voor het onderzoek binnen de faculteit (zowel het facultaire onderzoek als het aandeel van de faculteit in het faculteit overstijgende onderzoek). Hiervoor beschikt de faculteit over het basisbudget onderzoek naast de promotiepremies en O&O-component.
- 4 jaar stabiliteit in bedrijfsvoering faculteiten.
- herijking jaarlijks 4^{e} jaarschijf o.b.v. vast te stellen facultair onderzoeksbeleid door faculteitsbestuur in samenspraak met WDs en CvB. Onderzoeksbeleid wordt dus jaarlijks geactualiseerd voor nieuwe 4^{e} begrotingsjaar binnen UT onderzoeksstrategie/onderzoeksbeleidskader met horizon van 5 jaar.

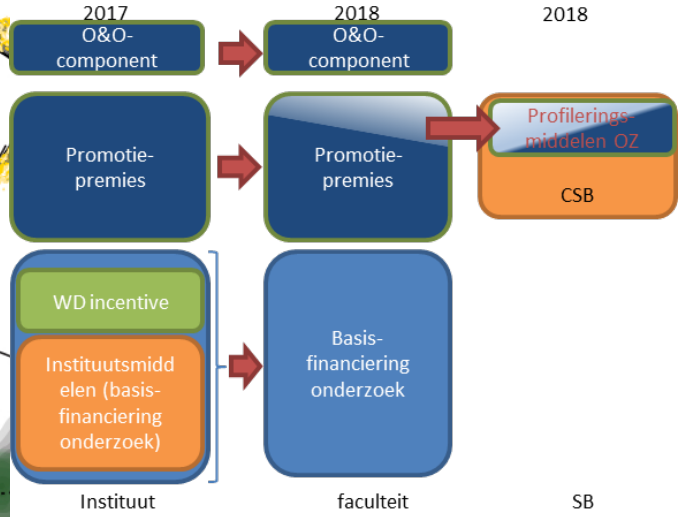
UITGANGSPUNTEN P&C CYCLUS STRATEGISCHE STIMULERING ONDERZOEK



- De instituten-nieuwe-stijl stimuleren en faciliteren de uitvoering van interfacultair onderzoek in een bepaald toepassingsgebied. Zij borgen de agendasetting van nationale en internationale onderzoeksprogramma's en borgen de werving van de daaraan gekoppelde externe funding. Tezamen vormen zij een herkenbaar beeld van onze universiteit naar buiten.
- Een instituutsplan wordt in principe opgesteld voor een periode van 5 jaar.
- Als onderdeel van de P&C cyclus zal jaarlijks het INS-plan en onderzoeksbeleid worden herijkt. Dit zal gebeuren op het moment dat de hoofdpunten van het beleid van de komende jaren wordt vastgesteld.

EFFECT VERWERKING UITGANGSPUNTEN ONDERZOEKSBEKOSTIGING

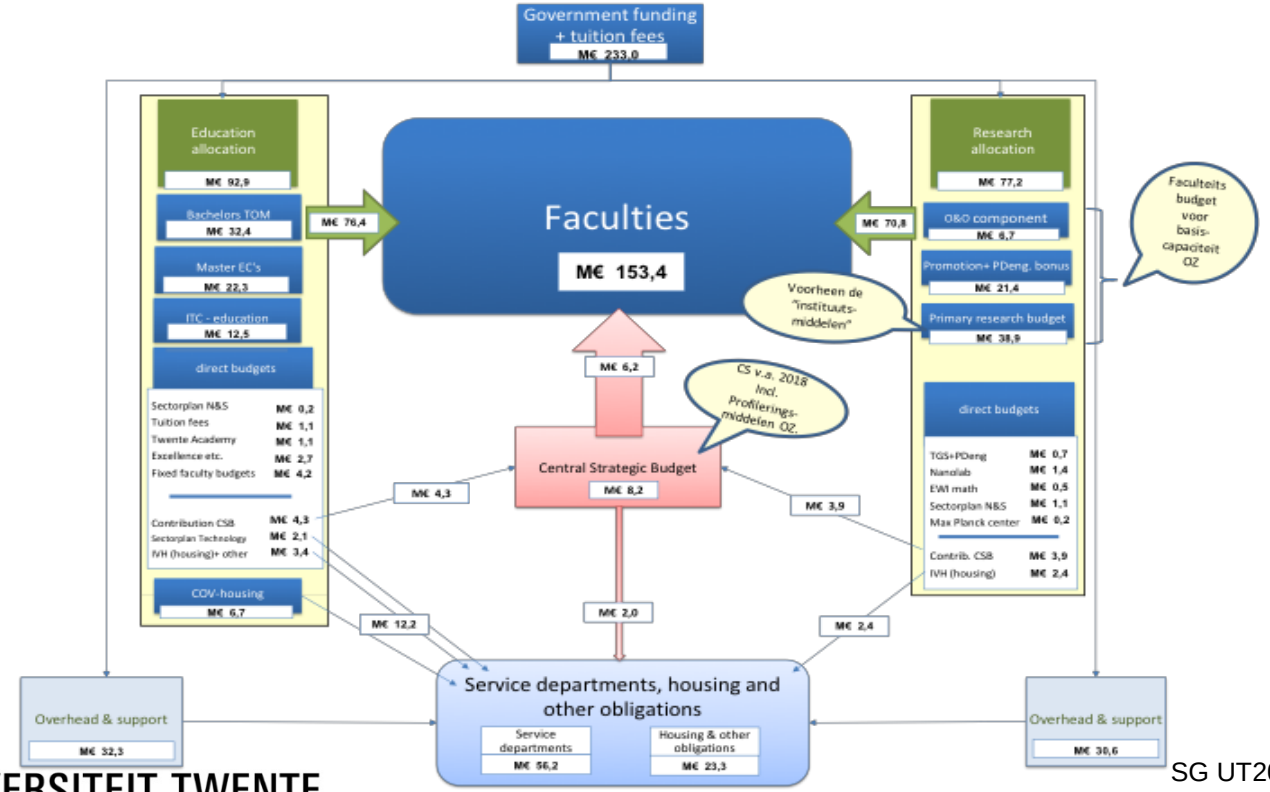
FEITELIJKE WIJZIGING BEKOSTIGING



Op basis van de genoemde uitgangspunten onderzoeksbekostiging is het totaal aan de onderzoeksmiddelen herverdeeld:

- Het gehele budget “instituutsmiddelen” (dus inclusief de WD-incentive) is naar de faculteiten overgeheveld als **basisbudget onderzoek**. In 2018 zijn dus de instituutsmiddelen, inclusief WD-incentive, omgezet in basisfinanciering OZ.
- Daartegenover staat dat het afgetopte deel van de promotie-premies wordt toegevoegd aan de profileringsmiddelen OZ (cf besluit OCW). In de kaderstelling is gekozen voor een geleidelijk afbouwscenario. Rekening houdend met de afnemende compensatie van de aftopping in de promotiepremiëring bereikt Profileringsmiddelen OZ in 2021 het uiteindelijke niveau.
- Waar de strategische middelen ***OW*** en ***OZ*** in 2017 nog versnipperd werden begroot, zijn v.a. 2018 de Profileringsmiddelen OZ samengevoegd met het budget Centrale Stimulering in het Centraal Strategisch Budget (CSB). Het CSB kan worden in ingezet ter stimulering van onderzoek, onderwijs en talentontwikkeling. SB besluit over de inzet van het CSB.

NIEUWE INTERNE VERDEELMODEL TOTAAL SCHEMATISCH



BUDGET “BASISBEKOSTIGING PER FACULTEIT”; BEREKENING

Voor de begroting 2018-2021 zijn de instituutsmiddelen van elk instituut beleidsarm omgezet naar een budget basisbekostiging OZ per faculteit. **De berekening is als volgt opgebouwd:**

Uitgangspunt was de verdeling van budget instituutsmiddelen in 2017:

- De in de begroting 2017 door de instituten aan de diverse faculteiten doorgesluisde instituutsmiddelen, inclusief WD-incentive, inclusief aandeel per faculteit in de in eerste instantie onverdeelde instituutsmiddelen.
- Het aan ET en TNW rechtstreeks toegewezen deel van de instituutsmiddelen.
- De M€ 1 voor BMS is structureel overgeheveld uit CS naar basisbekostiging OZ.

Vervolgens zijn de door de instituten op de instituutsmiddelen ingehouden overheadbudgetten (zie volgende sheet) toegevoegd aan het budget van de penvoerende faculteit.

De nu resulterende eindbedragen van de budgetten per faculteit 2017 leveren een ***verdeelpercentage*** op dat in de begrotingsperiode 2018-2021 wordt gehanteerd voor de verdeling van de budgetten Basisbekostiging OZ in 2018 t/m 2021 (exclusief ITC). Het in Kaderstelling opgenomen budget van ITC is afgeleid van het door OCW geoormerkte OZ-budget voor ITC.

Zie de bijlagen 11 en 11a van de nota kaderstelling 2018-2021 voor de uitwerking van het vastgestelde budget Basisbekostiging OZ.

BUDGET “BASISBEKOSTIGING PER FACULTEIT”

In de nota Kaderstelling 2018-2021 is de volgende verdeling van het budget Basisbekostiging (“Primary Research-budget”) opgenomen:

(amounts in k€)

	2017	2018	2019	2020	2021	%-allocation
ET	1.850	3.791	3.806	3.806	3.806	9,7%
EWI		9.250	9.285	9.285	9.286	23,8%
TNW	729	15.342	15.399	15.401	15.402	39,4%
BMS (2017: CSB budget Gamma versterking M€ 1,0)	1.000	4.624	4.642	4.642	4.643	11,9%
ITC 1)	5.417	5.475	5.390	5.395	5.398	14,1%
CTIT	6.394					
MESA+	11.850					
MIRA	5.885					
IGS	2.719					
Total institutes	26.848	-	-	-	-	
CE	**-**	424	426	426	426	1,1%
(temporary allocation Managing directors)						
Primary Researchbudget ET, EWI, TNW, BMS	**35.844**	**38.906**	**38.948**	**38.955**	**38.961**	**100,0%**

* *These percentages are specified in annex 11a.*

Deze budgetten zijn inclusief de overheadbudgetten van de instituten, die nu toegerekend zijn aan de penvoerende faculteiten EWI (CTIT), TNW (Mesa+, MIRA) en BMS (IGS). Zie de volgende sheet voor een specificatie en toelichting van deze instituutsoverhead.

1) Het budget ITC is inclusief het budget voor het *Capacity building* programma

BUDGET “BASISBEKOSTIGING PER FACULTEIT”; OVERHEADBUDGET

De instituten hadden in 2017 eigen burokosten, welke werden ingehouden op budget instituutsmiddelen => WD, ZD, ondersteunende staf, instituutsbrede activiteiten, ~lidmaatschappen etc. *Omdat de instituten in 2018 geen beheerseenheden meer zijn, zijn deze werkzaamheden, verplichtingen en kosten bij de faculteiten ondergebracht en de bijbehorende budgetten aan de faculteiten toegewezen.*

- De in 2017 door de instituten vastgestelde budgetten voor de eigen kosten, zijn v.a. 2018 *exclusief budget voor ZD,* toegerekend aan de penvoerende faculteit, deze neemt ook de huidige personele en materiële verplichtingen over. Hierbij wordt v.a. 2018 uitgegaan van een vaste omvang van 0,6 fte voor de WD. Aanpassing toerekening mogelijk wanneer betrokken faculteiten anders overeenkomen; geld volgt medewerker.
- Budgetten instituutskosten worden vooralsnog binnen het budget basisbekostiging afzonderlijk zichtbaar gemaakt.
- Budgetten voor ZD’s zijn centraal geparkeerd, in afwachting van besluitvorming inbedding.

Allocation budget for overhead institutes	ET	EWI	TNW	BMS	CE	Totaal
CTIT		485				**485**
MESA+			590			**590**
MIRA			579			**579**
IGS				282		**282**
- WD		115	230	115		**460**
- ZD		*127*	*216*	*43*		**386**
- ZD *(pending decision on inbedding in CE)*		*-127*	*-216*	*-43*	*386*	**0**
Total Allocation budget for overhead institutes	**0**	**600**	**1.399**	**397**	**386**	**2.782**

(Bovenstaande volgt de lijn van de afspraken in overleg SB 1-3-2017, tekst is geactualiseerd naar situatie September 2017).

UPDATE T.B.V. BEGROTING 2018

Omvang strategische stimulering onderwijs, onderzoek en talentontwikkeling 2017

- Inschatting 800k besteding profileringsmiddelen 2017 (oude situatie, m.i.v. 2018 dus onderdeel van CSB)
- Daadwerkelijke onderbesteding 2017 wordt geoormerkt in de Centrale Strategische onderzoeksreserve opgenomen.
- -115k vrije ruimte ‘CSB’ 2017

(bedragen in k€)

	B 2017	Δ 2017	Pr 2017
Centrale stimulering			0
Beschikbaar budget	7.140	387	7.527
Verwachte toekenningen	7.376	286	7.662
Vrije ruimte	0	101	**101**
Saldo Centrale Stimulering	**-236**	**0**	**-236**
Zwaartepuntvorming			
Beschikbaar budget	1.632	-300	1.332
Verwachte toekenningen	1.488	-300	1.188
Vrije ruimte	0		**0**
Saldo Zwaartepuntvorming	**144**	**0**	**144**
Profileringsmiddelen OZ (netto)			
Beschikbaar budget	765	300	1.065
Verwachte toekenningen tbv 4 OZ-programma's		800	800
Vrije ruimte / verwacht S° einde 2017	765	-385	**380**
Saldo Profileringsmiddelen	**0**	**-115**	**-115**

UPDATE T.B.V. BEGROTING 2018

Omvang strategische stimulering onderwijs, onderzoek en talentontwikkeling 2018

- K€ 700 oplopend tot K€ 4.900 vrije ruimte CSB.
- De toename van de vrije ruimte met K€ 4.200 is het gevolg van stijgende profileringsmiddelen OZ met K€2.400 omdat v.a. 2019 niet meer gecompenseerd wordt voor de aftopping door OCW van de promotiepremiëring en door dalende begrote toekenningen K€ 1.800.
- Note: de bedragen genoemd in het overzicht zijn gebaseerd op de indeling CSB zoals verantwoord in de nota kaderstelling 2018-2021 (annex 13). Als onderdeel van het proces van vaststellen kaderstelling 2019-2022, vindt tekstuele herindeling / herindeling layout plaats
- Daarnaast is *uitsluitend voor onderzoek* inzet mogelijk uit de Centrale Strategische onderzoeksreserve, binnen financiële kaders van de UT (schatting K€ 3.000). Deze reserve wordt per 31-12-2017 gevormd uit de saldi van de reserves van de vier instituten, na overheveling van afgesproken verplichtingen naar de reserves van de betrokken faculteiten.

(bedragen in k€)

Centraal Strategisch Budget	2018	2019	2020	2021
Totaal budget CSB Onderwijs	3.680	3.680	3.680	3.680
Totaal budget CSB Onderzoek	1.820	1.820	1.820	1.820
Totaal budget Profileringsmiddelen OZ	2.035	3.000	4.397	4.397
Totaal bijdrage ITC aan CSB	640	640	640	640
Total beschikbaar budget	**8.175**	**9.140**	**10.537**	**10.537**
-/- Totaal begrote toekenningen	7.480	7.302	6.310	5.658
-/- Vrije ruimte	**695**	**1.838**	**4.227**	**4.879**
Saldo	**0**	**0**	**0**	**0**

- Vanuit de vrije beleidsruimte CvB zijn vanaf 2019 onderzoeksmiddelen aan het budget ET toegevoegd (2019: K€500, 2020: K€750 en 2021: K€1.000)

UPDATE T.B.V. BEGROTING 2018

Duidelijkheid beoordelingskader claims

- UT onderzoeksbeleidskader en daarbinnen plannen INS zijn niet ver genoeg om een beleidsrijke begroting 2018 op te baseren.
- Er wel duidelijkheid nodig voor een betrouwbare begroting 2018 en het borgen van daadwerkelijke besteding, juist gezien de financiele krapte (druk op begrotingen van faculteiten door gewijzigde OCW systematiek promotiepremies, druk op strategische middelen door transitie werkwijze instituten, druk op diensten, etc.).
- Daarom voorstel spelregels om beleidsrijke aanwending CSB en inzet reserves te faciliteren.

SPELREGELS MIDDELEN INS EN BELEIDSRIJKE TOEKENNING CSB (1)*

- Alleen onderzoeksactiviteiten die zijn ingebed in INS plan en faculteitsoverstijgende programma's komen in aanmerking voor toekenning CSB (naast activiteiten die gekenmerkt worden als stimulering onderwijs of talentontwikkeling).
- Het INS plan bestaat uit een missie, visie, programma's, PI's, omzetdoelstelling, concrete activiteiten, een begroting voor de INS bijdrage aan deze activiteiten en een planning met een looptijd van 5 jaar.
- De INS plannen worden beoordeeld en gewogen binnen het SB. Het SB adviseert over de INS plannen. Het CvB beslist. De WD krijgt het mandaat om het INS plan te realiseren met inachtneming van de uitgangspunten en spelregels. Net zoals het FB het mandaat heeft om haar onderzoeksbeleid uit te voeren binnen de uitgangspunten en de spelregels.
- Twee keer per jaar wordt de voortgang van de INS plannen en het facultaire onderzoeksbeleid besproken en waar nodig inhoudelijk herijkt. De UT onderzoeksstrategie vormt het kader.
- Decanen en WD's bespreken regelmatig de voortgang van de inzet c.q. performance van capaciteit (PI's).

SPELREGELS MIDDELEN INS EN BELEIDSRIJKE TOEKENNING CSB (2)

- Soorten onderzoeksactiviteiten in een INS plan die in aanmerking komen voor toekenning budget zijn:
  1. Community uitbouwen en onderhouden (instituutsdag, conferentiebezoek, organisatie seminars, workshops, lidmaatschappen) – geoormerkt overgeheveld budget penvoerende faculteit
  2. Executing power (inhuren van tijdelijke krachten of uitbesteden van zaken: marktanalyse, PR, position paper, aanjaagfondsen, haalbaarheidsonderzoek, etc.) – budget CSB en geoormerkt overgeheveld budget ondersteunende capaciteit penvoerende faculteit (secretariaat, WD, ZD (afhankelijk van keuzes t.a.v. SBD, middelen nu geparkeerd in CE)
  3. Wetenschappelijke staf impuls: matching TT, PD – budget CSB, aanstelling, matching en indaling faculteit
  4. Grootschalige instrumenten: matching COFUND, zwaartekracht, onderzoeksinfrastructuur – over INS en faculteiten heen – budget CSB en matching faculteit(en)
- De middelen die worden toegekend voor deze activiteiten moeten aantoonbaar een hefboom zijn voor 2de en 3de geldstroomfunding met een multiplier.
- De middelen die worden toegekend inzake investeringen in grootschalige instrumenten en strategische infrastructuur dient middels een business case (met slagingskans percentage) aantoonbaar positief zijn binnen *X* jaar.

SPELREGELS MIDDELEN INS EN BELEIDSRIJKE TOEKENNING CSB (3)

- De WD is dus verantwoordelijk voor de realisatie van de onderzoeksprogramma's die passen binnen de missie, visie en begroting van het INS. Hiervoor beschikt het INS over capaciteit binnen de faculteiten, over binnen de faculteit geoormerkte middelen voor community building en interne executing power en over middelen uit het CSB voor extern in te huren executing power, matching van opbouw nieuwe onderzoeksspecialismen/impuls wetenschappelijke staf en matching binnen grootschalige instrumenten.

- WD's en decanen informeren de faculteiten, CvB en de ondersteuning tijdig en adequaat over slagingskans, ingeschatte beslag op facultaire en CSB middelen en onzekerheidsmarges van grote instrumenten (activiteit 4.). Zodat we op deze activiteit overschrijving van het daarvoor bestemde deel van CSB kunnen faciliteren en bijbehorende risico's kunnen managen in het belang van voldoende en kwalitatief hoogwaardige aanvragen.

- Voor de inzet van centrale onderzoeksreserves is reservebeleid nodig. Voor de jaren 2018 en 2019 is de mogelijkheid de onderzoeksreserves te gebruiken als financiële ruimte bovenop de beschikbare CSB middelen; het CvB besluit hierover, gehoord het SB. Vanaf 2020 zal de beschikbare onderzoekreserves bestemd zijn voor inzet welke te kwalificeren is als investering. De exploitatielasten als gevolg van deze investering moeten te dragen zijn vanuit de basisbekostiging onderzoek en CSB. Dat betekent dat alleen activiteit 4 en daarbinnen onderzoeksinfrastructuur in aanmerking komt.

UITGANGSPUNTEN BUDGETTEN VOOR ACTIVITEITEN INS

	Geoormerkt facilitair budget				CSB (resterende vrije ruimte)			
	2018	2019	2020	2021	2018	2019	2020	2021
Community								
Excuting power								
WP impuls								
Grote instrumenten								
	2.782	2.782	2.782	2.782	695	1.838	4.227	4.879

- Bedragen in bovenstaande tabel zijn cf bedragen genoemd op slide 13 en 15
- Vanaf 2019 ca. 15% “reserveren” of “toevoegen” voor nieuw INS of faculteitsoverschrijdende programma’s.
- Voor de jaren 2018 en 2019 is de mogelijkheid de onderzoeksreserves te gebruiken als financiële ruimte bovenop de beschikbare CSB middelen. Vanaf 2020 zal de beschikbare onderzoekreserves bestemd zijn voor inzet welke te kwalificeren is als investering.

VERVOLG

- Invullen financiele paragraaf INS conform spelregels
- Grootschalige instrumenten analyseren over INS en faculteiten heen
- Ontwikkelen reservebeleid onderzoeksreserves