SIP-REPORT FACULTY BMS

PRME SHARING INFORMATION ON PROGRESS REPORT 2017 & 2018

UNIVERSITY OF TWENTE.

Inhoud

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PREFACE

At the University of Twente, we are pioneers in fusing technology, science, and engineering with social sciences to influence the world around us. In our passion for understanding our planet and improving life for everyone on it, scientists, educators, and students wield a unique cross-disciplinary approach and excellence in scientific disciplines to contribute to the challenges we face. The scientists, teachers and students at the University of Twente experience a responsibility to develop societal-relevant solutions to be prepared for an unpredictable and highly changeable future. Our research and education contribute to change, progress, and renewal concerning the following scientific themes:

Improving healthcare via personalized technologies

Good healthcare for everyone is a challenge on a global scale. We can make treatments more effective via extensive personalization. Technology plays a vital role in this process. The University of Twente leads the way in this new approach to healthcare: from early detection and effective treatment to using information technology in order to make patients more self-sufficient.

Creating intelligent manufacturing systems

As natural resources become scarcer, we are forced to view production and consumption in a different light. At the same time, consumers demand better, cheaper, and more personalized products. The manufacturing industry is therefore transforming from isolated factories and chains to networks, which share knowledge to realize more efficient production, predictive maintenance, and reuse. This calls for new business models and a combination of production technology, IT, and supply chain management: a combination which UT excels at.

Shaping our world with smart materials

By cleverly manipulating the building blocks of nature, we can develop materials that have entirely new properties: lighter, cheaper, stronger, more versatile, and easier to produce and maintain. The University of Twente is a research, education, and valorization leader in this high-precision, high-potential field of materials science.

Engineering our digital society

Digitalization is rapidly changing the world. Our old notions of influence and control, of privacy and identity, and even of democracy are irrevocably changing in today's "digital society." The challenges that we focus on are building reliable and intuitive digital systems, integrating digital systems in our environment, and well-informed decision-making.

Engineering for a resilient world

If the United Nations' Global Goals tell us anything, it is that the planet we inhabit is vulnerable. Can we end poverty, handle climate change better, and be more responsible about our production and consumption? In order to help improve the resilience of our society in a sustainable manner, UT combines three pillars: data, technology, and people.

WELCOME LETTER BY THE DEAN OF THE BMS FACULTY

Theo Toonen

We are proud to announce our first Sharing Information on Progress (SIP) report concerning the United Nations Global Compact (UNGC), Principles for Responsible Management Education (PRME).

By joining PRME, we express our conviction that we, as a higher education institution which integrates universal values into curricula and research, can contribute to a more sustainable and inclusive global economy; and we can help build more prosperous societies.

In this first report we give examples of how the faculty devotes attention to responsible management in its education and research.

The six PRME principles

The Principles for Responsible Management Education (PRME) initiative works with UN Global Compact participants to help advance the **Sustainable Development Goals (SDG)** in academia. It also connects responsible businesses with higher education institutions to help recruit talent with sustainability mindsets, skills, and capabilities. PRME is the largest voluntary engagement platform for academic institutions to transform their teaching, research, and thought leadership in support of universal values of sustainability, responsibility, and ethics. Organizations that join PRME, express their conviction that higher education institutions which integrate universal values into their curricula and research, can contribute to a more sustainable and inclusive global economy and can help build more prosperous societies.

Principles for Responsible Management Education

As institutions of higher education involved in the development of current and future managers, we declare our willingness to progress in the implementation, within our institution, of the following Principles, starting with those that are more relevant to our capacities and mission. We will report on our progress to all our stakeholders and exchange effective practices related to these principles with other academic institutions:

Principle 1 | Purpose:
We will develop the capabilities of students to be future generators of sustainable value for business and society at large and to work for an inclusive and sustainable global economy.

Principle 2 | Values:
We will incorporate into our academic activities, curricula, and organisational practices the values of global social responsibility as portrayed in international initiatives such as the United Nations Global Compact.

Principle 3 | Method:
We will create educational frameworks, materials, processes, and environments that enable effective learning experiences for responsible leadership.

Principle 4 | Research:
We will engage in conceptual and empirical research that advances our understanding about the role, dynamics, and impact of corporations in the creation of sustainable social, environmental, and economic value.

Principle 5 | Partnership:
We will interact with managers of business corporations to extend our knowledge of their challenges in meeting social and environmental responsibilities and to explore jointly effective approaches to meeting these challenges.

Principle 6 | Dialogue:
We will facilitate and support dialog and debate among educators, students, business, government, consumers, media, civil society organisations and other interested groups and stakeholders on critical issues related to global social responsibility and sustainability.

We understand that our own organizational practices should serve as example of the values and attitudes we convey to our students

Overview: Faculty of Behavioural, Management and Social sciences

Identity:
The faculty of Behavioural, Management and Social sciences (BMS) represents the human touch in the university's "High Tech, Human Touch" slogan. BMS strives to play a pivotal role in understanding, co-engineering, and evaluating innovation in society.

Vision:
Innovation is driven by advances in technology and markets. By aligning technological advances with human needs and behaviors the faculty seeks to embed such developments in society. The BMS faculty boasts academic disciplinary knowledge in behavioural, management, and social sciences – all with a focus on tackling societal challenges.

Mission:
The mission of the BMS educational and research programmes is to use science for addressing the societal impact of technology and for providing every generation with state of the art knowledge, skills and, character that will make the best possible impact. BMS uses interdisciplinary scientific theories and methods to develop and assess technological innovations that have an impact on contemporary societal challenges. BMS commits itself in the next decade to five research themes: learning, health, resilience, industry, and emerging technologies.

The BMS mission is related to the University of Twente's mission. The seventeen UN Sustainable Development Goals deal with urgent issues, such as combating poverty, developing "smart and resilient cities," healthcare for everyone, safe drinking water, and sustainable energy. BMS wants to develop the capabilities of students such that they can become future generators of sustainable value for business and society by incorporating the UN Sustainable Development Goals (SDG) into our academic activities, curricula, and organizational practices.

	Total	**Total fte**
Academic staff	327	266
PhD-students	77	74,5

	BSc	**MSc**
Number of degree programmes	5	14
Student population (excl. postgraduate education) per 01-10-2018	1998	1588
Student intake 2018 (excl. postgraduate education) of which non-Dutch	666 59% EER; 4% non-EER	444 25% EER; 11% non-EER

EDUCATION

This section presents various projects and activities taking place to help promote an understanding of responsible management learning among our students and faculty

Principle 1 | Purpose

We will develop the capabilities of students to be future generators of sustainable value for business and society at large and to work for an inclusive and sustainable global economy.

Dean of education

Ciano Aydin

BMS will develop the capabilities of students and foster them such that they can become future generators of sustainable value for business and society at large who can also contribute to an inclusive and sustainable global economy. Our academic activities, curricula, and organizational practices will include the values of global social responsibility as portrayed in international initiatives, such as the United Nations Global Compact. Each program does this in a way that fits the programme and its institutional embeddedness. Not all sustainable development goals (SDGs) are relevant to all study programs and for each study programme other SDGs may be relevant.

Bachelor's programmes at the BMS faculty

Communication Studies (COM)
Industrial Engineering and Management (IEM)
International Business Administration (IBA)
Management, Society and Technology (MST)
Psychology (PSY)

All BMS study programmes are NVAO (Accreditation Organization of the Netherlands and Flanders) accredited. BSc IBA is also accredited by EFMD/EPAS (the accreditation system for degree programmes of the European Foundation for Management Development). BSc MST is also accredited by EAPAA (European Association for Public Administration Accreditation).

Master's programmes at the BMS faculty

Business Administration (BA)
Communication Studies (COM)
Educational Science and Technology (EST)
European Studies (including double diploma) (ES)
Leraar VHO Maatschappijleer en Maatschappijwetenschappen (LVHOM)
Industrial Engineering and Management
Psychology (PSY)
Philosophy of Science, Technology and Society (PSTS)
Public Administration (PA)
Science Education and Communication (SEC)
Sustainable Energy Technology (SET)
Environmental and Energy Management (MEEM)
Research Master Methodology and Statistics for the Behavioural, Biomedical and Social Science
Master Public Management *(postgraduate education)* (MPM)
Master Risk Management *(postgraduate education)* (MRM)

Most BMS study programmes are NVAO accredited. MSc BA is also accredited by EFMD/EPAS. BSc MST, MSc ES and PA are also accredited by EAPAA. MSc PM is only accredited by EAPAA.

Development of student capabilities

In this section certain programme directors indicate how the capabilities of students will be developed for a specific programme such that they can become future generators of sustainable value for business and society at large who can work for an inclusive and sustainable global economy

Susanne McKenney, Programme Director MSc EST
Twente's Master programme in Educational Science and Technology is directly relevant to SDG 4: quality education. The graduates of this programme can contribute to education development in multiple contexts and at multiple levels via the *design* and *evaluation* of learning scenarios. Our program helps students develop theoretical understanding (e.g., about learning, assessment, educational technologies, training approaches, innovation, and organizational change) and apply their new knowledge in authentic tasks that help solve real-world challenges. Students can become specialized in varied contexts of application, ranging from educating primary school children to secondary and vocational education, in-service, or on-the-job training for adult employees, such as nurses, civil servants, managers, and schoolteachers.

Michel Ehrenhard, Programme Director BSc IBA and MSc BA
Graduates of the bachelor International Business Administration and the master Business Administration are educated not only to be pioneering and curious, but also to be excellent collaborators who act with integrity and responsibility. Our classrooms are international and inclusive. While deploying intercultural competence, our students learn to critically reflect on organizational performance, including the responsible, sustainable, and ethical aspects of business.
The projects in our bachelor's programme deal with social and/or technological innovations. Their wider social context and associated ethical implications are also considered. The master's programme focuses on designing social and/or technological innovations and bringing them to the market, while considering their wider social context and associated ethical implications.

Michiel Heldeweg, Programme Director MSc MEEM
Today's grand challenges (climate change, resource depletion, urbanization, as well as ecological and socio-economic stress) call for professionals who are able to organize, manage, and lead socio-technical change. *The Master programme Environmental and Energy Management* teaches the interrelated management and governance of three crucial natural resources: environment, energy, and water. The program will equip students to convert global challenges, such as the United Nations' Sustainable Development Goals (SDGs), into manageable local solutions.

Marianne Boenink, Programme Director MSc PSTS
The MSc programme, *Philosophy of Science, Technology and Society*, teaches students to analyse specific technologies and their impact on society. The questions which the students will explore in this master's program include:
How are information and communication technologies affecting our privacy?
Can we anticipate the future implications of nanotechnology for society?
Are there ethical limits to the genetic modification of animals and human beings?

Menno de Jong, Programme Director BSc and MSc COM
Everything in human life hinges on communication. In the Bachelor of *Communication Science*, students will learn to analyze complex problems while considering the role that communication can play in solving them. Students deal with questions such as: How do ICT (information and communications technology) developments affect the inclusion of less educated people? Which communication and Internet skills do people need to function in society? Does the use of social media cause people to live in "information bubbles"? What are the main current and future privacy threats posed by ICT?

René Torenvlied, Programme Director BSc MST, MSc PA and MSc ES

The programmes in the public administration field at the University of Twente are strongly oriented towards real-life challenges that link closely with the United Nations' sustainable development goals. The bachelor's program in Management, Society & Technology integrates the core subjects of public administration with profound knowledge of modern technologies and their effects on societal challenges. Students design innovative solutions to complex governance challenges in fields such as poverty and immigration, public health, education, (cyber) security, sustainable cities and communities or climate action. Public administration as a field is all about building strong institutions for peace, justice, and prosperity. The master's programs in Public Administration, as well as Global and European Studies, build specialized, interdisciplinary competences in students when it comes to public administration and these fields. The joint degree bachelor's program in Public Governance across Borders with the University of Münster, provides intercultural competences and experiences of students who cross borders in the world.

Marco Schutten, Programme Director BSc and MSc IEM

An industrial engineer aims at optimising processes to improve not only organisations, but also the environment and society. Product lifetimes are decreasing, suppliers and buyers are spreading across the planet, and more activities are outsourced. Sustainability is an important issue, which we address in this context. In both our bachelor's and master's programmes, students learn to cut straight to the heart of the supply chain – from sourcing raw materials to delivering finished products to customers. Furthermore, they learn to connect fundamental research with practical application to develop and implement effective healthcare. In this way, we educate students who will have a positive influence on our society.

Mariëlle Stoelinga, Scientific Leader MRM

The part-time Master programme in Risk Management enables managers and professionals to realize their risk management ambitions across the public and private sector. This comprehensive program equips practitioners with a thorough understanding of societal and business risks, as well as their dependencies. They develop an understanding of various specialist risk management themes with a view to develop a sustainable vision and policy. These themes include, for example, financial risks, project risks, human risks, and technological risks.

Examples of SDG-related education in BMS's study programmes

Principle 2 | Values:
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BSc IBA Module 11: Changel*. *Teachersteam: Hans Vossensteyn (coordinator), Rez Kabir, Celeste Wilderom, Peter Stegmaier, and Jeff White

This module (third year) is designed around the development of a sustainable and responsible business innovation based on the knowledge domains of change management, corporate governance, business ethics, leadership, as well as strategic and responsible foresight. Students analyze – individually and in groups (of four to six students) – real-life business cases from the knowledge domain perspectives and learn to define the roles which businesses can play to enhance responsible innovation. As such, corporate innovations and firm performance are aligned to social responsibility, cross-cultural collaboration, and sustainable development.


Hans Vossensteyn


Rez Kabir


Celeste Wilderom


Peter Stegmaier


Jeff White

Marc van Vuuren, BSc CS Module 11: A Better World (201700207)

The world faces grand challenges. These challenges affect people, raise questions about the use of resources, and are influenced by technologies. Think: climate, health, polarization, democracy. These and other themes are difficult to address, given that knowledge is incomplete or contradictory, a large number of people and opinions are involved, and they are interconnected with other problems. In this module, students can select one of these contemporary global problems and analyse the role of communication in the emergence of the problem. We aim at proposing a step forward in which communication plays a central role. How can communication scholars contribute to a better world? Students will have to address the different perspectives on the nature, causes, consequences, and proposed solutions to this problem, and be reflexive about their own position. We will explore ethical and philosophical paradigms to cope with the complexity.

Laura Franco-García, MSc MEEM: Sustainable Management Strategies (SMS)

In this course, the graduates gain knowledge of and insight into key concepts and principles, which direct management strategies at businesses towards sustainability. Students learn about the design and implementation processes of environmental management systems (ISO14001) and corporate social responsibility. Circular economy is also addressed, due to the burgeoning deployment of "circular" business models, such as service instead of product ownership, which enables producers to keep the value of materials. We also discuss the social and environmental life cycle assessment (SELCA) as a tool whereby managerial decisions concerning social and environmental impacts can be made. Moreover, students learn about social entrepreneurship theories and examples. In sum: This course reflects on the developments – in practice – of SMS and the way in which responsibilities are shared among businesses, governments, consumers, entrepreneurs, and non-governmental organizations (NGOs). Collaborators from Oost NL and ET faculty (Willem Haanstra)

Raymond Loohuis, MSc BA: Business to Business Marketing

What does it take to successfully strategize and create value in complex, dynamic business environments? This course focuses on the key processes, which are involved in creating/capturing value and strategizing from an ecosystem perspective with a particular emphasis on the continuing smart industrial revolution. Students learn about the foundational premises of these processes. They learn to critically analyze and address contemporary strategic business marketing problems at a firm level and they learn to consider its wider societal/industrial implications. They also learn about creating solutions and new, sustainable business opportunities by using state of the art literature.

Devrim Yazan, BSc IEM: Module 6, Consumer Products

This module contains a component, **"Sustainable Supply Chains."** This component is designed such that it enables the BSc IEM students to understand how sustainable product design can be integrated to bring about sustainable supply chain design and to measure the sustainability performance indicators of a consumer product's supply chain.
In the project of this module, the IEM students try to design (in collaboration with Mechanical Engineering and Industrial Design Engineering) a sustainable product by considering a specific company's needs. The students are expected to learn how to:

- Describe the main concept of sustainability;
- Describe how the products and supply chains relate to the sustainability concept;
- Apply environmentally and socially sustainable solutions in their projects with companies;
- Design environmentally friendly and economically efficient supply chains;
- Identify sustainability niches in products and relate these to circular supply chain thinking; and
- Relate the product design phase to the supply chain design phase and execute these phases simultaneously in their projects.

Henry van Beusichem, MSc BA: Business Valuation and Corporate Governance

Valuation and Corporate Governance is one of the core courses of the MSc Business Administration program. The course aims to provide students with advanced-level knowledge and insights into company valuation and corporate governance mechanisms. Overall good corporate governance can lead to improvements in terms of firm value and improvements for an economy as a whole. It can also lead to improved relations with stakeholders. This can be achieved via, for example, social issue participation, whereby firms engage in projects, which are concerned with becoming more sustainable.

Matthias de Visser (coordinator), Harry de Boer, Henk van der Kolk, Nils-Frederic Wagner, BSc IBA Module 1: TOP (Technology, Organisation, People)

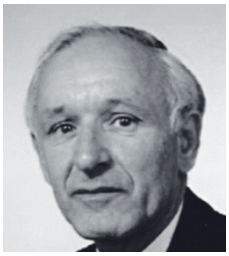
Supported with lectures on sustainability (triple bottom line), project students are invited to develop and answer a research question, which is related to one of the sustainable development goals set by the UN (no poverty, zero hunger, good health, etc.). If they submit such an answer, they compete for the SDG award: "As a BMS student you can participate in the SDG award competition if your (group) assignment (first or second quartile 18/19) has a demonstrable relation with one or more Sustainable Development Goals. First prize bachelor's assignment: €500. First prize master's assignment: €300."

Matthias de Visser

Harry de Boer

Henk van der Kolk

Nils-Frederic Wagner



Koos Krabbendam, MSc SET: Specialization Bioresource Value Chain Manager, basics in management

During September 2018, the University of Twente launched a specialization programme: Bioresource Value Chain Manager in the (3 TU) Sustainable Energy Technology master's. A part of the programme is the course basics in management on concepts of operations strategy, organizational design, and financial assessment. The main goal is that the students learn by applying the given theory to a real case of an innovative biomass industry, thereby finding business solutions for sustainable technological challenges.

Aldis Sigurdardottir, BSc IBA: Module 7a SUM (Specialization Supply Management)

Since 2010, the University of Twente is the only Dutch university to offer a specialization in Supply Management at bachelor's level. In our study on Dutch purchasers, CSR (corporate social responsibility) has been identified as one of the five megatrends, which is expected to create activities – also for the next decade. Likewise, our EU (European Union) project, PERFECT, which maps the relevant skills for European purchasers, identified "sustainability" as one of the top ten skills that are required. Hence, a part of the course consists of modules on "green procurement and corporate social responsibility."

Jeroen Meijerink, BSc IBA: Module 4 HOLI (15 EC) and MSc BA course Global Talent Management (5 EC)

In addition to realizing the SDGs, students are enabled to design human resource management policies and talent management systems, which meet both the needs of business/managers, as well as those of workers. In order to realize this, our students partner with local and multinational corporations where they design solutions to real-life challenges by combining conceptual insights with input from multiple organizational stakeholders.

Ringo Ossewaarde, MS&T: Module 2, Immigration

In my courses for BSc Management, Society & Technology, I address the UN sustainable development goals concerning societal transformations in the Technological Age, Europe in the Global Age, and Citizenship in the Digital Age. In these three courses, issues of global inequalities, poverty, gender, decent work and economic growth, technological innovation, energy, discrimination, sustainable cities and communities, climate action, global peace, and global partnerships are all discussed. In a project on the societal challenge of migration and integration, a few of these issues are also discussed in project form. Furthermore, in the bachelor's and master's theses, various of the UN sustainable development goals are typically addressed in, for instance, theses on the energy transformation or on the migration crisis.

Tanya Bondarouk, MSC BA Master Track: Human Resource Management (HRM)

In this track, students learn how management of talent, innovation, and technology contributes to sustainable business models, which are future proof. HRM sustainability means creating a competitive advantage for companies**,** sustainable employability for employees, and value for the shareholders**.** Focusing on sustainable HRM is not a soft issue. It means that you need to examine the value, which the process will deliver to the organisation in the future. This is adding responsibility to action. Focusing on sustainability is difficult in today's world. Therefore, you need to be realistic and pragmatic. And that is difficult enough already. Our students learn to focus on the customer who binds the employees and shareholders together, they learn to balance the approach between all stakeholders and technologies, they learn to develop a sustainable leadership style within the organisation, and they learn to focus on the long-term future through innovation. The double degree with the University of L'Aquila will strengthen this profile.

Giedo Jansen, BSc MS&T and MSc PA

When Giedo Jansen teaches his courses and modules, he always taps into major societal challenges. Closely tied to SDG 8 and 10, which strive towards “decent work and economic growth” and “reduced inequalities,” the thematic focus of his teaching connects with a wider and fierce debate about the future of work and resilience of economic and democratic institutions, all of which turns on the following questions: Are the risks/gain of economic and technological changes equally distributed? Or do they divide populations into those who benefit from flexibilization, globalization and technological advancements and those who do not? These SDG-relevant actions are evident in Jansen’s key teaching activities, which are as follows: (a) developing, coordinating, and teaching the module, *Public Governance Across Countrie*s, in the *Management, Society & Technology* programme, which explicitly deals with comparing socioeconomic inequalities within and between countries, (b) teaching the course, *Social Problems,* in the Public Administration master's programme, in which societal and technological challenges are examined from various theoretical perspectives, and (c) supervising a wide array of bachelor's and master's students, often within the area of the "gig" economy and the future of work.

Erwin Hans

The CHOIR research centre is one of the most productive healthcare operations management research groups in the world. Our dedicated research staff members teach our developed knowledge at every academic level. It is taught within the BSc and MSc programmes of Health Science, as well as Industrial Engineering & Management, and at a national PhD level within the Graduate Program Operations Management & Logistics (GP-OML). We also organise international PhD summer schools and teach healthcare professionals at various levels and intensities.

Anna Bos-Nehles and Maarten Renkema, MSc BA, HRM Track course: HRM & Innovation

Many organizations have many innovative ideas, but to sustainably implement these ideas is a challenge. The employees are the ones who develop these ideas and therefore we focus in this course on the HRM and management practices, which can help organizational members generate, promote, and sustainably implement innovative ideas in organizations. Our students apply innovative HRM solutions to real-life business challenges by engaging in an empirical research project to develop implications, as well as recommendations, for theory and practice.

Bas Denters (coordinator), Guus Meershoek, and Ringo Ossewaarde, MS&T Module 8: Governance-at-the-street level

New technologies have changed the ways in which urban communities face common challenges. We increasingly notice a shift from government-centred approaches towards models, which are based on initiatives and co-productions by citizens and communities in (smart) cities and communities. This trend is visible in domains as different as community policing, finding employment for the persistently unemployed, social care for multiproblem households, local energy initiatives, and neighbourhood cooperatives. In this module, we explore which factors affect the development and effectiveness of these new, co-produced, or citizen-initiated (often digitally mediated) modes of public value creation?

Bas Denters

Guus Meershoek

Ringo Ossewaarde

Devrim Yazan, MSc SET: Sustainable Bioresource Supply Chain Management (BSCM, 5 EC)

This course is financed by the European Commission, based on the Horizon 2020 ***Bioenergy Train*** project. During the course, the students are expected to learn how to:

- Model the material/waste/energy flows of Biouresource Supply Chains (BSCs);
- Identify the dynamic conditions of BSC operations;
- Quantify the economic, social, and environmental sustainability indicators of BSCs;
- Efficiently use game theory to define business strategy in BSCs;
- Develop a decision support framework for implementing sustainable businesses within BSCs; and
- Internalize the utility of business information systems to improve the sustainability of BSCs.

Maarten Arentsen, MSc SET: Specialization Bioresource Value Chain Manager

Our university is the first in Europe to offer a master's track in Bioresource Value Chain Management (BVM). Students can pursue this track in the final year of the 3TU Master in Sustainable Energy Technology. By participating in the specialization, Bioresource Value Chain Management (BVM), the students will be taught to manage, optimize, and innovate bioresource supply chains in European regional contexts and to optimize resource utilization within the framework of a bio-economy. The program aims at scientifically educating professionals to analyze, develop, manage, and innovate existing, as well as new, bioresource value chains in a European regional context. The multidisciplinary curriculum combines knowledge and skills of biology, chemical and mechanical engineering, business development and economics, as well as supply chain management and innovation.

Reinoud Joosten, MSc IEM: Special Topics in Financial Engineering

The course, Special Topics in Financial Engineering, considers techniques and games with which to engineer interesting multi-agent decision problems of the social dilemma variety, including fishery games, forestry games, shallow lake games, and other environmental pollution games, but also resource extraction games (oil, gas, etc.) concerning non-replenishable resources.

Minna van Gerven (coordinator), Ringo Ossewaarde, and Shawn Donnelly: BSc MS&T Module 7, Europe in Crisis

This module forms part of the European Studies (ES) specialization track, Management, Society and Technology (MS&T). Based on sociological, political, and socio-economic insights, the module portrays a Europe in crisis during the global era by 1) presenting a comprehensive view on the ideological principles of the current and the past crises, 2) investigating the future of the European Union in relation to its ability to govern itself in the global era, and 3) analyzing the EU's capabilities to deal with the economic, political, and social consequences of the various crises it faces now (foreign policy/security, democracy, migration, financial stability, many of which at center of the SDG goals) and evidently will face in the future when technology develops at an ever-increasing speed.

Furthermore, Minna van Gerven's teaching profile gravitates towards health, welfare, and wellbeing, all of which are closely connected to a variety of SDGs. Minna's teaching involves topics of *poverty* (1), *good health and wellbeing* (3), *gender equality* (5), *decent work* (8), *reducing inequalities* (10), and *sustainable communities* (11) in the context of bachelor's education in Management, Society and Technology (modules 2, 4, and 7) and Health Sciences (module 1). Minna also teaches the innovations course in the public health track of the Master Health Sciences, as well as policy design and implementation beyond nation states in the European Studies master's. In the latter, the UN and its SDGs feature, respectively, as one of the core institutions and one of the core object of study in our discussion about the global social policy design and implementation.

MSc BA: Entrepreneurial Leadership and Responsible Organisational Design; Teachersteam: Michel Ehrenhard, Niina Erhama, and Isabelle Hatak

In this core course for the Master in Business Administration, students how entrepreneurial attitudes can be strengthened (or weakened) by leaders, organizational designs, and the role of the firm in society. A key aspect of the course is reflecting on how far a firm's responsibility reaches in a global market place and ever increasing competition. Furthermore, factors influencing responsible (leader) behaviour and the possible gap between firm values and practices are discussed and empirically researched.

Olaf Fisscher, MSc RM: Masterclass Organizing Risk Management

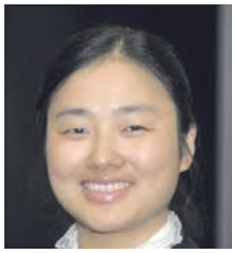
In this module, which forms part of Organizing Risk Management, three of the fifteen sessions clearly focus on the knowledge and understanding of ethics, integrity, compliance, corporate responsibility, and governance.

In the session "Fundamentals of Ethics," Prof. Dr. Ciano Aydin reflects on the most important ethical theories and the students/participants will reflect on their own moral dilemmas.

In his contribution, "Compliance & Corporate Governance," Dr. Richard Hoff focuses on responsible entrepreneurship, codes of conduct, compliance programs, and integrity risks – particularly in the financial sector – all based on theoretical concepts and experiences from his supervisory function at *De Nederlandsche Bank*. Emeritus Prof. Dr. Olaf Fisscher's session, "Organizational Ethics and Integrity," is all about reflecting on the integrity of the individual and of his/her own organization. Questions concerning the organization of integrity, social accountability, and the development of moral competence at individual and organizational level are central. The neo-liberal and stakeholders perspectives on knowledge exchange and reflection are discussed, as well as modernist and post-modern approaches.

Kris Lulofs, MSc MEEM: Water Governance

Water Governance is a specialization offered in the Master of Environmental and Energy Management (MEEM). It teaches students to *understand* the problems and challenges involved in reaching out for sustainable water resources, as well as safe and affordable water supply (such as droughts, floods, pollution, salinization, increased water demand, soil subsidence, infrastructure, and management). The specialization track also teaches them to *analyze* the governance of water systems, as well as water supply services, and to assess the potential for improvement. Furthermore, it teaches them to *design* options for improvement by applying multidisciplinary and multisectoral perspectives and ultimately it teaches them to *manage* the implementation of strategies, as well as plans, and to manage the continuation of good water governance.



Xiaohong Huang, BSc IBA: Module 8a, FENSI

The course, Financing Entrepreneurial Startups and Innovative firms (FENSI) introduces financial management tools and techniques, which are used by firms and investors. Via the course, the students becomes familiar with the international institutional context, which is relevant to financing and investments. It describes the organization of international financial markets and helps students make asset allocation decisions, design investment portfolios, and evaluate portfolio investment performance. Students learn how to perform a risk-return portfolio analysis; such an analysis can benefit from international investment opportunities, including those related to socially responsible investments and emerging market investments.

Erwin Hofman, MSc BA elective course: Strategic Technology Management and Innovation

In the elective course, Strategic Technology Management and Innovation, students from Business Administration, as well as Industrial Engineering and Management, study the concept of business roadmapping, modularity, and platforming. Modularity is studied from a product perspective (modularity in product design), as well as an organizational perspective, namely how product modularity plays an important role in the design and adoption of circular (inter-organizational) business models.

Kasia Zalewska, Courses: BSc IBA, Module 5, SME; MSc BA: Global Strategy and Business Development (GS&BD)

In both the bachelor's module – Strategy, Marketing & Economics (SME) – as well as the master's course, GS&BD, students learn about the strategies of companies and their impact on their natural and social environment. More specifically, we focus on corporate social responsibility and the models that established companies use to deal with environmental issues and to serve their (broad range of) stakeholders. Furthermore, students learn which issues must be considered for developing social business models. In SME, bachelor's students can incorporate one of the SDGs into the project. They do so by proposing a new "green" strategy. Furthermore, in the master's course students become familiar with social entrepreneurship. Students then need to design a business model for a new sustainable enterprise aiming at solving environmental or social problems.

Devrim Yazan, MSc IEM: Sustainable Business Development (5 EC)

Sustainable business development based on circular economic business models is implemented in four phases: identification, assessment and evaluation, implementation, and monitoring sustainability. This course is therefore based on four principle learning goals:

- Identify opportunities for conducting business and recovering value in accordance with the principles of the circular economy.
- Assess and evaluate the dynamic conditions, which influence decision-making and define managerial strategies for identified business opportunities in a real case.
- Implement circular economic business in a real case based on the outcomes of the identification and assessment phases.
- Monitor the sustainability of the implemented business over a period of time, based on the decisions that were made in the assessment phase

Maarten Arentsen, MSc MEEM: **Energy Management**

Energy Management is one of the three specializations offered in the Master of Environmental and Energy Management (MEEM). The specialization particularly refers to SDGs 7 (energy) and 13 (climate change). The course teaches students about the need of a rational use of energy in markets, regions, cities, communities, and industries. It also provides them with knowledge and tools to innovate, as well as optimize, current energy use in the Global North and the Global South.

Mattijs Noordzij, MSc PSY course: Compassionate Technology (Positive Psychology and Technology)

Compassionate Technology teaches knowledge and skills for the possibilities to reduce suffering and increase wellbeing in mental healthcare through technology. Therapy through technology is often framed as cold and uncaring; it is also often contrasted with a human therapist's warmth and connection. This course will enable students to learn a new viewpoint and be ambassadors for the idea that both technology and the human therapist together can create compassionate mental healthcare. However, just as a therapist needs to be well trained, technology needs to be well designed and evaluated to make a relevant and positive contribution to mental healthcare.

Shawn Donnelly

My overall teaching profile is concerned with economic strategy in which a wide variety of SDGs are addressed. I teach on the topic of *Decent work and economic growth (8)*, as well as industry, innovation and infrastructure (9). I also teach the related topics of poverty (1) and sustainable communities (11) in the context of bachelor's education in Management, Society and Technology (Modules 1 and 7) and International Business Administration (Module 5). I focus is on promoting and managing technological innovation in developed countries, engineering financial markets – particularly in Europe, and analyzing the sources of inequality and their solutions (Module 7 MST). Peace, Justice and Partnerships are handled in MST Modules 7 and 8, and as part of the Master in European Studies (the international relations and regulatory design courses). Health and Well-Being is taught in the course on innovations in public health track of the Master in Health Sciences

Hans Bressers, MSc PA elective course Environmental Policy

Already since 1988 students from MSc PA and its Dutch language predecessor have been able to follow the course Environmental Policy. Also, UT master students from other programmes often follow this elective course. The course deals with the various aspects of policies that aim to support a more sustainable society. Next to the relevant theories, also the practical functioning of these policies is discussed. Among the subjects included are: sustainability and environmental quality as policy problems, the various forms of steering strategies in environmental policy, water management, the relationship between governments and companies in practice, the role of consumers, the international context and environmental governance.

Minors, electives, and courses for other UT degree programs

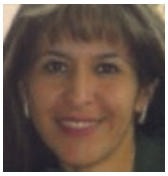
Minor: Crossing Borders (30 EC)

Students of all UT bachelor's programmes can enroll.

Crossing Borders is structured around international Grand Challenges of which the Sustainable Development Goals are the prime example. In two modules, students learn about these challenges: first from a theoretical perspective, then from a practical, hands-on experience. As part of the latter, students do an international field study, a study tour, or a virtual project. In all of these versions, students conduct a research project, which is connected to an international Grand Challenge. The minor allows students to develop insights into the world's challenges. It encourages them to actively contribute toward solving these challenges, while they gain valuable academics skills and boost their personal development in the process.

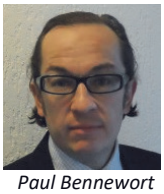
Teachersteam:


Martin Stienstra


Laura Franco Garcia


Renze Kolster


Ben Jongbloed


Paul Bennewort

HTHT minor Innovations in Sustainable Chain Management

This high tech – human touch minor is about analyzing and improving chains to contribute toward a sustainable future. Students learn and practice the concepts, methodology, and approaches that are needed to optimize chains in a people, planet, and profit (3Ps) perspective. The module, Analysis (15 EC), has mapping interactions between materials, technology, economy, and society as central theme. The module, Design (15 EC), elaborates on options for improvement in an interactive design process. A real life case, connected to stakeholders, is used in both modules, while the assignments target both technical and social innovations of chains.

Teachersteam: Kris Lulofs (coordinator: design module) and Frans Coenen (coordinator: analysis module)


Kris Lulofs


Frans Coenen

Minor: Module Innovation & Entrepreneurship (15 EC: Joost Brinkman, Sandor Löwik, Jeroen Sempel, Joris Heuven, and Bjorn Kijl) + Module New Technology Business Development (15 EC: Raymond Loohuis, Patrick Bliek, and Bjorn Kijl)

Innovation & Entrepreneurship is the first part of a 30 EC program. This part is organized around the basics of innovation, financial management, and general entrepreneurship. The biggest part is concerned with the lean startup project. We encourage student to consider (SDG) problems from another perspective. The problems that student write a business plan on can help change existing businesses or create new businesses within the technology,sSustainability, and development disciplines. In the module course, Innovation Management, students learn that organizations can use SDG challenges as drivers for new sustainable and social innovations.

New Technology Business Development is the second part of a 30 EC program. This part is organized around new technologies of the university or companies. The advanced knowledge about intellectual property and high-tech marketing help the students work toward a feasibility study on a new technology. This new technology can add value to existing or new businesses within the technology, sustainability, and development disciplines.

Teachersteam:


Joost Brinkman


Sandor Löwik


Jeroen Sempel


Joris Heuven


Bjorn Kijl


Raymond Loohuis


Patrick Bliek

Minor: Industry 4.0 with Human Touch

This new multidisciplinary minor responds to the Fourth Industrial Revolution: Industry 4.0 (also called Smart Industry). This revolution involves advances in underlying technologies, for example, production and ICT (information and communications technology), as well as changes in the business models of firms. It is also likely to have a deep impact on our society.

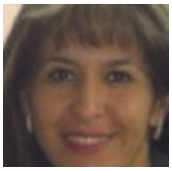
This minor consists of a project assignment and four courses, namely Technology, Computer Science, Business, and Society. Sustainability is included in the "Society" component to add reflective insides on how industry 4.0 technologies influences the environment quality and society.

The BMS people who are involved are: Holger Schiele, Laura Franco Garcia, Katrin Hahn, Anna Bos-Nehles, Kornelia Konrad, and Klaasjan Visscher; coordinator: Wieteke de Kogel Polak.

https://www.utwente.nl/en/industry40/minor/flyer-minor-industry-4.0.pdf

Teachersteam:


Holger Schiele


Laura Franco Garcia


Katrin Hahn


Anna Bos-Nehles


Kornelida Konrad


Klaasjan Visscher


Wieteke de Kogel Polak

Minor: High Tech Talent Management in a Global Context (15 EC)

This minor course is open to students from a diverse set of studies, with both a business/social and technical background.

In today's global and technical economy, organizations still need people. This has led to a war for talent. This minor is designed to develop knowledge and skills for managing IT-enabled talent management practices in an international context. The issues which are addressed, include the following: who are talents, are cultural differences taken into account, and how can information technologies facilitate processes like selection of human talent? Through interactive participation and group assignments this minor prepares students to think and discuss with peers from different backgrounds, thereby resulting in valuable academic and personal skills.

Teachersteam:


Tanya Bondarouk


Milou Habraken

Minor: Serious Gaming (Ton Spil)

This minor starts with a three week health challenge in which the UN health goal is explored at three healthcare organizations in Twente. This usually leads to innovative advice from the student groups. Afterwards, they can select from the UN goals and create a serious game, which drills down from the abstract goals to specific goals on learning, health, and sustainability.

The Curious U course, Serious Gaming, is designed with the same course format, but is taught in eight days instead of ten weeks.

SUM-LAB: Smart Urban Mobility in Curitiba, Brazil

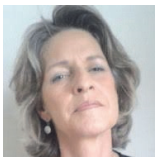
On the initiative of the former UT research institute, IGS, the Smart Urban Mobility Lab was developed in conjunction with the City of Curitiba in Brazil. In this virtual lab, UT exchange students carry out projects with researchers and students from the local universities UTFPR (the Technological Federal University of Paraná), UFPR (the Federal University of Paraná) and PUCPR (the Pontifical Catholic University of Paraná). The research team formulates the key challenges facing urban mobility in the metropolis of Curitiba and how these challenges can best be met. The SUM-LAB brings many disciplines and backgrounds together so that thorough and in-depth analyses can be conducted concerning the multifaceted challenges that relate to urban mobility in the metropolis. This also enable the students to test innovative mobility solutions by using the city as a living lab.

BMS students who are interested in topics related to urban mobility are welcome to participate in the SUM-LAB exchange program (15 EC courses, 15 EC research project). Thus far, sixteen UT students (MSc and BSc) have spent a research period at the SUM-LAB,

Michael Nagenborg, BSc Civil Engineering: Module 6, "Sustainable Development"
The module is focused on the SDG's role for civil engineers. In module 6 ("Sustainable Development") of the civil engineering program, Michael Nagenborg's contribution is focused on the role of (distributive) justice in the SDGs in general and in meeting specific SDG targets in particular. A particular emphasis is placed on understanding SDGs in context rather than in isolation. Other teaching activities in various programs contribute toward a better understanding of values in technological design (e.g., "Ethics in Industrial Design" as part of the module "Smart Products" in the industrial BA design program).

CuriousU summer school

During summer school 2018 a few SDG-related courses were offered by teachers of BMS

Joost Brinkman and Annemarie de Ridder. *Entrepreneurial U*
This program (open for everybody) is designed as a summer school track for the University of Twente's summer school, CuriousU. The project runs for eight days in a row with one day off. Students can accelerate their own entrepreneurial opportunity. A content program is offered by *NIKOS* (the Netherlands Institute for Knowledge-intensive Entrepreneurship) together with entrepreneurs and experts. The program stimulates ideas in fields of technology, sustainability, as well as development and social entrepreneurship.


Sjoerd de Vries and Joachim Wetterling *Smart Cities*
Smart Cities is a rapidly growing concept in both research and policy practice. It is viewed as a solution for cities to better cope with key societal challenges like energy transition, mobility, and social innovation through extensive and effective use of big data and IT.
This, in turn, calls for new modes of – smart – governance, with the active involvement of a wide diversity of public, private, and citizens' organizations. In this summer course, Smart Cities is studied via three themes. First, we focus on Resources and Infrastructure (water, energy, and mobility). Second, we focus on the Digital City (Big and open data, geo informatics). And third, we analyze Social Innovation (new modes of governance and behavioral change).

Jochem Goldberg *Health and Happiness*

Researchers have long known that health and happiness go together. Studies show how individuals can actively influence their own health and well-being. Numerous interventions and techniques, often with the help of technology, have been developed to help promote a healthy lifestyle.

In this summer course, we will address a couple of questions:

What role can technology play to support health and well-being?

What makes people happy?

How can we change unhealthy behavior?

Inspired by insights from health psychology, positive psychology, communication sciences, and eHealth, this course will help you address these questions. You will work on several cases related to health and well-being, with the ultimate goal to boost health, both physically and mentally.

Andreas Weber *Governance and Ethics of Technology*

Technological innovation is a genuinely social process: people matter! New technologies are made, used, and maintained by people. Conversely, technologies are shaping people, society, economy, politics, world views, and culture. Technologies and societies coevolve, at present, in the past, and in the future. In the form of lectures and hands-on exercises, the participants of this summer course learn how to understand, evaluate, and shape this dynamic. The summer course is taught by an enthusiast team of governance and innovation scholars, philosophers, and historians from the University of Twente and international guest lecturers. After ten days of intensive study and debate, students will have a clear view on the options and limitations concerning the conscious shaping of technology in society.

Sofie Berghuis, Evaluating Future Health Technologies

Technology in healthcare is improving; more and more new technologies to improve the quality of healthcare are being developed. However, it would be impossible to implement all these technologies, and one of the underlying reasons are the rapidly increasing healthcare costs. Although the technologies seem very promising, we still have to make good decisions on whether or not to use them in clinical practice or reimburse them.

This CuriousU Summer School track learns students how to evaluate new technology in terms of its potential effectiveness and its additional cost. They will learn several health economic methods that can be used when performing an early health technology assessment. These methods include, for example the Multi-Criteria Decision Analysis, decision trees, Markov models, and the Budget Impact Analysis. Students will work with these methods and they will gain hands-on experience in such health economic methods to evaluate new technologies. First, students will get to know the new technologies, which are currently being developed or refined at the University of Twente. Second, the students will evaluate these technologies themselves by using the methods, which they have learned during this summer school.

Other courses

Joost Brinkman, Tailored acceleration programme for Chinese honour students

Selected group of Chinese honour students

This program is designed as an extra-curricular activity in which students can accelerate their own entrepreneurial opportunity. A group of students from an affiliated Chinse university visits Twente for three weeks as part of a summer program. The basics of Entrepreneurship are taught. The programme stimulates ideas in field of technology, sustainability, as well as development and social entrepreneurship.

Massive open online courses (MOOCs)

As a young and entrepreneurial university in the Netherlands, the University of Twente prepares young people to tackle the grand challenges the world will be facing during the coming decades.
BMS has developed four MOOCs for this purpose.

Prof. Peter Paul Verbeek, **Philosophy of Technology and Design: Shaping the Relations Between Humans and Technologies**
https://www.futurelearn.com/courses/philosophy-of-technology

By the end of the course, you will be able to:
- Evaluate a few classical thinkers in philosophy of technology;
- Reflect on the power of technology: are humans still in control?;
- Explore the contemporary philosophical approach of technological mediation;
- Engage in case studies to gain insights into the impact of technology on society and human life;
- Debate the ethical dimension of technology and apply this to design; and
- Discuss the ethical limits of designing technologies that influence our behaviour.

Prof. Jos van Hillergersberg, **Supply Chain Innovation: How Technology Can Create a Sustainable Future**
https://www.futurelearn.com/courses/supply-chain-innovation

Understand how new technologies can make supply chains more sustainable and learn how to deal with today's trends. Every product, which we use today is the result of a supply chain: a complex series of steps that turn raw materials into the final products we use and everything related with this. Managing these supply chains has become more and more challenging, especially with all the modern technologies and trends. A few of these trends include the 24-hour economy, fast delivery of goods to your home, wanting to have customized products, and – of course – the focus on sustainability.

Lisette van Gemert-Pijnen, **eHealth: Combining Psychology, Technology, and Health**
https://www.futurelearn.com/courses/ehealth

By participating in this course you will learn:
- How technology can improve health and well-being;
- How eHealth technologies are used to enable or improve self-care, as well as prevention, supportive care, and societal health;
- How to develop eHealth that fits the user and the context;
- How to design for engagement; and
- About the diffusion and evaluation of eHealth technologies and implementation in practice.

(MOOC by Lisette van Gemert-Pijnen, Saskia Kelders, Floor Sieverink, Hanneke Kip, 2016 online, 20,000 visitors)


Saskia Kelders


Floor Sieverink


Hanneke Kip

Prof. Dr. Holger Schiele, **Purchasing and supply management fundamentals**
https://www.oncampus.de/weiterbildung/mooc/perfect?lang=en

This MOOC was developed as an output of the EU-funded project PERFECT (Planning for Environment and Resource Efficiency in European Cities and Towns). Offering free education at global accessibility, this course contributes to the goals 1 (reduce poverty), 8 (economic growth), and 9 (innovation). The course content is as follows:

- Identify the basic role, benefits, processes, and aspects of a PSM department and a variety of specific job roles. Apply a range of purchasing techniques and tools to purchasing activities;
- Describe cross-functional connections between purchasing and other departments, and departments' connections to external stakeholders;
- Identify opportunities and challenges when acting as the interface between internal customer requirements and external supply networks;
- Understand how supplier relationship management impacts on PSM performance and apply collaboration tools; and
- Evaluate trends and developments in PSM and interpret their consequences.

Rainer Harms, **Technology Entrepreneurship: How to Start a New Venture**
https://www.futurelearn.com/courses/technology-entrepreneurship-start-a-new-venture

From September 2018, the MOOC, “Technology Entrepreneurship,” is online. With the MOOC we contribute to the UN development goal no 8, the promotion of sustained, inclusive and sustainable economic growth. MOOC-based entrepreneurship education leads to “ higher levels of economic productivity through diversification, technological upgrading and innovation” and promotes “entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises”. We point out that a MOOC is also inclusive, as it can be accessed from people all over the world. By the end of the course, students will be able to:

- Develop a technology-based business model from a basic idea towards a financially sustainable business;
- Apply the lean startup principles as a tool for new venture development;
- Recognize the importance of being marketing-oriented and how networks affect new venture development; and
- Use tools for analyzing the revenue of a new venture.

Student activities

The University of Twente Purchasing Conference (UTPC) is an independent nonprofit organization, which is organized by a team of international, motivated, and highly engaged students from the University of Twente. Under the heading “Come and meet the excellence,” this conference specifically explores the topics of purchasing and supply management. Participants of the UTPC have the chance of gaining state of the art insights and the opportunity of meeting with outstanding people in an international context, thereby extending their professional network.

The fourth edition of the UTPC took place as a one-day event on **March 5th, 2018** and was organized around the topic: **"Discover new opportunities – Supplier innovation in Purchasing**." When organizations collaborate with their suppliers, they can build trust, reduce relational stress, and increase innovation-related activities. With the changing climate, sustainability becomes a more important topic, which can be faced by innovation. Organizational progress and development is ensured by innovation – so how do you discover new opportunities? The next edition will take place on the March 15th, 2019 and will deal with the following topic “Soft skills and Strategy - the essence of future leaders!”

Student association: Sustain

Lisanne de Weert
Bas Coenen and Lisanne de Weert joined the minor, "Sustainable Development in Developing Countries" (now "Crossing Borders"). During their field study in Guadalajara, Mexico, they were inspired by the altruistic work, which the students were doing there. Back home they joined forces with other students from this minor (including BMS students) and organized a large lunch lecture with different speakers and a no-waste lunch for more than one hundred students. The goal was to inspire them to use their knowledge and energy for good causes. This enthusiastic group of people is still growing and new students who joined are now starting an association: Sustain!

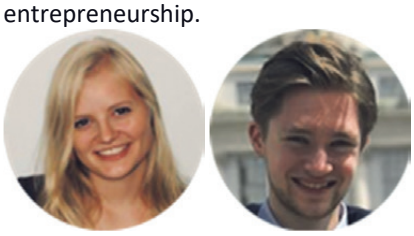
AIESEC (International Association of Students in Economic and Commercial Sciences)

At present the world faces a lot of challenges, which are mostly caused by humans and which can also be overcome by humans. The sustainable development goals are set as a more concrete goal to reach. When striving to overcome these challenges, AIESEC believes that leadership is the key to achieve the sustainable development goals, because we need people who take responsibility for the world and share their findings. We try to develop leadership qualities in young people by providing practical experiences abroad, which will give them a different perspective on the world and its cultures. We hope that this will make people more aware of the global issues and that people can have an impact on what is happening around them.
On a more practical note: At the University of Twente, AIESEC helps students go abroad on a voluntary project in one of the more than one hundred and twenty five countries AIESEC is situated in. All AIESEC's voluntary projects are connected to at least one of the sustainable development goals.

University Innovative Fellows (UIF)

The University Innovation Fellows Program empowers students to become change leaders in higher education. Students are taught to think critically and to come up with innovative solutions. Amongst others, the UIF Twente are running projects not only to attract more students to Enschede, but to also get them to stay in the region after graduation. Moreover, the UIFs are hosting a four-day meet up about innovation and entrepreneurship.

In general, the UIF projects are closely related to the SDGs “Quality Education” and “Industry, Innovation and Infrastructure.” The current UIFs from the BMS faculty are Julian Sotscheck and Anja Dömer



STRESS Study tour 2018-2019 “Sustainability by Technological Innovation”

Every year during the minor semester (third year, first semester), the student association STRESS organizes (together with some teachers) a study tour for BSc IBA and IEM students. In 2018/2019 the study tour goes to Singapore. Singapore is one of the most forward-thinking cities when it comes to sustainability. It has been Southeast Asia's most modern city for more than a century. Besides, Singapore is a dynamic city, which is rich in contrast and color, where a harmonious blend of culture, cuisine, arts, and architecture can be found.

The students will learn more about "Sustainability by technological innovation." The main question will be: "How do technological innovations impact the sustainability of businesses within Singapore?

RESEARCH

This section presents various research projects related to the UN sustainable development goals

Principle 4 | Research:
We will engage in conceptual and empirical research that advances our understanding about the role, dynamics, and impact of corporations in the creation of sustainable social, environmental, and economic value.

Research and activities related to Sustainable Development Goals

BMS has an excellent research track record in areas related to the sustainable development goals in the form of journal articles, books, research projects, conferences, workshops, and PhD projects. Research covers areas such as CSR (corporate social responsibility), sustainability, social entrepreneurship, development studies, global political economy, and responsible communication.

Ellen Giebels, Dean of Research

The research and education related to the UN's SDGs fit perfectly in with the BMS strategy, which was renewed in 2016 ("BMS under STEαM; Towards a Vision 2021").
The BMS faculty's *research mission* is "Technology for Life." This refers to technology as the interplay between technical artifacts, individual lives, organizations, and society. The synergy that is created in interdisciplinary research contributes toward the development of concepts and theories to better understand the impact of human-technology interaction;, it also contributes toward research methods to create, assess, implement, and valuate technological innovations, which have an impact on contemporary societal challenges. The BMS faculty strives to create societal value by designing and experimenting with technological innovations in close collaboration with societal partners. By closely collaborating with societal groups and institutions, the BMS research program wants to contribute toward the following: continued education of professionals about technological innovations; endorsing the development of new technologies that people will use to solve societal problems, supporting the establishment of new forms of organizing adapted to new technological systems, providing new implementation strategies and governance models, and delivering tools, and well as regulations and advice for socio-economic policies at a societal level.
The BMS faculty focuses on 5 focal research themes that are relevant to science and society and which emerge as the starting point for further planning and BMS research programme development during the next five to ten years:
1) **Healt**h: Health and well-being, health technology, and healthcare;
2) **Learning**: Interdisciplinary learning sciences and technology research;
3) **Resilience:** Smart cities, sustainable communities, and safe societies;
4) **Smart Industry**: Business, society, and people in the Fourth Industrial Revolution
5) **Emerging Technologies** and societal transformations (overarching)
Each of the five themes contributes toward an overarching research program in its own unique way by being tailored to the theme's specific challenges. The first theme has a cross-cutting focus on the interplay between emerging technologies and societal transformation, which provides the means to conceptualize and evaluate the interplay across the other themes. The themes are also mutually related to each other.

This section gives an overview of the relevant research projects and activities, which were undertaken for each focal research theme during 2017 and 2018.

The BMS Ethics Committee

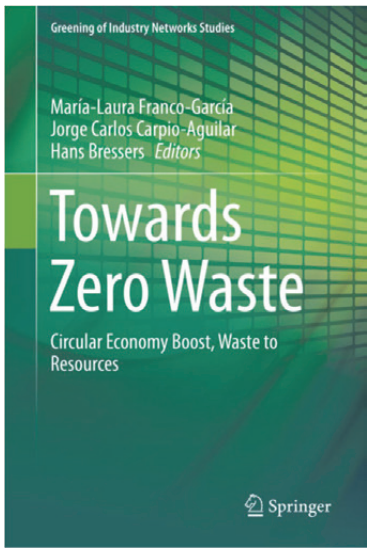
Marianne Boenink, Chair

In order to ensure an ethically responsible research practice, the BMS faculty's employees and students can only commence with research on human beings after their research proposal had been ethically assessed. As of October 1st, 2016, this mandatory ethical assessment of research is extended to all research on human subjects carried out within the entire BMS faculty. A webpage contains all the information pertaining to the assessment procedure, as well as the ethical principles and criteria applied. https://www.utwente.nl/en/bms/research/ethics/

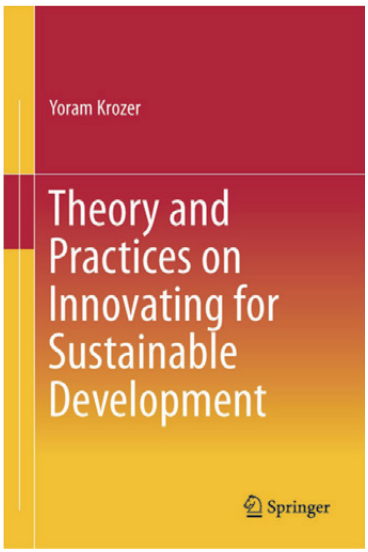
Principle 2 | Values:

We will incorporate into our academic activities, curricula, and organisational practices the values of global social responsibility as portrayed in international initiatives such as the United Nations Global Compact.

Examples of books



Laura Franco (European coordinator of the "Greening of Industry Network") October 2018



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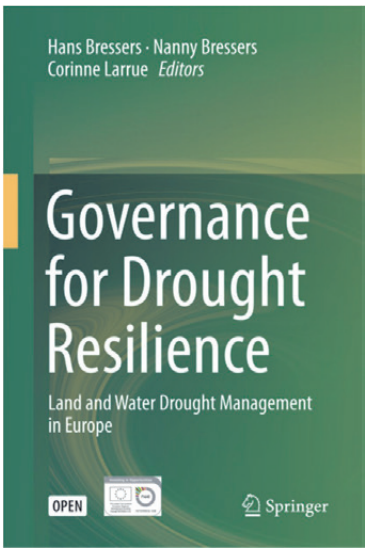

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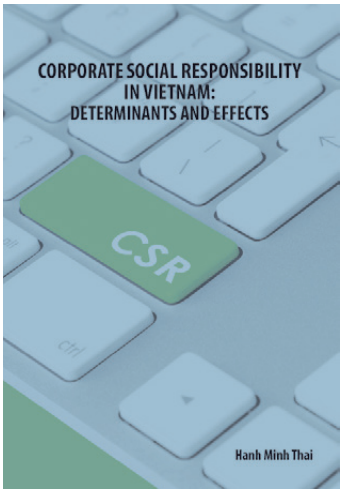
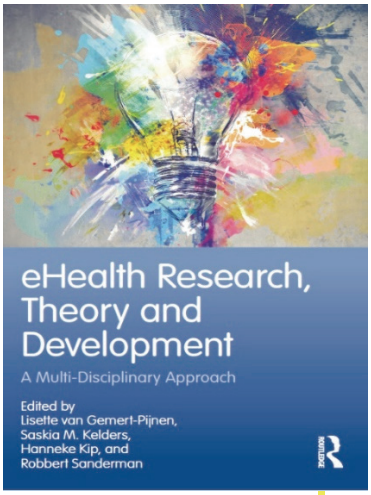
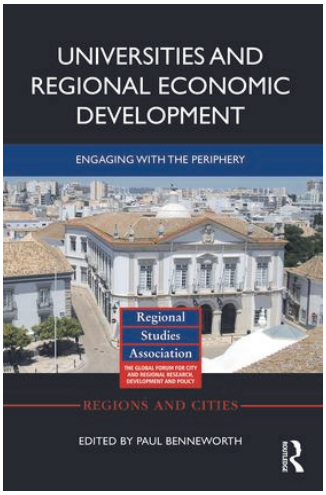


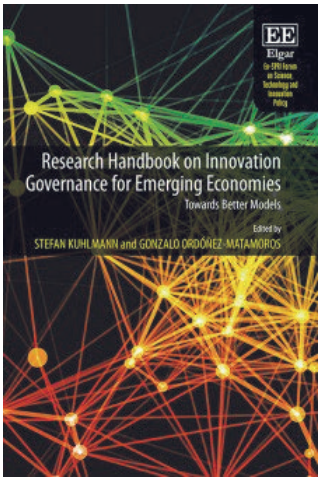
Hanh Min Thai
PhD research , Sept 2017
Promotor: Rez Kabir



2018 Research & Education eHealth (see MOOC eHealth)



2018 Universities and regional economic development in the periphery



Kuhlmann, S. & Ordóñez-Matamoros, G. (eds.) (2017): Research Handbook on Innovation Governance for Emerging Economies: Towards Better Models, Cheltenham, UK (Edward Elgar)

Petra Kuenkel
PHd research December 2017
Promotor: Celeste Wilderom

Health: health technology, healthcare systems, and the transformation of healthcare

Ensure healthy lives and promote well-being for all at all ages

Lisette van Gemert-Pijnen

In order to anticipate societal challenges and also future funding opportunities, the BMS health research program undertakes to make a societal impact on the *health and well-being* of individuals, the *transformation of healthcare* governance, as well as the organization and development of *novel technologies*, by iteratively including the perspectives and preferences of all stakeholders, thereby contributing to an including a healthy society. For instance, a community-based approach to healthy living might be developed by integrating new all-inclusive technologies in health initiatives and empowering citizens to manage their own health and well-being even during and after illness.
To this end, researchers work closely with stakeholders and organizations in the health domain to develop and evaluate new technological interventions, as well as evaluation methods, and to advise on their implementation.

Selection of publications related to SDGs

- Derks, P. M. J., De Visser, T., Bohlmeijer, E. T., & Noordzij, M. L. (2017). mHealth in Mental Health: How to efficiently and scientifically create an ambulatory biofeedback e-coaching app for patients with Borderline Personality Disorder. International Journal of Human Factors and Ergonomics, 5(1), 61–92.
- van Lier HG, Oberhagemann M, Stroes JD, et al. Design Decisions for a Real Time, Alcohol Craving Study Using Physio-and Psychological Measures. In: International Conference on Persuasive Technology. ; 2017:3-15.
- van Lier HG, Pieterse ME, Schraagen JMC, et al. Identifying viable theoretical frameworks with essential parameters for real-time and real world alcohol craving research: a systematic review of craving models. *Addict Res Theory*. 2017;0(0):1-17.
- Nelson EC, Verhagen T, Noordzij ML. Health empowerment through activity trackers: An empirical smart wristband study. *Comput Human Behav*. 2016;62:364-374.
- van Gerven, M., & Ossewaarde, M. (2018). Beyond the neoliberal paradigm? Images of Social Europe in open method of coordination employment peer reviews. *Social policy and administration*. DOI: 10.1111/spol.12390
- Schulz, L.M. ,Spil, Ton AM & Vries, S de(2018) Gamified Wearables in Obesity Therapy for Youth, *AMCIS conference 2018,* New Orleans.
- Spil, Ton AM, Bruinsma, G & Katsma, CP (2017) Implementation and Diffusion of a Serious Game; Playing is the proof of the game. *European Conference of Game Based Learning proceedings,* Graz
- Spil, Ton AM, Sunyaev, A, Thiebes, S & Van Baalen, R (2017) The Adoption of Wearables for a Healthy Lifestyle: Can Gamification Help?, proceedings HICSS, USA.
- Spil, Ton A.M. & Bruinsma, G (2016).Designing Serious Games with the Game of Games. *European Conference of Game Based Learning proceedings,* Glasgow, Great Britain.
- Spil, A.A.M. & Cellucci, Leigh W. (2015). Electronic health records across the nations. *Health policy and technology, 4*(2), 89-90. 10.1016/j.hlpt.2015.02.002
- Hurmuz MZM, Janus SIM, van Manen JG. Changes in medicine prescription following a medication review in older high-risk patients with polypharmacy. International Journal of Clinical Pharmacy. 2018;40(2):480-487.
- Steentjes L, Siesling S, Drummond FJ, van Manen JG, Sharp L, Gavin A. Factors associated with current and severe physical side-effects after prostate cancer treatment: What men report. Eur J Cancer Care. 2018; 27, 1, e12589.
- Kip, H., Bouman, Y., Kelders, S. M. & van Gemert-Pijnen, J. E. W. C. 21 Feb 2018. eHealth in Treatment of Offenders in Forensic Mental Health: A Review of the Current State. In: Frontiers in Psychiatry. 9,

- Sieverink, F., Kelders, S. M. & van Gemert-Pijnen, J. E. W. C. Clarifying the Concept of Adherence to eHealth Technology: Systematic Review on When Usage Becomes Adherence. 6 Dec 2017 In: Journal of medical internet research. 19, 12, e402
- Scholten, M. R., Kelders, S. M. & Van Gemert-Pijnen, J. E. W. C. Self-guided Web-based interventions: Scoping review on user needs and the potential of embodied conversational agents to address them. 1 Nov 2017 In : Journal of medical internet research. 19, 11, 18 p., e383
- Lentferink, A. J., Oldenhuis, H., de Groot, M., Polstra, L., Velthuijsen, H. & van Gemert-Pijnen, J. E. W. C. Key Components in eHealth Interventions Combining Self-Tracking and Persuasive eCoaching to Promote a Healthier Lifestyle: A Scoping Review Aug 2017 In : Journal of medical internet research. 19, 8, 19 p., e277
- von Birgelen C, Zocca P, Buiten RA, Jessurun GAJ, Schotborgh CE, Roguin A, Danse PW, Benit E, Aminian A, van Houwelingen KG, Anthonio RL, Stoel MG, Somi S, Hartmann M, Linssen GCM, Doggen CJM, Kok MM. Thin composite wire strut, durable polymer-coated (Resolute Onyx) versus ultrathin cobalt-chromium strut, bioresorbable polymer-coated (Orsiro) drug-eluting stents in allcomers with coronary artery disease (BIONYX): an international, single-blind, randomised non-inferiority trial. Lancet. 2018 Oct 6;392(10154):1235-1245. doi: 10.1016/S0140-6736(18)32001-4. Epub 2018 Sep 22.
- Chakhssi, F., Kraiss, J., Sommers-Spijkerman, M., & Bohlmeijer, E.T. (2018). The effect of positive psychology interventions on well-being and distress in clinical samples with psychiatric or somatic disorders: A systematic review and meta-analysis. *BMC Psychiatry, 18,* 211, doi: 10.1186/s12888-018-1739-2
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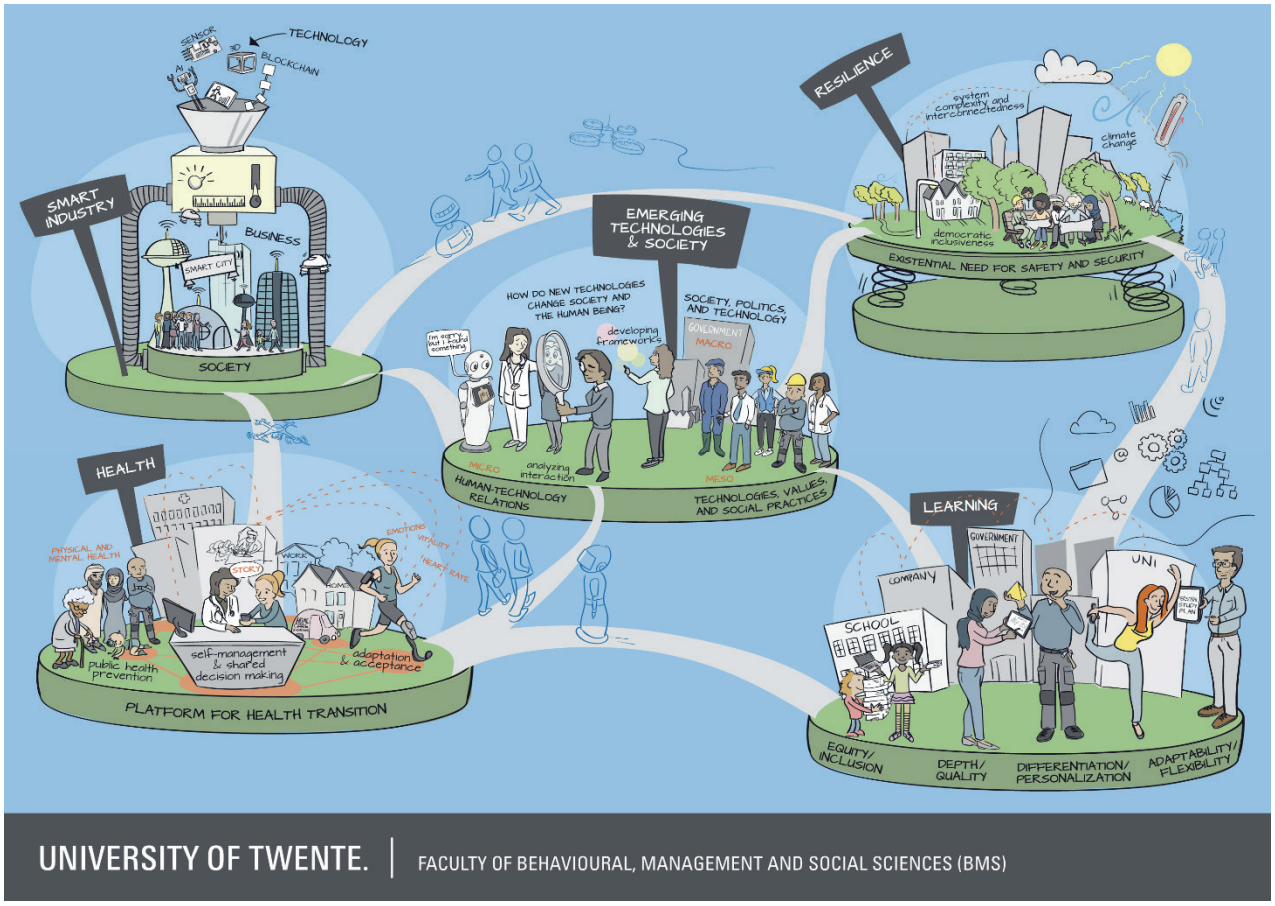


UNIVERSITY OF TWENTE. | FACULTY OF BEHAVIOURAL, MANAGEMENT AND SOCIAL SCIENCES (BMS)

Sabine Siesling: Improving cancer care

Cancer care, follow-up, as well as implementing innovative diagnostics and treatment (i.e., new technologies or new guideline decision trees) can differ between countries and within countries between hospitals. Identifying the factors, which influence this variation, that is the older age of patients at the time of diagnosis, can promote future implementation. Moreover, how the variation affects the outcome of patients can reveal the effects of innovation in daily practices. Furthermore, the organization of care, which is based on the personalized risk of patients such as recurrent cancer, can reallocate care and limited resources. The data of the Netherlands Cancer Registry, which is related to other data sources, can be used.

Christina Bode: Healthy with a chronic disease

Being diagnosed with a somatic chronic disease can influence a person's life in a variety of ways. It challenges the responsibility and self-management of the person and his / her social network regarding disease management, emotional regulation, finding new roles, and finding meaning in life. The goal is to live as healthy as possible – mentally and physically – with chronic disease(s). In order to achieve this objective, a combination of innovative assessment technology and coaching with technology-driven personalized behavioral change techniques – on a conscious and an unconscious level – are developed to support people just in time to prevent worse consequences, such as depressive mood or chronic fatigue, and to promote wellbeing and a healthy life style.


Lisette van Gemert and René Torenvlied, TIME: Technology Implementation Evaluation

The TIME project focusses on how implementation sciences and the study of knowledge translation – developed in interdisciplinary research settings – support the improvement of health and wellbeing, as well as the transformation of healthcare systems. The implementation of technologies in healthcare (systems) is a complex, multi-scale process that integrates a variety of factors simultaneously, for example, multiple stakeholder interests, legislation and financing systems, culture and diversity, and technology providers. We must develop advanced methods (qualitative and quantitative) to observe and measure the processes of compliance, translation, acceptance, and adoption of technologies over time. This enables us to collect evidence on how the implementation influences society and individuals. The goal of the project is to develop predictors for successful implementations of health technologies in different care settings and to design a methodology for assessing implementation processes in integrated care.

Thomas van Rompay: Environmental design for well-being

Environmental design is recognized as an important factor for wellbeing and related processes, such as creative thinking and feeling connected to others. Furthermore, technological developments provide ever more opportunities for tailoring design to specific patient needs and concerns. At the same time, VR (virtual reality) technology provides means for simulating and testing environmental setups in a realistic manner. Based on specific target groups, needs, and academic insights into "what design can do," technology-inspired interventions are developed and tested in diverse settings including care centers for the elderly, home environments, and hospital settings.

Erwin Hans

CHOIR (Center for Healthcare Operations Improvement and Research) is an interfaculty research centre of BMS and EEMCS, focussing on Healthcare Operations Management and Operations Research. CHOIR's research is driven by many collaborating healthcare organisations who face the challenge of how to effectively and efficiently organise their processes. We use a scientific approach to design and/or optimise the planning and control of processes and take into account each stakeholder's perspective. We use mathematical models and simulations to support objective decision-making. The spin-off company, Rhythm, is the valorisation partner for bringing the results (in)to practice.

Mattijs Noordzij, SENSE-IT: A stable platform to design and research real-time, real world biofeedback into personalized mental healthcare

Most interventions in mental healthcare, which are aimed at emotion, self, stress, or aggression regulation emphasize the importance of the ability to feel your own physiological state (e.g., your current heart rate). To some (limited) extent, biofeedback is already used for this, but when it is offered, it occurs at a table in a static, controlled environment. Unfortunately, the challenges of life come unexpectedly, away from a safe environment and they often require a direct, adequate response. For these situations, people should also remember to take into account their bodily state when they are reacting. However, who knows the state of their own autonomic nervous system in a challenging emotional situation (e.g., your child is going into a tantrum)? To this end, the Sense-IT wearable platform has been developed, which allows for continuous, personalized heart rate biofeedback (corrected for movement). This platform is now used in a variety of research and implementation projects concerned with high-stakes mental healthcare and wellbeing.

Ariana Need

Universal vaccination programmes have greatly reduced the number of deaths from infectious diseases. However, vaccination coverage rates show substantial variation between countries and they vary considerably over time. Low vaccination coverage rates are problematic. In a society, at least 95% of the people must be vaccinated to prevent outbreaks. Today, countries like the United States, Britain, France, and Italy have vaccination rates below 95%. Hesitancy to vaccination most often stems from either religious motives or from fear regarding vaccination safety – but these factors are known to also affect vaccination hesitancy.

Governments can take different measures to raise vaccination rates: They can, for instance, make vaccinations mandatory or they can withdraw child benefits if parents do not vaccinate their children. However, we do not yet know how these policies affect the vaccination rates and which policies are most effective. This project aims to find an answer to this general question.

Mina van Gerven and René Torenvlied: the KNAW project – "Local networks of elderly care provision in China and the Netherlands"

This project, which ran between 2016 and 2018, is a collaboration between the public administration department and Fudan University, China. Addressing the UN's SDG 3 on good health and wellbeing, this project studies the implementation of innovations in elderly care in Shanghai (China) and the Netherlands. In the context of rapid population ageing, the project seeks answers to the question under which conditions can innovations be successfully implemented in elderly care.

Marloes Postel: Personalized mobile alcohol avoidance training

Many people drink excessively, but experience a high threshold for seeking help and therefore do not get adequate support for their problematic drinking. Furthermore, regular care is not 24/7 available, which makes it often unavailable during the difficult craving moments. There is a need for an easily accessible, low-effort, 24/7 intervention. Within this project, a personalized version of the mobile Cognitive Bias Modification Alcohol Avoidance Training will be developed and evaluated.

Pieter Jan Klok: Cooperation in health prevention

Prevention of health problems, such as obesity, is only possible when professionals from different fields cooperate in a context, which is well beyond the scope of traditional healthcare organizations. These joint efforts are already hampered by different institutional rules and professional cultures. However, when it comes to prevention, financial barriers also arise in the sense that today's cost of intervention brings about uncertain benefits that are not clearly linked to specific stakeholders. The project aims at developing ways to remove these barriers.

Florian Bonensteffen

Florian is involved in the project, *Design and implementation of ICT-based communication systems in victim-offender mediation,* which is funded by the Tech4People program and supervised by Dr. Ellen Giebels, Dr. Sven Zebel, and Dr. Mariëlle Stoelinga. This project aims at realizing ground-breaking advances in developing and applying victim-offender mediation (VOM) via the design and implementation of ICT-based communication systems. Despite the positive outcomes of mediation towards the psychological well-being of both victim and offender, confrontation with the other party may often be experienced as very stressful. By offering alternative, digital ways of communication, such as video messages or –chat, this research is dedicated to significantly enhance the restorative, meaningful dialogue between a victim and an offender after a crime had occurred.

Ton Spil

His research is about the design and implementation of serious gaming to improve the design methods of serious gaming and to motivate the diffusion of the games. Spil is a programme member of the conference ICT4WE (International Conference on Information and Communication Technologies for Ageing Well and e-Health) – a conference that focuses on improving the wellbeing of people via ICT (information and communications technology). He has published articles concerning the Digital Divide, ICT in Africa, and many health papers.

Carine Doggen: Healthcare Transformation

Health-services research is a multidisciplinary scientific field that investigates how individuals gain access to healthcare professionals and healthcare services, how much care costs, and what happens to patients as a result of this care. Research focuses on the role of innovations, including technology and processes, in healthcare. Of special interest is the transformation of healthcare from hospital-based care to care at home (hospital@home) and the use of various innovative quantitative and qualitative methods.

Jeannette van Manen

Chronic diseases become more and more prevalent. This poses questions not only about how to sustain quality of life, but also about specific issues like mis-/overuse of medication or about how to effectively implement innovations, which support better care. Research was done on elderly care and continues in oncology.

Erik Koffijberg: Health Technology Assessment & Health Systems Engineering

Innovations in healthcare provide opportunities to improve health outcomes and efficiency of health care services worldwide. However, since many innovations, such as novel point-of-care tests, biomarkers, devices, and drugs are expensive, optimizing their use is crucial. This requires a structured and explicit quantitative analysis of the country-specific context, resources, and (clinical) needs combined with an estimation of the added value, cost-effectiveness, and budget impact of innovations. Such analyses are supported with simulation modelling, which can also address the requirements for actual implementation on health system level to ensure that value is generated for all the stakeholders involved.

Anke Lenferink

Self-management interventions and digital health technologies enhance care delivery substitution from secondary to primary care. It also facilitate home-based support. This is essential to manage the increased number of patients – mainly elderly – with chronic diseases. It is a challenge to tailor chronic disease self-management interventions to patients' needs and preferences, and to make them better accessible and applicable for individuals. Recently, a digital self-management portal for patients with COPD (Chronic Obstructive Pulmonary Disease) and comorbidities was developed in multidisciplinary research (MATCH study), based on paper versions of a self-management intervention (COPE-III study). This research creates an opportunity to contribute toward the further adaptation and implementation of patient-tailored chronic disease self-management interventions.

Janine van Til

Patient involvement in actual healthcare decision-making in is increasing. Awareness of the needs and preferences of the most important stakeholders concerned with decision-making is ethically, morally, and practically key to ensuring high-quality healthcare and high-quality decisions on how to achieve this. In recent years, we have performed many projects that demonstrated how eliciting patient preferences can help make more value congruent decisions in clinical practice. Recent research efforts focused on developing innovative research methodologies to elicit patients and the general public perspective on societal decisions.

Gerben Westerhof: The power of stories

Personal stories provide a unique picture of how individual lives unfold over time. We combine interpretative methods with computing methods to better understand the meaning of stories and how they relate to health and well-being. We develop interventions that support people in telling empowering stories about their past, present, and future lives. Digital storytelling provides innovative means to develop new storylines in person-centered care.

Ernst Bohlmeijer: Sustainable mental health

Mental health has long been focused on the prevention and treatment of mental illness. There is increasing evidence that mental health also encompasses emotional, psychological, and social well-being. In order to achieve sustainable mental health, it is therefore also important to preserve and promote flourishing. We use positive psychology to build interventions and apply technological innovations, such as gamified online interventions, to deliver them. We work closely together with mental healthcare institutes to implement them.

Learning: 21st century skills, educational technology, and the future of learning

Ensure inclusive and equitable quality education and promote life-long learning opportunities for all

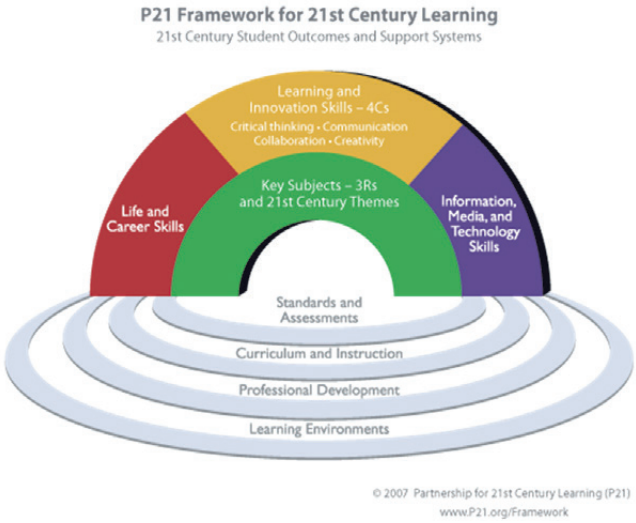
Achieve gender equality and empower all women and girls

Susanne McKenney, Chair

Learning is the cornerstone of societal development. Our research theme supports the development of individuals, groups, and systems that carry our heritage forth, enrich our existing experiences, create new and better ways to care for our environment and one another, and provide structures to enable social, economic and political reform. At BMS, we contribute to these goals through research focused on four themes: Depth/Quality, Inclusion/Equity, Adaptability/Flexibility, and Differentiation/ Personalization.

Our work yields scientific contributions, which are theoretical as well as methodological. It can also impact society at large by directly influencing three interacting layers: learners, learning environments, and the systems to which these are connected.

The learning research strives to contribute to systems through insights that help improve quality monitoring and assurance, mitigate divides, adapt to the changing needs of its participants, and establish practices that are responsible, reliable, ethical, and sustainable. Like other colleagues at BMS and UT, our researchers work closely together with schools and organizations to develop and evaluate in(ter)ventions that contribute to the quality of learning.



Selection of publications related to SDGs

- Anand, G. & McKenney, S. (2015). Professional Development Needs: Early Childhood Teachers in [Indian] Public Child Care Centers. *Staff and Educational Development International 19*(2-3), 85-104. (This article based on the MSc thesis of an EST student)
- Raval, H., McKenney, S. & Pieters, J. (2014). Remedial teaching in Indian under-resourced communities: Professional development program of para-teachers. *International Journal of Educational Development*, 38, 87-93. (This article is based on the dissertation of a Twente PhD student)

Willem Verwey

My research and teaching concerns learning to interact with human-made technology, with a special focus on driving cars. Basic studies involve the capacity of humans to learn to develop behavioral patterns and how this develops with age. This knowledge is applied in the investigation and design of driver-vehicle interfaces, including those used in autonomously driven cars. In this context, the development of human trust in these advanced, increasingly more intelligent systems, and how this affects driver behavior, are also important aspects.


Renze Kolster and Frans Kaiser

Related to the quality of education, gender equality in higher education is an important topic. CHEPS (Center for Higher education Policy Studies) researchers, Renze Kolster and Frans Kaiser, studied this topic, *inter alia* by conducting a literature review on the gender gap in study success. They identified four influential mechanisms: social and academic integration, commitment and competences, expectations regarding the program and position in the labor market, as well as the costs and benefits of studying. Instruments affecting integration and engagement are most effective in improving study success, but there is no consistent evidence that they contribute toward closing the gender gap. Student-focused learning environments appear to work better for women than for men. Moreover, economic prospects are better for men than for women. Yet, these incentives do not keep women from continuing and completing higher education at a significantly higher rate.

Jon File

U-Multirank is a multidimensional, user-driven approach to international ranking of more than 1,600 higher education institutions across 95 countries, comparing their performances in: (1) teaching and learning, (2) research, (3) knowledge transfer, (4) international orientation, and (5) regional engagement. The U-Multirank web tool enables comparisons at the level of the university as a whole and at the level of specific study programmes. Based on empirical data, U-Multirank compares institutions with similar institutional profiles ("like-with-like") and enables users to develop their own personalized rankings by selecting indicators in terms of their own preferences.
In this way, U-Multirank contributes toward equal access to quality higher education for students worldwide and uncovers quality education beyond the traditional highly prestigious universities.

Bernard Veldkamp

The core of my work focusses on adaptivity in education. Most of my projects are concerned with adaptive testing, adaptive learning, or adaptive teaching. By using statistics and big data analytics, the tests, the learning materials, and the instruction can be tailored to the individual's needs. Personalization not only increases the motivation of both students and teachers, but also increases efficiency and a more effective use of available resources. This substantially lowers the workload of teachers and enables a fair and equal access of all children, men and woman, to educational programmes.

Maaike Endedijk

Successful completion of a study program not only entails acquiring the necessary knowledge and skills, but also the development of a professional identity. Students with a strong professional identity are more successful in their studies and career. For girls and women in science and engineering, the development of a professional identity is more difficult, because they do not easily identify themselves with the prototypical male and “nerdy” engineer.
This results in lower career self-efficacy and larger drop-out rates for women who are highly in demand in the labor market. In the "Bridge the gap!" project we aim at developing adaptive tools to support a diverse group of engineering and science students, as well as young professionals, to develop a strong professional identities, to empower women, girls, and other less prototypical (future) engineers, and to guide them in their further professional development and career choices.

Maike Heiting

Given the vast development of technological applications, education cannot ignore the use of technology in preparing students for society. Using technology in education has become both a goal and a tool, meaning that teachers must have the ability to use technology as an effective teaching tool and students need to learn how to use technology properly in their day-to-day lives. Measuring or mapping students' and teachers' technological skills is necessary for effective education. Our research contributes to quality education by investigating how to assess these technological skills in authentic settings. Currently, our research focuses on improving students' digital literacy skills and the technological pedagogical skills of teachers.

Ton de Jong

In many countries in the world there is high potential of youngsters who are talented when it comes to science and engineering, but where this potential is not exploited because a) there are no good means for offering engaging science and engineering education and b) teachers are not pedagogically equipped to offer this kind of instruction. The EU H2020 GO-GA project uses online laboratories to bring online learning facilities for inquiry-based learning to a series of African countries. The project also provides African teachers with training and workshops on new science learning pedagogies and the use of technology for teaching.

Hannah Bijlsma

Determining teaching quality and conveying the results to teachers serve important improvement and accountability purposes in education. A possible way to collect teaching quality scores is to measure how students perceive their teachers' teaching quality. For that reason, the University of Twente developed the Impact! tool. Impact! is an easy tool with which students can provide on teaching quality scores. If the scores are disclosed to the teacher, then it can give them insight into their strengths when it comes to lecturing and they can also gain insight into aspects with room for improvement. Teachers can improve their lessons, based on the feedback. Impact! has been developed for and researched in secondary education and is used by several secondary school teachers in the Netherlands and in England.

Cindy Poortman

Teacher professional development is a key factor for providing quality education. Networks of educators (from different schools), such as teacher design teams and research learning networks, appear to provide these promising forms of teacher development. At the same time, there is still a lot to learn about this process of collaboration and influencing conditions. My research focuses on these challenges. As co-coordinator of the network, *Professional Learning Networks*, part of the International Congress for School Effectiveness and Improvement (ICSEI) and an ICSEI board member, I have the opportunity to collaborate with researchers, policymakers and practitioners from all over the word to contribute to making schools more effective for all.

Frank van der Velde

My research concerns the learning of concepts and their relations. Concepts play a key role in human intelligence and (increasingly) in artificial intelligence. They underlie the ability to communicate about the environment and the societal context we live in. A further understanding of how concepts arise and how they influence communication can help the development of tools that promote communication between humans and also between humans and intelligent systems when they engage in a specific (e.g., learning or design) task.

Jon File

CHEPS (the Center for Higher Education Policy Studies) is running a project with the newly established Ethiopian Institute of Higher Education (EIHE) at Addis Ababa University, Ethiopia. The project generally entails building the institute's capacity by establishing a long-term relationship between the two organisations. It particularly also entails building capacity in the area of leadership development for senior staff members of Ethiopian universities (deans, vice-presidents and presidents). The latter is the major responsibility of the institute as mandated by the Ministry of Education. The project is funded by the German Agency for International Cooperation (GIZ) and started in mid-2018. The project aims to have ten cohorts of twenty participants complete a three-seminar leadership development program by the end of 2020.

Irene Maureen

This project takes place in Indonesia. having achieved very impressive economic growth in overcoming the Asian financial crisis, Indonesia put education, including early childhood education, as one of the development priorities since 2015. Within this current climate, there is a strong focus on literacy – and for good reason. Literacy is the key to citizenship and active participation in society. The development of literacy should, therefore, be nurtured from an early age. Since digital technology has also become a part of most young children's everyday experiences, literacy for today's children should also include developing a range of digital skills and knowledge. Hence, this study is intended to develop literacy and digital literacy skills in early childhood education through storytelling, which is a natural and playful form of communication with young children.

Resilience: Smart cities, sustainable communities, and safe societies

Make cities and human settlements inclusive, safe, resilient, and sustainable

Achieve peaceful and inclusive societies, rule of law, effective and capable institutions

Take urgent action to combat climate change and its impacts

Jan Maarten Schraagen, Chair

The BMS Resilience research program addresses key and pressing societal concerns at multiple levels, which include a few of Europe's Grand Challenges (climate action; secure societies; Europe in a changing - interconnected - world: inclusive, innovative, and reflective societies). First, by considering the infrastructural level of interconnected (information) systems and the societal dimension as co-shaping, we plan to develop technology-oriented methods, tools, policies, and practices that enhance trust, increase safety and security, reduce vulnerability, and engage citizens and professionals for dealing with volatility, uncertainty, complexity, and ambiguity. By focusing on interconnection and interoperability of sociotechnical systems, we push the UT's "High Tech, Human Touch" mission beyond established domains of activity and expertise to establish new forms of knowledge and organizing, while at the same time improving technological design and development.

Second, the focus on climate change pays specific attention to the governance and economics of climate adaptation and mitigation at the levels of ecosystems, communities, physical infrastructure, and economies. Notably, it will develop new methods to promote social and spatial resilience, new policy tools to allocate risks, costs, benefits, and responsibilities of climate change between public and private spheres, new modes of governance for urban and rural areas, and new insights into the nexus between urban/water/energy justice and urban resilience.

Finally, the focus on inclusivity tackles the extent to which technological innovation promotes democratic inclusion. By investigating the conditions under which the risks, costs, and benefits of technological changes are distributed fairly, as well the influence of technology on social cohesion, collective action, reciprocity, and identity, this research focus devises techno-social solutions for triggering a positive loop between inclusivity and resilience.

building SUSTAINABLE COMMUNITIES

Selection of publications related to SDGs

- Eckardt, F., Velderman, W-J., & Benneworth, P.S. (2018). Knowledge, urban policymaking and citizen participation: a democratic challenge. In Dotti, N.F. (Eds.), *Knowledge, Policymaking and Learning for European Cities and Regions* (pp. 181-192).
- Eckardt, F., & Benneworth, P. (2018). The G1000 Firework Dialogue as a Social Learning System: A Community of Practice Approach. *Social Sciences*, *7*(8), 129.
- Benneworth, P. S. , Eckardt, F., & Velderman, W-J. (2017). Burgerkennis als hulpbron voor stedelijke ontwikkeling. *Geografie*, *2017*(3), 38-41.
- Evren Özcan, Maarten Arentsen (2014), Nonconformity of policy ambitions with biomass potentials in regional bioenergy transition: A Dutch example, Energy Policy, 65 212–222.
- Maarten Arentsen, Sandra Bellekom (2014) Power to the people: local energy initiatives as seedbeds of innovation? Energy, Sustainability and Society 2014, 4:2
- Kafait Ullaha, Maarten J. Arentsen, Jon C. Lovett (2017), Institutional determinants of power sector reform in Pakistan, Energy Policy 102 (2017) 332–339
- Imke Lammers & Maarten Arentsen (2017) Rethinking participation in smart energy system planning, Energies, Energies 2017, 10, 1711; doi:10.3390/en10111711
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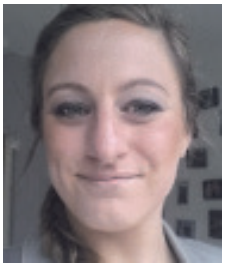


Marlies Koers-Stuivers

We are witnessing the largest level of displacement of people since World War II. Refugees want to become independent as quickly as possible and build a new, safe future for themselves and their families. However, access to the labor market is difficult and refugees face many problems that are difficult to solve, making self-employment an attractive alternative. In our research, we examine the drivers for refugees to develop an entrepreneurial opportunity. In addition, we examine whether these latent refugee entrepreneurs, based on their specific experience, consider social entrepreneurship as a mean to develop their entrepreneurial ideas.

Bas Denters and Pieter-Jan Klok: Community initiatives, co-productions and collaborative governance

When it comes to resilient societies the capacity for self-governance and community collaboration is crucial. This is the case when people deal with social problems (such as health and social exclusion) or when sustainability issues (circular economy, energy transition) are at stake. In a series of research projects, PA researchers have investigated citizens' involvement in community initiatives, co-productions, and collaborative partnerships with public and private organizations in producing public value. An important question at this juncture is how governments and professionals can exploit the potential of public involvement for smart governance rather than impeding or even "colonizing" bottom-up initiatives.

Bas Denters

Pieter Klok

Nthabi Mohlakoana: Energy and gender in African street food business

CSTM (presently the Department of Governance for Sustainability at the University of Twente) leads a consortium working on "Productive Uses of Energy and Gender in the Street Food Sector," a four-year project, which is part of the DFID (Department for International Development)-funded ENERGIA (International Network on Gender & Sustainable Energy) Gender and Energy Research programme. This research focuses on male- and female-owned micro enterprises that prepare and sell food in Rwanda, Senegal, and South Africa. This sector provides livelihoods for many women and men in these countries and this project provides the gender- and energy-nexus analysis. One of this project's primary goals is to influence energy policy making and implementation in the focus countries.

Kamia Handayani: PhD researcher on climate change mitigation and adaptation

Around 1.3 billion people worldwide still do not have access to electricity. Hence, providing universal access to electricity is a vital goal for many developing countries. This goal is challenged by the necessity to combat climate change, since these countries pledge to reduce their CO_2 emissions while also affected by the adverse impacts of climate change. This research aims at contributing to resolve this challenge through a holistic consideration of both climate change mitigation and adaptation within the context of the electricity sector in a developing country.

Hans Bressers

In 2007, the initiative was taken to start a large-scale multi-stakeholder program, "Space for River Vecht." In addition to goals, such as as flood safety, spatial quality, and biodiversity, it also aimed at supporting the tourism industry and community identity. Although the province took the lead, the program depends on the collaboration of all partners to achieve integrated projects.

In 2016 - 2018 the *Governance of the River revitalization program "Space for River Vecht"* (Hans and Nancy Bressers*)* studied the degree of supportiveness during the past period and the prospects for the following period in which the role of the province will be much smaller.

Tatiana Filatova

By 2050, 80% of the world's population will reside in cities and many of these cities will have developed, for historic reasons, in delta areas and along waterways. This rapid urbanization is in tension with climate change that promises to deliver more frequent and severe floods. Climate adaptation is inevitable. The "European Research Council" project, SCALAR (2018 - 2022; two PhDs, postdoc and a programmer), focuses on developing formal models to assess cumulative impacts of individual adaptation in coastal cities around the world. It aims to shed light on the distributional aspects of damage and climate adaptation, and on how resilience evolves across scales.

Laura Franco-García

Circular Economy (CE) principles are regionally studied through the dissertation of Juli Nurdiana. This research aims to contribute to the body of knowledge of circular cities by exploring CE in the contexts of developing country. Oostrom's theory is part of her analytical approach. Her promoter is Prof. Dr. Michiel Heldeweg.

In her development studies concerned with social entrepreneurship, Laura designed and implemented the STAR-T project (living smart campus) jointly with colleagues from *NIKOS* (the Netherlands Institute for Knowledge-intensive Entrepreneurship)and ET faculty to support ex-refugees through an entrepreneurial skills development training programme.

Gül Özerol

Through transdisciplinary research projects, we collaborate with governmental, non-governmental, and private sector organizations to co-create solutions for water and climate resilience in different parts of the world. In the Palestinian-Dutch Cooperation Programme on Water (PADUCO), we are developing the capacity of the Palestinian higher education and water sectors through addressing water quality and supply problems in urban and rural areas. The CATCH project, "water sensitive Cities, the Answer To Challenges of extreme water events", brings together practitioners and scientists in the North Sea Region to improve the midsize cities' capacity for climate change adaptation through water-related measures.

Kris Lulofs: Transatlantic cooperation in urban resiliency

BMS is the initiating partner in a program about international cooperation in urban resiliency. In 2015, UT partnered the Stevens Institute of Technology in the US and regional partners of UT joined the program. A yearly program of research and education in urban resilience, as well as faculty and student exchanges, is in place since 2015. This partnership benefits from understanding the latest frameworks to evaluate, analyze, and improve urban resilience. The partnership also benefits staff and students who can immerse themselves in research that has a resilience focus in areas of importance. Urban climate change adaptation, urban vitality, urban metabolism, quality of urban life, as well as urban planning and data management are among the key topics.

Paul Benneworth and Franziska Eckardt

Within the *Knowledge Matters* project*, our research goal is to investigate how the knowledge of citizen types function in new models of sustainable urban governance. The individual case studies (e.g., the waste-water injection case, G1000 firework dialogue) draw on different theoretical perspectives derived from democratic, social science, and political theory.

Paul Benneworth

Franziska Eckardt

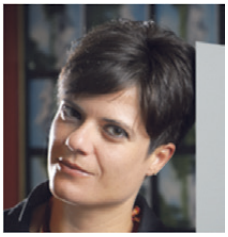
* Reference number: 464-15-114; project Title: *Whose knowledge matters? Competing and contesting knowledge claims in 21st century cities*

Peter Stegmaier: Governance of discontinuation of socio-technical systems (DiscGo), NWO/ORA

Stegmaier's research primarily focuses on how to get rid of incumbent socio-technical systems while keeping "the rest" rather stable or on a resilient change track. Projects include case studies about the EU phasing out incandescent light bulbs, exit from nuclear energy production, the DDT ban, and efforts to abandon the internal combustion engine.

Cristina Luján

As part of her PhD, Cristina Luján is researching ways to assess the impact of the textile sector, seeking to support the transition to sustainable production patterns.
The textile and clothing industry is currently one of the manufacturing industries with the greatest influence in the world economy, but it is also one of the most polluting industries with many social concerns. In this sense, it is necessary to develop innovative economic models, which are both environmentally and socially responsible. Therefore, the interest of this research is to develop a methodology that evaluates the sustainability of the textile industry in terms of a life cycle approach, taking into account environmental, economic, and social aspects in order to improve performance and support a more sustainable textile industry.



Annalisa Pelizza

Annalisa Pelizza works at the intersections of science and technology studies (STS), communication science, and political theory.
She is currently the Principal Investigator of the European Research Council's Starting Grant "Processing Citizenship: Digital registration of migrants as co-production of citizens, territory and Europe" (2017 - 2022). The project is concerned with the resilience of individuals and institutions in the management of migration flows, or – as she calls it - "Alterity Processing".

***Gonzalo Ordóñez-Matamoros'* research contributes to SDG 16 on issues related with the governance of STI in emerging economies**.

In this line of research, Gonzalo directs several PhD dissertations. He recently edited a book with Stefan Kuhlmann entitled "Research Handbook on Innovation Governance for Emerging Economies. Towards Better Models," published by Edward Elgar in 2017, as well as a journal article entitled "The Peace Process and its Challenges and Opportunities for Science, Technology and Innovation Policy in Colombia," published by the *Universidad Externado de Colombia* in Bogotá in 2018. His research also contributes to SDG 17: "Partnerships for the Goals," in the framework of the H2020 project. This project, which has been running for four years since January 2018, is called "Using science for / in diplomacy for addressing global challenges" (S4D4C). He is also actively involved in the network Red GCTI where he acts as coordinator.

Joy Clancy

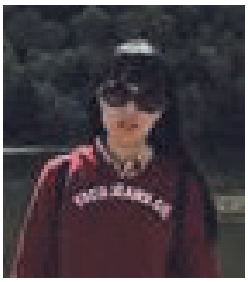
Joy Clancy is a professor in development studies specializing in energy and gender. For more than thirty years Joy's research has focused on small-scale energy systems for developing countries, including the technology transfer process and the role that energy plays as an input for small businesses and the potential it offers to entrepreneurs, particularly women, by providing a new infrastructure service. Joy is currently the Principal Investigator in a five-year £4.5 million research program funded by the UK's Department for International Development (DfID): *Building the Evidence Base for Improving Energy Investments Effectiveness by Taking a Gendered Approach*. As part of this programme, in July 2018, at the UN in New York, Joy spoke on gender and SDG7 at a side-event of the High-Level Political Forum concerned with the SDGs. In 2018, at the request of the European Parliament's Gender Committee, Joy (together with her CSTM colleagues, Marielle Feenstra and Victoria Dashkalova) conducted a research study on gender and energy poverty within the European Union.

Maarten Arentsen: **Sustainable communities**
Sustainable development in communities is about rethinking and redesigning the material and social conditions for the future. Our research focuses on the transition in energy supply towards renewable resources and on rethinking and redesigning the role and position of the farm on the Dutch countryside. Both themes are interrelated as core issues in the transition towards a biobased economy.

***Bas Denters, Marcel Boogers, and Danielle Overdijk*: The effectiveness of empowerment strategies in Dutch social policy**
After the recent decentralizations in the social domain, many municipalities and care institutions are seeking new ways to empower citizens when it comes to developing their capacity for self-help in dealing with social risks. However, insight into the effectiveness of various empowerment strategies, which professionals might want to use, is lacking. Together with BMC (https://www.bmc.nl/), PA researchers want to improve our understanding of the potentials and pitfalls of different professional practices. The research is carried out in partnership with six municipalities.


Bas Denters


Marcel Boogers



Zhang Qiansong
Zhang Qiansong (from Northwestern Polytechnical University, Xi'an, China) is a guest researcher for CSTM (currently the Department of Governance and technology for Sustainability at the University of Twente).
A green (or eco) industrial park demonstrates strategies for conserving energy, conserving resources, and minimizing pollutant emissions by encouraging the industries, which are based in the industrial park, to optimize their production processes by sharing or exchanging energy and resources. My research focuses on how the sustainability aspects can be balanced by the industrial park stakeholders in China. The future development of green or eco industrial parks can be found in model construction and data analysis. The theme of the study is to promote sustainable development of industrial parks.

Bräytan Noll, PhD
His research includes “Behavioral analysis of autonomous flooding adaptation."
Due in part to rising global temperatures, an increased risk of flooding is a reality, which many populations are forced to address. Extreme climate events, such as flooding, can significantly undermine the affected populations’ wellbeing and livelihoods. This PhD aims to better understand which actions households currently take to address the risk of flooding. It also aims to better understand how the elements that motivate their adaptation decisions develop over time. The results will contribute to better informed and more sustainable pathways for addressing flood risk in the future.

Michel Ehrenhard
Ehrenhard's research primarily focuses on aspects of (entrepreneurial) leadership in which corporate responsibility and long-term orientation take an important role. Examples of current research are projects related to integrity in the financial sector and inclusion of people with disabilities in business.

Jan Maarten Schraagen

Jan Maarten Schraagen's research primarily focuses on enhancing the resilience of teams in complex adaptive sociotechnical systems by promoting team reflection, primarily in the railway sector. This contributes to the Dutch railway sector being overall resilient to disturbances and potential surprises (*NWO*/ProRail RAILROAD-project). This research contributes to the SDG of sustainable cities and communities, with access to public transportation for all. He is also interested in multi-level linkages between individual, team, and organizational resilience by studying resilient communication patterns and social networks that develop over time

Imke Lammers

The *Smart Regimes for Smart Grids* project contributes toward the transition to more sustainable electricity systems. In the context of Imke Lammers' PhD thesis (entitled "Rules for Watt?"), governance arrangements are designed for the introduction of smart grids in Dutch residential areas. The research focusses on the institutional side of decision-making practices, specifically on the "rules of the game", which govern multi-stakeholder local energy planning processes. This project is part of the *NWO* research programme "Uncertainty Reduction in Smart Energy Systems," project number 408-13-005.

Giedo Jansen

In his current research, Giedo Jansen's work focuses on how inequalities in the economy translate to social, civic, and political participation. His research is concerned with the social consequences of the "gig economy" in which secure and long-term employment is in decline, because new forms of work are increasingly short-term, on-demand, and excluded from social protection. Closely tied to SDG 8 and 10, which strive for "decent work and economic growth," as well as "reduced inequalities," this research line is part of a wider and fierce debate about the future of work and the resilience of economic and democratic institutions. All of these revolve around the question whether the risks/gain of economic and technological changes are equally distributed or whether they divide populations into those who benefit from flexibilization, globalization, and technological advancements – and those who do not. These SDG-relevant activities are apparent in Jansen's key research activities: (a) his prestigious VENI-award research and publications on solo self-employment and collective interest representation, (b) a top publication on labor strikes in the *American Journal of Sociology* in 2016, (c) his planned research on risk management in the online platform economy for 2019 onwards, and (d) his leading role in externally funded projects concerned with (local) governance (Dutch Local Election Study, *Basismonitor Politieke Ambtsdragers*).

Isabella Hatak

In light of the dynamism and complexity of today's environments, the continuous exploitation of entrepreneurial opportunities is gaining importance and therefore it pronounces the study of behavioral aspects in conjunction with entrepreneurial processes. In her research, Isabella puts emphasis on increasing our understanding of entrepreneurs' health and wellbeing for the creation of value. Her research has been published in leading journals, such as *Journal of Business Venturing*, *Academy of Management Perspectives* and *Journal of Management Studies*, among others, which also featured in the press. She regularly co-organizes topic-related conferences and workshops, such as the conference for the Academy of Management.

Ringo Ossewaarde

In my own research line on governance, technology, and society, I address various issues of the UN sustainable development goals. In this research I am mainly concerned with relationships between societal transformations, societal and technological challenges, and governance issues in the field of inclusive economy, technological innovation, gender, sustainable communities (including migrant communities), discrimination, energy, and climate action. For 2019, my research plan is to focus on algorithmic governance and exclusion (sexism and racism), which is also clearly linked to the UN sustainable development goals.

"Smart Industry: Business, society, and people in the 4th Industrial Revolution"

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Maria Iacob, Chair

With our research, we aim at having an impact on the following –

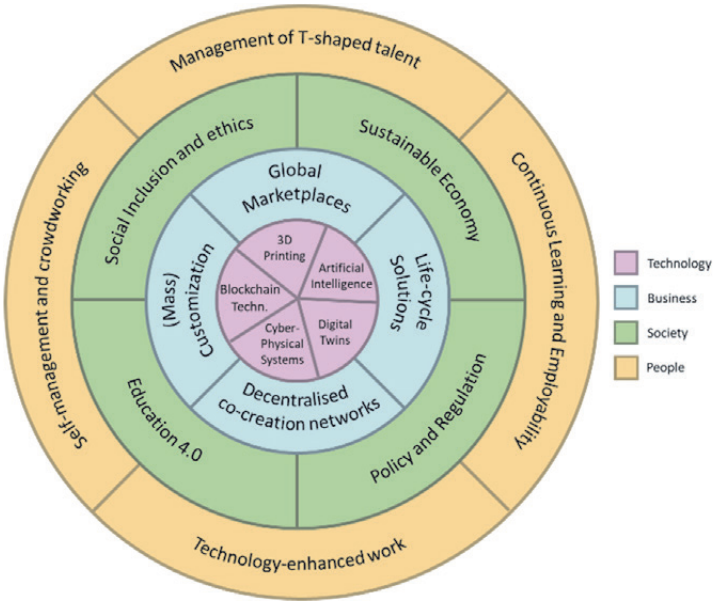
Sustainable economy: Through our research aimed at novel ways to manage the production, distribution, trade, and consumption of goods such that they promote waste reduction and the efficient use of resources, we address important sustainability concerns. Our vision is that organizations can use sustainability-driven management systems, sensor technology, and big data analytics to ensure that such efficiency objectives and industrial symbiosis are achieved, and that a circular economy is developed.

Policy and regulation: We argue that a critically important aspect for all the smart industry technologies is that they deal with large amounts of data on organizations and individuals, which need to be shared and handled in a responsible and secure way. Therefore, our research will address the development of new policies and regulations, together with standardization in areas, such as sustainable production and consumption, data sharing and management, as well as interoperability of systems and organizations within the global value chain.

Education 4.0: With the introduction of new technologies, processes, and practices, the workforce of the future needs to be educated within a fundamentally new type of education system adequately tailored to smart industry needs. Understanding how to create the institutional context to support the development of and migration toward this new type of education, while focusing on how to shape professionals that master 21st century skills, is part of our research program.

Social inclusion and ethics: In this respect, we intend to explore the ways in which we can steer this technological transformation in an inclusive manner to anticipate and avoid – at an early stage – the risks and challenges of excluding (large) groups of people from the gains of the socio-technical transformation (e.g., due to the digital divide).

The SMART INDUSTRY ROADMAP MODEL - different aspects of the three themes: people, society, and business



Selection of Publications related to SDGs

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- Harms R., Linton J. (2016): Willingness to pay for refurbished products: on the joint effect of refurbishing and eco-certification. Journal of Industrial Ecology. Vol. 20, No. 4, pp. 893-904 [2016 SSCI IF 4.124].
- Rezaul Kabir and Hanh Minh Thai : Does corporate governance shape the relationship between corporate social responsibility and financial performance? Pacific Accounting Review Vol 29 No2, 2017
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- Yazdanpanah, V., Yazan D.M., Zijm, H. (2018) Industrial Symbiotic Networks as Coordinated Games, 17th International *Conference on Autonomous Agents and Multiagent Systems (AAMAS),* Stockholm, Sweden, July, 10-15.
- Fraccascia, L., Yazdanpanah, V., van Capelleveen, G., Yazan, D.M. (2018) Implementing energy-based Industrial Symbiosis: Evidences from the literature and future directions; *3rd ESEIA Conference on Smart Energy Systems in Cities and Regions*, Dublin, Ireland, April, 10-12.
- Fraccascia, L., van Capelleveen, G. Yazdanpanah, V., Yazan, D.M. (2017) Resource inventory for fostering industrial symbiosis practices. *Symbiosis User Network Conference*, Rome, Italy, October, 25.
- Yazdanpanah V., Yazan D.M. (2017) Industrial symbiotic relations as cooperative games, *7th Industrial Engineering and Systems Management Conference,* Saarbrucken, Germany, October, 11-13.
- van Capelleveen, G., Amrit, C., Yazan, D.M., (2017) A literature survey of information systems facilitating industrial symbiosis identification, *EnviroInfo 2017*, Luxemburg, September, 13-15.
- Yazan, D.M., Fraccascia, L. (2017) Efficient operations of industrial symbiosis: an Enterprise Input-Output model integrated by Agent-based Simulation, at: *25th International Input-Output Conference,* Atlantic City, USA, June 19-23.
- Yazan, D.M., Fraccascia, L., Albino, V., Zijm, H. (2016) Cooperation in industrial symbiosis business models: An Agent-Based Modelling approach. *International Society for Industrial Ecology Meeting*, Bogota, Colombia, May, 24-27.
- Wijnhoven, F., Beckers, D. and Amrit, C. (2016) 'Reducing waste in administrative services with lean principles', *Thirty Seventh International Conference on Information Systems*.
- Wijnhoven, F. and Pieper, A. T. (2018) 'Review spam criteria for enhancing a review spam detector', in *International conference on information systems, ICIS 2018*.

Rez Kabir

Several research projects paid attention to socially responsible activities of business organizations. One project studied the organizational and managerial factors, which influence corporate social responsible activities. Another project examined to what extent organizational performance is affected by socially responsible activities. Research was also undertaken to investigate whether CSR (corporate social responsibility) disclosures affect the cost of capital.

Peter Stegmaier: European Markets for Climate Services (EUMACS), EU H2020

Stegmaier's research primarily focuses on strengthening EU/MS economies by greening it and shaping a market for strategic intelligence on climate issues (focal sectors: finance, tourism, urban planning).

His research also deals with aspects, such as smart information, governance, and business innovations concerned with sustainable supply and payment mechanisms for forest ecosystem services (InnoForESt), EU H2020 Sustainable transition.

Katrin Hahn

Hahn's research primarily focuses on understanding and analysing the ongoing digital transformation in industry and linking emerging questions around the purported “Fourth Industrial Revolution” with societal challenges.

Her projects include the following –

The Horizon 2020 project entitled “Industrial Innovation in Transition” (2015 - 2017): Better understanding industrial innovation ecosystems and innovation practices" (presentation and session organization EUSPRI (European Forum for Studies of Policies for research and Innovation) conference Vienna, 2017);

The *BMBF* (*Bundesministerium für Bildung und Forschung*) project, “AntEx,” which focuses on developing insights about industrial innovation practices concerning opportunities for more inclusive and responsible open innovation, anticipation, and experimentation cultures (2017, conference presentation EUSPRI Paris, 2018); and Reflection about the ongoing changes in industry and shortcomings of the Industry 4.0 vision regarding societal challenges (presentation at the Triple Helix Conference Manchester 2018 and workshop digitalisation in Berlin, 2018).

Afsheen Abrar: PhD research on microfinance institutions

Microfinance movement aims to create a world in which as many poor and near-poor households as possible have permanent access to an appropriate range of high-quality financial services – not just credit, but also savings, insurance, and funds transfer facilities. Through micro-enterprises, poor people are able to fulfill their financial needs and can move away from costly informal lenders. In order to enter a sustainable growth path, microfinance institutions try to achieve a new balance between social and commercial objectives; they also come up with more diversified methods and products. This PhD project examines how microfinance institutions contribute towards financial development and economic welfare (e.g., increasing economic growth, reducing poverty levels); it also examines how the efficiency of existing commercial banks is affected.

In 2018, the journal, *Pacific Accounting Review*, bestowed the highly commended award on Dr. Hanh Min Thai's PhD research, “Corporate social responsibility in Vietnam.”. The paper studies the moderating effect of foreign and state ownership, board size, and board independence on the relationship between CSR (corporate social responsibility) and the financial performance of firms. It analyzes a large sample of listed firms from Vietnam, which have in recent years increased their focus on CSR activities.

Milou Habraken: Smart industry and human resource management

Despite its popularity, smart industry is a complex phenomenon and, to make matters more complicated, it is only one of the many denotations used to represent the Fourth Industrial Revolution. This project, therefore, examines what smart industry brings to the academic and public table. Additionally, we know this phenomenon can result in radical changes within today's organizations. Consequently, the influence on human resource management is also explored. Questions currently being addressed are: What are the changes in work design and what are the influences on relations in the work context?

Jeroen Meijerink

The current research of Jeroen Meijerink focuses on human resource management (HRM) (i.e., recruitment, appraisal, compensation, coordination, etc.) in the gig/digital economy where online platforms (e.g., Uber, Deliveroo) act as matchmakers between customers and independent contractors/freelancers who offer on-demand services. He studies HRM in the gig economy and in so doing, seek to uncover the economic and social value of HRM activities for the multiple stakeholders involved, including workers, customers, and the online platforms. Furthermore, he studies the value of HRM (shared) services to employees in order to explain under which conditions employees reap the benefits of centralized, on-demand services which are provided within organizations.

Reinoud Joosten

Reinoud Joosten investigates common resource pool games, a special brand of social dilemmas. Commercial fisheries create havoc for the fishing stocks on which they depend and about 80% of the species targeted commercially are in serious danger of extinction. Diligent management concerning these replenishable resources can be shown to induce both ecologically and economically (near) optimal results in the long run.
The models developed by Joosten can also be used to engineer pollution games – another social dilemma. Short term profit maximization by avoiding investments in environmental improvements may lead to large losses or huge costs in the long run, for instance those as implied by the threat of global warming. The fact that agents may be involved in a competitive field usually exacerbates the tendency to take the short-term advantage over the long-term loss. Here too, the economy and the environment can often be managed by serving their common and mutual interests.

Wouter Kroes

Kroes' research includes studies on managing organizational change in a Dutch municipal organization, as well as a study concerning the implementation of Sustainable Development Goals (SDGs) in the municipality of Rheden. The municipality of Rheden is one of the first Dutch municipalities to adopt the Sustainable Development Goals (SDGs) of the United Nations into their organization. This study aims to provide insight into the change process of this organization and the benefits of the SDGs by collaborating with citizens and private organizations. Grounded theory methodology is used for this specific situation in which the 8-accelerator model of Kotter is applied as a framework. Outcomes show that most of the accelerators are recognized in the process, but that little attention is given to the formation of a guiding coalition and the institutionalization of the change. Furthermore, the results indicate that the SDGs provide a shared framework and a common language for cooperation between the municipal organisation, citizens, and private companies.

RHEDEN 4 GLOBAL GOALS
Samen op weg

Petra Kuenkel

Petra Kuenkel's dissertation studies globally sustainable development as a collective leadership challenge. The research takes a leadership practice model which is derived from multi-stakeholder collaboration initiatives as a point of departure and enquires into how a system's view of life could advance the conceptualization and practice of leadership as the capacity of collectives of actors. It particularly investigates what this means to leading transformative change collectively in large systems, as required by the challenges incorporated in the UN Global Sustainable Development Goals (SDGs).

Anna Bos-Nehles, research focus: Sustainable implementation of innovations and digitalization – the role of line managers

Digital transformations and implementing innovative ideas involve many different stakeholders. Line managers are responsible for adopting innovative solutions at an operational level and making sure that these solutions are sustainably implemented. This research focuses on what it takes for line managers to sustainably implement digital and innovative transformations in their teams and in which ways people management changes in a digital era.

Ewold Drent, PhD research project: Robotization of human touch

The media hype around robotization may change, alter, or even replace human interactions, thereby creating implications for employees. For organizations, it is crucially important to understand the consequences of robotization for human interactions and the conditions required to ensure that these altered interactions are successful. Therefore, this research project aims at exploring the ways in which robotization affects the relationship between employees and their line managers and the conditions that are necessary to maintain successful relations between employees and line managers.

Laura Franco Garcia

Greening of Industry Network (GIN) is an international network, which was formed by representatives of the industry, academia, civil society, and government with a common goal: *Share knowledge and best practices to transform the industry towards sustainable production and consumption*. At present, GIN has about 2000 members and four coordinators (Laura is one of them). The coordinators promote and organize, in collaboration with universities and industries, international conferences/meetings. In the last years, the most recent events were organized in Mexico, Great Britain, and Indonesia. GIN secretariat is based at CSTM (presently the Department of Governance and Technology for Sustainability at the University of Twente). Laura contributed toward the first two conferences of ARISE on the circular economy topic (https://www.utwente.nl/en/events/!/2018/5/266681/arise-symposium-circularity-through-design). ARISE is a research group at UT.

Circular economy and (social) life cycle analysis from the managerial perspective have been the main topics of research for Laura, as well as her PhD and master's students.

Erwin Hofman

Designing products for reuse will, for many firms, become a new norm. An important means for a circular business model is by using modular systems and standardized, upgradable, and 100% reusable components. More research is required to convince businesses and governments that a circular economy is feasible by adopting modular products and their related circular platform businesses.

Holger Schiele

Several research projects support sustainability goals, each having generated at least ten Scopus-listed publications: regional innovation systems and supplier innovation, as well as global sourcing and supplier satisfaction. The studies concerned with innovation in buyer-supplier relations and in regional clusters contribute to goal 9 (innovation) and 1 (poverty reduction) by showing how to provide economic benefits. The global sourcing research particularly helps industrializing countries gain access to industrialized markets and, hence, have a chance to increase their welfare on a sustainable basis. Finally, the research focuses on supplier satisfaction, which supports goal 8 (decent work) – a little observed contribution to sustainable development goals and decent work.

Tanya Bondarouk, research: "Digital HRM"

My research into digital HRM (human resource management) touches upon questions such as the following: How can HRM connect a next generation digital workplace to create capacity, grow capability, empower employees, and boost organizational credibility? There is significant potential for creating extra capacity – both for HR professionals and their clients – by simplifying many HR activities via digital workplaces. Growing capability will be enabled by providing "just-in-time" contextual information with trust becoming a new currency in employment relationships. A digital workplace can go a long way to enrich employee experience by freeing up HR professionals to respond to the needs of managers and employees.

Devrim Murat Yazan

With a background in sustainable supply chain management and industrial symbiosis (IS) (i.e., the use of a company's process waste as a substitute for another company's traditional resource), Devrim's research has aligned with two main research fields: **circular economy and bio-based economy**. He pays particular attention to topics, such as sustainable bio-resource supply chains, using alternative energy resources in process industries, sustainable self-emergent and designed IS Networks (ISNs), developing intelligent decision support tools as facilitators for IS-based businesses.

Devrim's sustainability-oriented research yielded a variety of grants awarded by several institutions from different countries, as well as the European Commission. The most recent and relevant one is the SHAREBOX project, which is financed by the European Commission under the Horizon 2020 SPIRE (Sustainable Process Industries through Resource and Energy Efficiency) framework. This project, with a total budget of €6,000,000 of which €725,000 is for IEBIS department (Department Industrial Engineering and Business information Systems), allowed Devrim to form the **Sustainable Circular Economy research team** by involving two PhD students and one postdoc researcher. The project aims at developing a secure IT management platform in which companies can share information about their process wastes and implement IS, which is a circular economic business model.

Within the SHAREBOX (October 2015 - October 2019), the research team implemented **intelligent decision support tools** as circular economy business facilitators. We are planning a seminar during which we will present our research and the beta version of the SHAREBOX software at BMS (the Faculty of Behavioural, Management and Social sciences) in 2019.

Fons Wijnhoven

Wijnhoven primarily conducts empirical research concerned with information and power asymmetries on information markets (SDG 10), search engine biases, internet information biases related to sexism (SDG 5), and unethical influencing by search engine outcomes (SDG 10), as well as social media content manipulation (SDG 12). His research also includes design science development studies of internet information triangulators to empower search engine users in debunking manipulative content (SDG 10), as well as developing and validating detectors of review spam and fake news (SDG 10). He participates in the national health on DSS (decision support system) for clinical decision making in oncology (Goal 3).

Maria-Eugenia Iacob

Maria's research has primarily emerged as result of work in different projects carried out together with industrial partners (e.g., from logistics, healthcare, finance, etc.) and was aimed at the direct applicability and support for the modern needs of the Business-IT-OT alignment. Maria has a track record in the acquisition of *NWO & TKI Dinalog* projects in the area of smart logistics, with specific focuses on sustainability, big data analytics, Internet of Things, synchromodal transport, and intelligence amplification for logistics decision-making. Here follows a few links to Iacob's recent projects of relevance:

- SynchromodalIT (Dinalog) https://www.dinalog.nl/en/project/synchromodalit/
- Datatrel (NWO) – together with prof. Havinga from EWI https://www.nwo.nl/en/news-and-events/news/2017/ew/five-granted-projects-within-compartment-2-of-the-%E2%80%98big-data-real-time-ict-for-logistics%E2%80%99-research.html
- Autonomous Logistics Miners for Small-Medium Businesses (Dinalog) https://www.dinalog.nl/project/autonomous-logistics-miners-for-small-medium-businesses/
- BATMAN project (BArge - Terminal Multi Agent Network), winner of the 1-st price of Connekt's "IDVV prijsvraag" https://www.utwente.nl/bms/iebis/research/completedresearchprojects/batman/

Emerging technologies and life in the Digital Society (overarching)

Peter-Paul Verbeek, Chair

The programme's main goal in terms of societal impact is to contribute toward responsible research and innovation by developing frameworks and tools to analyze, evaluate, and govern the social implications of technological developments. In order to achieve this goal, we choose various routes:

- Developing frameworks for managing and governing innovation;
- Developing tools and methods for responsible design;
- Participating actively in public discussions to stimulate critical reflection and deliberation among citizens and policymakers;
- Imagination and future telling to support anticipating the future implications of new and emerging technologies; and
- Developing research project with companies and societal organizations – for which the DesignLab is a suitable environment – in order produce research outcomes, which are relevant for societal practices and organizations.

Selection of publications related to SDGs

- Gauttier, S. (2018). 'I've got you under my skin'–The role of ethical consideration in the (non-) acceptance of insideables in the workplace. *Technology in society.*
- Nagenborg, M. (2018). Urban robotics and responsible urban innovation. *Ethics and Information Technology*, https://doi.org/10.1007/s10676-018-9446-8
- Kuffer, M.; Wang, J.; Nagenborg, M.; Pfeffer, K.; Kohli, D.; Sliuzas, R.; Persello, C. (2018). The Scope of Earth-Observation to Improve the Consistency of the SDG Slum Indicator. *ISPRS Int. J. Geo-Inf.*, 2018, *7*, 428. https://www.mdpi.com/2220-9964/7/11/428
- Brey, P. A. E. (2017). Sustainable Technologies for Sustainable Lifestyles. In D. Kaplan (Ed.), *Philosophy, Technology and the Environment* (pp. 191-212). MIT Press.
- Brey, P. (2018). The strategic role of technology in a good society. *Technology in society*, *52*, 39-45. DOI: 10.1016/j.techsoc.2017.02.002
- Gurzawska, A. M., Mäkinen, M., & Brey, P. A. E. (2017). Implementation of Responsible Research and Innovation (RRI) Practices in Industry: Providing the Right Incentives. *Sustainability*, *9*(10), [1759]. DOI: 10.3390/su9101759
- Verbeek, P.P. (2017), 'The Struggle for Technology: Towards a Realistic Political Theory of Technology'. In: *Foundations of Science* 22:2, pp. 301-304, ISSN: 1572-8471
- Verbeek, P.P. (2017). 'Designing the Morality of Things: The Ethics of Behavior-Guiding Technology'. In: Jeroen van den Hoven, Seumas Miller, Thomas Pogge (eds.), Designing in Ethics. Cambridge University Press 2017, ISBN 9780511844317, pp. 78-94.
- Kudina, O. and P.P. Verbeek, Ethics from Within: Google Glass, the Collingridge Dilemma, and the Mediated Value of Privacy. Science, Technology, and Human Values (2018, online first)
- Kuhlmann, S., & Rip, A. (2018). Next Generation Innovation Policy and Grand Challenges. *Science and public policy*. DOI: 10.1093/scipol/scy011
- Grohn, J., Loohuis, R. P. A., & Kijl, B. (2017). *Exploring how technological and social drivers affect the experience of co-creation in the video game industry*. Paper presented at Servitization 2017: 6h International Conference on Business Servitization 2017, Barcelona, Spain.
- Damm, A., Stegmaier, P., Harjanne, A., Köberl, J., & Jiménez Alonso, E. (2018). The market for climate services in the tourism sector: An analysis of Austrian stakeholders' perceptions. *Climate Services*.
- Shane, A., Fernandez Rivas, D., Schulze Greiving-Stimberg, V. C., Huskens, J., Konrad, K. E., Kunturu, P. P., ... Westerik, P. J. (2018). Pathways to Electrochemical Solar-Hydrogen Technologies. *Energy & environmental science*. DOI: 10.1039/C7EE03639F
- Konrad, K., & Alvial Palavicino, C. (2017). Evolving Patterns of Governance of, and by, Expectations: The Graphene Hype Wave. In D. M. Bowman, E. Stokes, & A. Rip (Eds.), *Embedding New Technologies into Society: A Regulatory, Ethical & Societal Perspective* (pp. 187-217). Singapore: Pan Stanford Publishers.

- Bowman, D. M., Dijkstra, A., Fautz, C., Guivant, J. S., Konrad, K., Shelley Egan, C., & Woll, S. (Eds.) (2017). *The Politics and Situatedness of Emerging Technologies*. (Studies of New and Emerging Technologies; Vol. 8). IOS Press.
- Konrad, K. E., Rip, A., & Schulze Greiving-Stimberg, V. C. (2017). Constructive Technology Assessment: STS for and with Technology Actors. *EASST review*, *36*(3).
- te Kulve, H., & Konrad, K. E. (2017). The demand side of innovation governance: Demand articulation processes in the case of nano-based sensor technologies. In D. M. Bowman, E. Stokes, & A. Rip (Eds.), *Embedding New Technologies into Society: A Regulatory, Ethical and Societal Perspective* (pp. 159-186). Pan Stanford Publishing.
- Kuhlmann, S., Konrad, K. E., & Roberts, L. L. (2017). Engaged Science, Technology and Policy Studies: The Twente Approach. *EASST review*, *36*(3).
- Visscher, K., Hahn, K., Konrad, K. E., Sauer, A., Dale-Clough, L., & Georghiou, L. (2017). *Innovation ecosystem strategies of industrial firms*. Paper presented at EU-SPRI Annual Conference 2017, Vienna, Austria
- Pelizza, A. (2017). Processing Citizenship: Digital registration of migrants as co-production of individuals and Europe. *EASST review*, *36*(3).
- Pelizza, A. (2017). *Processing Citizenship: On peopling 'aliens' for peopling 'Europe'*. Paper presented at Peopling 'Europe' through Data Practices, London, United Kingdom.
- Pelizza, A., & Kuhlmann, S. (2017). Mining Governance Mechanisms: Innovation policy, practice and theory facing algorithmic decision-making. In E. G. Carayannis, D. F. J. Campbell, & M. P. Efthymiopoulos (Eds.), *Handbook of Cyber-Development, Cyber-Democracy, and Cyber-Defense* Berlin, Germany: Springer. DOI: 10.1007/978-3-319-06091-0_29-1

Raymond Loohuis

Our research particularly focuses on the manufacturing industry and how smart industrial (digital) technologies shape – and are shaped by – business value logics. We strive to produce valuable insights into the impediments which firms face, as well as the strategies to successfully exploit technology that makes industries more sustainable. The members of the project team are: Bart Nieuwenhuis, Lisa Bakir, and Raymond Loohuis. In another study, we explore the technology and business readiness levels of four potential application areas concerned with Drone technology (project EFRO Space 53 in collaboration with Saxion).

Peter Stegmaier

Through his research, Stegmaier is involved in the following:

- Forward Visions on the European Research Area (VERA), EU FP7:
  Providing relevant strategic intelligence for future governance and priority setting of the research, technology, development, and innovation (RTDI) system in Europe, thereby ensuring both continuity and change; and
- Research and Innovation Futures 2030: From explorative to transformative scenarios (RIF), EU FP7:

Providing relevant strategic intelligence for future governance and priority setting of the research, technology, development, and innovation (RTDI) system in Europe, thereby ensuring both continuity and change.

Stefanie Gauttier

The GLASNOST Marie Curie project studies how human enhancement and cyborg-like technologies can be used in the workplace to ethically enhance employees' and firms' productivity. It implies developing a case study on technologies that help manage the stress levels and well-being of healthcare professionals, with a new wearable being tested in several European countries.
The project is at the crossroad between different sustainable development goals: It investigates innovation and productivity, as well as well-being and mental health.

Stefan Kuhlmann
The Department of Science, Technology, and Policy Studies (STePS) takes the assessment and governance of innovations and emerging technologies as its central theme of teaching and research. Relevant research includes: the "Constructive Technology Assessment (CTA) Toolbox," which provides several approaches that support users to consider economic, societal, ethical, and legal aspects in technical research projects; the *NWO* project entitled "Community innovation for sustainable Energy: Aligning social and technical innovation," which studies the use and articulation of local energy storage technologies and smart micro grids; the European Research Council project "Processing Citizenship," which studies the digital registration of migrants as a collaboration of citizens, territory, and Europe.

Verena Schulze-Greiving, Kornelia Konrad, and Haico te Kulve
BMS-STePS have developed the CTA Toolbox. It provides an overview and description of several approaches helping consider **economic, societal, ethical, and legal aspects in technical research projects**. The "toolbox" is meant for everyone who is interested to learn about such socio-technical integration approaches and everyone who wants to integrate them in their work. This can, for instance, be a PhD researcher or postdoc, or a bachelor's or master's student focusing on a particular project or technology, or a senior researcher exploring the potential of a new research field.


Verena Schulze-Greiving


Kornelia Konrad


Haico te Kulve

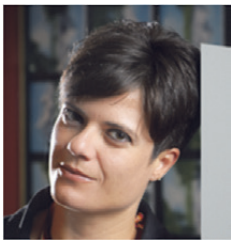
Michael Nagenborg
Michael's research is focused on the interplay between technologies and (smart) cities and, thus, has a strong focus on SDG 11. This includes publications on specific SDG targets (Kuffer et al., 2018), an *NWO*-funded project on the role of smart urban infrastructure concerned with the livability of cities (BRIdging Data in the built Environment, BRIDE), and the development of a general framework for responsible urban innovation (Nagenborg 2018). He is a board member of the international Philosophy of the City Research Group and, thus, leads an international network of scholars who work at the intersection of political theory, environmental ethics, and philosophy of technology. He is also a management team member of 4TU.Ethics and joined the 4TU Resilience Engineering Centre.
Michael is also an Advisory Board Member of SDG-related projects, such as ITS4LAND (https://its4land.com) and NordSTEVA (https://nordsteva.prio.org).

The major goal of the Res-AGorA project (Responsible Research and Innovation in a Distributed Anticipatory Governance Frame. A Constructive Socio-normative Approach, 2013 - 16) was to develop a normative and comprehensive governance framework for Responsible Research and Innovation (RRI). A key output is the "Responsibility Navigator." It supports decision makers to govern research and innovation activities towards more conscious responsibility. This framework was developed based on three years of intensive empirical research comprising an extensive programme, which involved in-depth case studies.
In the Res-AGorA, Stefan Kuhlmann, Bart Walhout, and Gonzalo Ordonez (BMS-STePS) collaborated with seven other European partners from universities and offices for science and technology. The project was coordinated by *Fraunhofer-Gesellschaft*, the largest organization for applied research in Europe.


Stefan Kuhlmann


Bart Walhout


Gonzalo Ordonez



Annalisa Pelizza: Principal Investigator of the European Research Council project entitled "Processing Citizenship. Digital registration of migrants as co-production of citizens, territory and Europe",
This project involved a five-year high risk research effort involving a team consisting of sociologists, ethnographers, software developers, and policy analysts. How does migration enact Europe? This question can be answered legally and politically, as most policy makers, sociologists and journalists are doing. Or it can be answered technically. How do data infrastructures for migrant processing co-produce citizens, Europe, and territory? Intensifying migration waves are changing not only EU policies, but also the way knowledge about individuals, institutions, and space is created. Information systems are key enablers of this knowledge. They materialize legislative, political, and administrative dynamics in which citizenship, state, and territory are co-produced. This is the project's point of departure.

Ellen van Oost and Binod Koirala (BMS-STEPS)
Van Oost and Koirala are partners in the project entitled "Community Innovation for Sustainable Energy. Aligning social and technological innovation", which studies the practices of the Dutch energy cooperatives and evaluates these initiatives in terms of their actual and potential role in the sustainable energy transition.


Ellen van Oost *Binod Koirala*

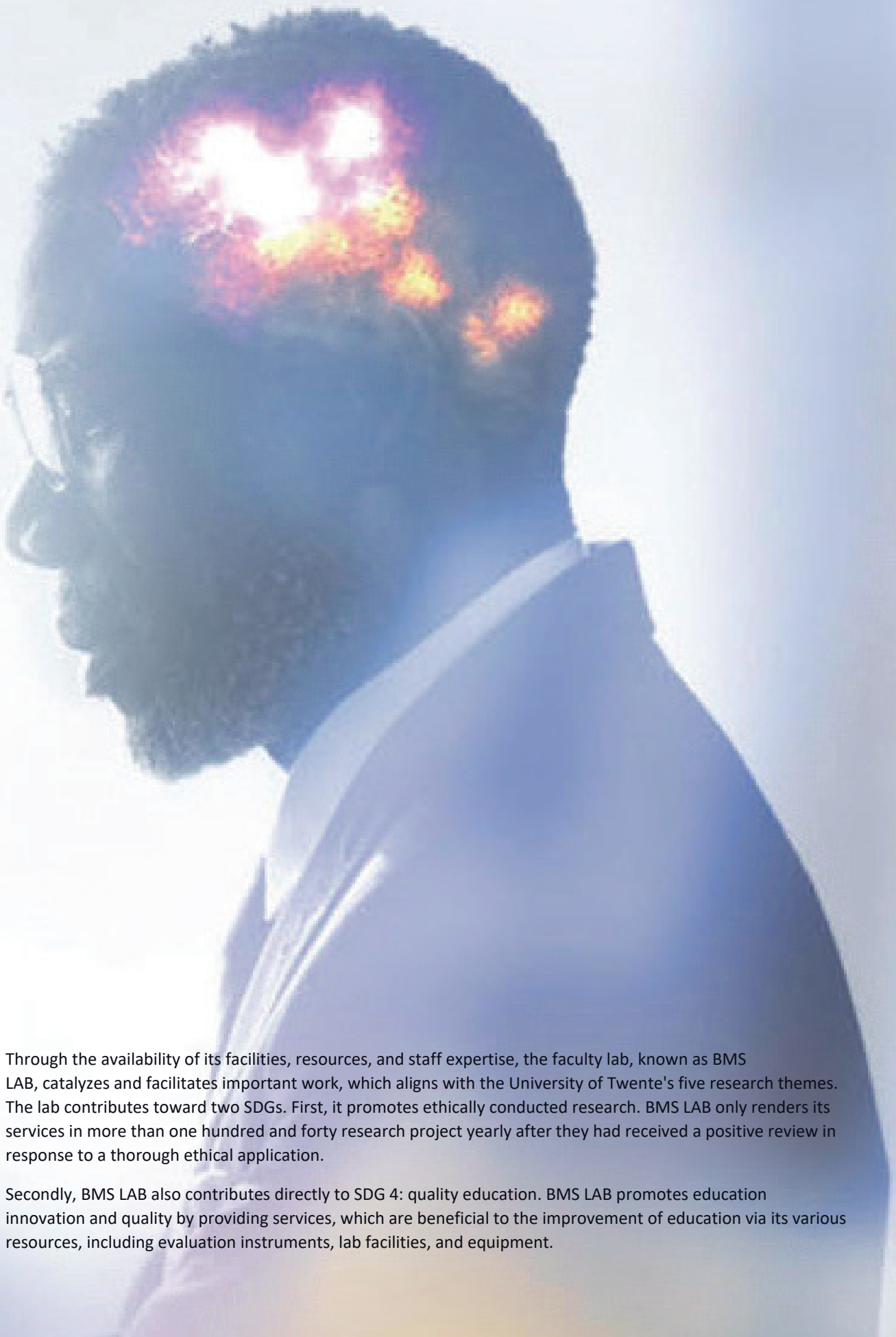
Stefan Kuhlmann, Peter Stegmaier, Kornelia Konrad, and Gonzalo Ordonez (BMS-STePS)
During Summer 2018 *Kuhlmann, Stegmaier, Konrad, and Ordonez* – together with eighteen other European research partners led by the *Institut National de la Recherche Agronomique* (*INRA*, France) submitted a major project proposal to the European Commission (H2020) **"assessing IMPacts of Research and monitoring food R&I investments (IMPROVE)"**. Agriculture, food, fisheries, and aquaculture (AFFA) are facing an increasing number of "grand challenges," such as global nutritional security, adaptation to and mitigation of climate change, natural resource scarcity, as well as the resilience and sustainability of rural areas. If funded, the EU Commission will spend €7 million on research efforts aimed at providing public and private decision makers in AFFA research sectors and at different levels of governance with the following: advanced and empirically tested and validated knowledge, as well as tools and methods to better monitor public and private R&I investments and assess and enhance their impacts. IMPROVE will develop monitoring and impact assessment methodologies and tools through a participatory approach with a variety of relevant stakeholders.




Stefan Kulmann *Peter Stegmaier* *Kornelia Konrad* *Gonzalo Ordonez*

Peter-Paul Verbeek
Peter-Paul Verbeek is professor of Philosophy of Technology and scientific co-director DesignLab. His work focuses on the philosophy and ethics of human-technology relations and technology design. He is principal investigator of a 1,5 M€ research project (*NWO-VICI:* one of the largest grants for individuals in the Netherlands, awarded by the Netherlands Organisation for Scientific Research) involving 6 researchers to develop a theory of human-technology relations and connect this to Responsible Design. He is also involved as a researcher and *co-PI* (principal investigator) in two projects on smart cities and public values. He was recently appointed as a distinguished university professor to further strengthen the University of Twente's High Tech, Human Touch profile, connecting technology and society. He is a member of the UNESCO world commission for the Ethics of Science and Technology, of the NWO Program Council for Responsible Innovation and of the Royal Netherlands Academy of Arts and Sciences. More information: www.ppverbeek.nl .

The BMS Lab



Through the availability of its facilities, resources, and staff expertise, the faculty lab, known as BMS LAB, catalyzes and facilitates important work, which aligns with the University of Twente's five research themes. The lab contributes toward two SDGs. First, it promotes ethically conducted research. BMS LAB only renders its services in more than one hundred and forty research project yearly after they had received a positive review in response to a thorough ethical application.

Secondly, BMS LAB also contributes directly to SDG 4: quality education. BMS LAB promotes education innovation and quality by providing services, which are beneficial to the improvement of education via its various resources, including evaluation instruments, lab facilities, and equipment.

RESEARCH, EDUCATION AND PROJECTS WITH PARTNERS

NWO project entitled "Action Repertoire for Distributed Business Models in Inclusive Business Value Chains"

Petra de Weerd-Nederhof, Tamara Oukes, and Ariane von Raesfeld

The University of Twente, Nyenrode Business University and The Next Organizations' *NWO* proposal entitled "Action repertoire for Distributed Business Models in Inclusive Business Value Chains" (DBM-II) was granted in March, 2018. Inclusive business development requires extensive business model innovation, whereby new organizational processes, rules, and structures need to be established. In this process, the deep involvement of multiple stakeholders is crucially important. The complex constraints to inclusion in Base-of-Pyramid (BoP) markets can simply not be addressed in isolation. Together with the Netherlands Organisation for applied scientific research (TNO) and BoP Innovation Center, the DBM-II partners aim at providing a reusable framework to support key stakeholders in collaborative business model innovation for inclusive business.
To this end, they research how individual business models must be aligned to achieve inclusion. Also, the partners intend to provide all-round guidelines to support key stakeholders in creating the right collaborative conditions for business model innovation. In order to achieve this, they study which current theoretical frameworks best explain successful collaboration in a Bottom of the Pyramid context.
www.inclusivecollaboration.nl.


Petra de Weerd-Nederhof


Tamara Oukes


Ariane von Raesfeld

NWO project entitled "Whose knowledge matters? Competing and contesting knowledge claims in 21st century cities"

Funded by The Netherlands Organisation for Scientific Research (*NWO*), the *Knowledge Matters* project explores the functioning of citizen knowledge in urban decision-making in order to understand how urban management can best respond to these pressing challenges. The *Knowledge Matters* project is an international collaborative research project (September 2016 to February 2020), which involves two research teams located at the Dutch University of Twente (Center for Higher Education and Policy Studies (CHEPS)) and the British University of Sheffield (Sheffield Method Institute). Both research teams seek to stimulate dialogue among a range of societal partners (citizens, practitioners, universities, policymakers) to provide potential opportunities for creating more inclusive urban knowledge architectures in 21st century cities.
Cities face a challenge: they must lever their knowledge assets to develop suitable strategies for guiding their development toward sustainable and secure futures in the face of imminent problems around housing, social services, environment, and quality of life. However, professionalization of urban governance has constrained the ways in which citizen knowledge can inform these strategic development processes, thereby hindering these hidden knowledge resources to contribute toward solving these pressing urban problems.

NWO-Brill/Creative industries proposal entitled “Making Sense of Illustrated Handwritten Archives”

Kick-off meeting in early 2016 with computer scientists from Leiden and Groningen, the CEO of Brill publishers, and Dr. Andreas Weber and prof. Lissa Roberts (both STePS).

Members of the BMS Department of Science, Technology, and Policy Studies (STePS) play a leading role in the *NWO*-Brill Creative industries project entitled “Making Sense of Illustrated Handwritten Archive.” The project was jointly submitted by artificial intelligence researchers of the Bernoulli Institute at Groningen University, computer scientists from the Leiden Institute of Advanced Computer Science (LIACS), the Leiden Centre of Data Science (LCDS), Brill Publishers, heritage professionals and biologists from the Naturalis Biodiversity Center in Leiden, and researchers from STePS. It received funding in early 2016. The four-years project aims at developing an online service for the heritage sector, which serves curators of illustrated handwritten archives and researchers who wish to further the understanding of such collections. The project is centered around one of the Naturalis Biodiversity Center's top collections: The archive and collection of the *Natuurkundige Commissie*, which contains a world-wide unique verbal and pictorial account of Indonesia's flora and fauna in the first half of the nineteenth century. The project has attracted national and international attention from researchers and the GLAM (galleries, libraries, archives, and museums) sector (see also: www.makingsenseproject.org).

4 UT Programme DeSire

Tatiana Filatova

Tatiana is the *PI* (principal investigator) for the national collaborative program across the four Dutch technical universities on resilience entitled "Designing Systems for Informed Resilience Engineering" (DeSIRE, sixteen tenure track positions across the four universities). The DeSIRE program is an interdisciplinary, massive program focusing on the resilience of urban centers and conjoint rural areas. It covers both climate adaptation (primarily to floods) and climate mitigation (e.g., with renewable energy, smart grids).

The *KNAW* (*Koninklijke Nederlandse Akademie van Wetenschappen*) project: Local networks of elderly care provision in China and the Netherlands

Minna van Gerven and René Torenvlied:

This KNAW-funded project ran between 2016 and 2018 and is a collaboration between the public administration department UT and Fudan University, China. Addressing the UN’s SDG 3 on *good health and wellbeing*, the project seeks answers to the question under which conditions innovations in elderly care can be successfully implemented in China and the Netherlands.

Minna van Gerven

Rene Torenvlied

Delta Lady project

CSTM (presently the Department of Governance and Technology for Sustainability at the University of Twente) is the project leader of **the Delta Lady Project**, funded by the Interreg Europe program. The project aims at improving regional policies to promote sustainable ecosystem services in river deltas in order to boost regional economies. Nine partners from six European countries cooperate to encourage the relevant stakeholders to become actively involved in this process to improve the implementation of the policy instruments for sustainable regional development. The six delta regions are: the Rijn delta (Netherlands), the Danube delta (Romania), the Camargue delta (France), the Albufera delta (Spain), the Po delta (Italy), and the River Blackwater delta (Ireland). Contacts: Yoram Krozer, Maia Lordkipanidze

Course: Energy management in small- and medium-scale industries with a focus on preparing for ISO 50001 Energy Management (EMSI)

The University of Twente/BMS Department of Governance and Technology for Sustainability organized a course entitled "Energy Management in Small- and Medium-scale Industries with focus on preparing for ISO 50001 Energy Management (EMSI)" together with UNIDO (the specialized agency of the United Nations, which promotes industrial development for poverty reduction, inclusive globalization, and environmental sustainability) and UNEP DTU (a Centre within the Department of Management Engineering, Technical University of Denmark Partnership, which works in close collaboration with the Energy and Climate Branch of UN Environment's Economy Divison).

EMSI is an example of the University of Twente's long-standing commitment to international education. The course was first held in 1987. The content evolved in response to changing demands in the energy sector. As part of the Course, the participants work in groups in a real-situation energy audit, which forms the basis of a plan to achieve ISO50001. In 2017, the audit was undertaken in a factory of an international tire company with the full cooperation of the factory management.

Course: Formulating proposals for low carbon climate resilient development: Designing Green Climate Fund Projects (ICREP)

The University of Twente/BMS Department of Governance and Technology for Sustainability organized a course on formulating proposals for low carbon climate resilient development together with UNEP DTU (a Centre within the Department of Management Engineering, Technical University of Denmark Partnership that works in close collaboration with the Energy and Climate Branch of UN Environment's Economy Divison) and ECo (a consultancy specializing in the formulation of sustainable energy and climate change projects). The course was first held in 1983. The content evolved in response to changing demands in the energy sector. The course aims at developing the participants' skills to prepare proposals for low carbon climate resilient development in areas such as clean energy access, energy efficiency, and adaptation to climate change such that they can mobilize climate finance and catalyse the deployment of climate change solutions in developing countries. The course assignments include developing a draft concept note for a Green Climate Fund proposal ready for feedback during the residential part of the course. During the course, the participants work – individually or in pairs – on their draft concept note, which will be presented and discussed with feedback on possible areas for improvement.

In 2016, the course was substantially revised. The delivery of the programme included an element of teaching through online modules spread over an sixteen-week period followed by a two-week residential programme. For 2018, the updated course covers both adaptation and mitigation. In 2016, ICREP course was the Netherlands' nomination for the UNESCO-Japan Prize on Education for Sustainable Development.

Center for Higher Education Policy Studies
CHEPS is a center of expertise offering research, training and consultancies related to higher education policy in an international comparative perspective. Amongst other themes, CHEPS studies higher education's contribution toward social inclusion and sustainable societal development.

CHEP's research includes, for example, studies on how to stimulate access and equity in higher education participation. In addition, we collaborate with governments in development and transition countries – Mozambique, Uganda, Ethiopia, Vietnam, Croatia, Kazakhstan, Kosovo, and the republic of Georgia – to implement national reforms, to stimulate organizational effectiveness, and to assure education and research quality with the aim to increase the impact of higher education on social and economic development. Intensive leadership and management development programs and workshops form part of these sustainable development activities

The Twente Water Centre offers an interdisciplinary platform to researchers, students, and society. The goal is to span the boundaries of scholars', as well as their disciplinary research departments' individual expertise. The Twente Water Centre therefore bundles the expertise of five research groups from four faculties at the University of Twente (among which is BMS (The Faculty of Bahavioural, Management and Social sciences)). The research themes include understanding the physical processes in water systems, human interference, uncertainty, risks, governance of water challenges, and water resource management. In addition to research on urgent water challenges, the Twente Water Centre also develops water curricula and facilitates valorization activities.

OTHER ACTIVITIES

Risk & Resilience festival

https://www.utwente.nl/onderwijs/professional-learning-and-development/executive_opleidingen/master-risicomanagement/evenementen/risk-and-resilience-festival/

As of 2009, the University of Twente seriously strives to provide us with an ambitious answer to what is increasingly becoming apparent in the field of risk management in both the practice of government organizations and the business community. Companies are increasingly confronted with the need to adapt their strategy and operations to complex social, technological, and climatological developments. Governments manifest themselves in various forms as regulators, clients, and as partners in business processes. At the same time, we notice an increasing necessity, also among government organizations, for being socially responsible.

It is evident that an effective form of risk management is crucially important in this context, both within the private sector and within the government. Essential processes within healthcare, building infrastructure, industry, utilities, IT, and public order are daily threatened by internal and external incidents and developments. The consequences for the individuals and organizations involved are often considerable. It is vitally important that companies and government organizations have the ability to continuously renew their products, processes, and services. In order to innovate, organizations will have to dare to take risks. Primarily, the question that must be answered is: "What is an acceptable level of risk in such an innovation?"

In order to cope with the social, technological, and climatic risks, a proactive attitude is essential: Are we able to anticipate problems that may arise in the future? It also concerns the ability to adapt: Aare we sufficiently skilled in exploring and developing new solutions for changing circumstances that present themselves? And finally: Are we as a society, organization, or individual sufficiently resilient to absorb – energetically and effectively – unwanted shocks that arise?

Risk & Resilience festival November 2018

Prof.dr. Marielle Stoelinga

Prof.dr.ir. Joop Halman

Dick Wijnveen

UT entrepreneurial challenge, Joost Brinkman

Joost Brinkman,
All UT students and PhD students can participate
This program is designed as an extra-curricular activity in which students can accelerate their own entrepreneurial opportunity. The project runs from December until June every year. The participants can use the university's knowledge and network to advance their own development. *NIKOS* (the Netherlands Institute for Knowledge-intensive Entrepreneurship) also offers a content-based acceleration program. This, together with the Golden Egg Academy, give structure to research-based acceleration. The program stimulates ideas in the technology, sustainability, as well as development and social entrepreneurship fields.

SILROD Seminar

In September 2017, a seminar was organized on Sustainable Innovation, Leadership, and Responsible Organizational Design (SILROD).

Living Smart Campus

Michiel Heldeweg
In 2017, Michiel Heldeweg coordinated a Living Smart Campus project called “To Responsibly Fast-Forward; How (Not) to 'Try First and Ask For Forgiveness Later'", which was about investigating regulatory designs for responsible experimentation within a living smart campus with regard to disruptive innovations of technology, such as drones, robotics, sustainable energy, and big data use. The project sought to combine concerns over, inter alia, safety, privacy, and environment, with the desire to experiment with new and promising technologies, which may promote amongst others, well-being and economic growth (SDGs 3 and 8), in a way that does justice to stakeholders’ interests (SDG 16). One of the focal themes was an investigation to determine if an overarching license to operate such new technologies for the whole campus as an experimental space is possible. Research into this project is still ongoing.

Processing Citizenship seminar series

From September 2017 onwards, the “Processing Citizenship” project at the Department of Science, Technology, and Policy Studies organized public workshops and conferences on the topic of digitally managing non-European citizens.
A few of the events that had already been organized are:

February 1st , 2018, launch of the Processing Citizenship seminar series at the University of Twente with a seminar entitled "Governing Migration/ Bordering Europe at the 'Hotspots' in Greece," with Katerina Rozakou (University of Amsterdam) and Martina Tazzioli (Swansea University);
March 1st , 2018, a seminar entitled "The Registration imperative: controlling migration, controlling Europe," with Bernd Kasparek (Götenborg University) and Melina Antonakaki (MCTS (The Munich Center for Technology in Society), the Technical University of Munich). The seminar series will start again in Spring 2019, after an intense period of fieldwork, and will involve members of the Processing Citizenship’s Advisory Board: https://processingcitizenship.eu/advisory-board/

STAR/T

STAR/T is a Twente project to help status holders start a business in the Netherlands. In the past year, approximately thirty five participants followed various training courses to further expand their idea into a working business model. And the first entrepreneurs have already started. Perhaps the best known is Fadi who started a bicycle shop. But recently Zabi (import/export), Alias (interior designer) and Dapo (entrepreneurial artist) also commenced with their entrepreneurial activities.
It was recently announced that STAR/T is one of the ten finalists of the ESF (European Social Fund) Award 2018. The Ministry of Social Affairs and Employment certified STAR/T as a special project, partly because the activities are developed with a subsidy from the European Social Fund (ESF), which is deployed regionally. This nomination is therefore a crowning achievement for the cooperation in Twente. Three research groups at UT were involved in this project, CSTM (presently the Department of Governance for Sustainability at the University of Twente), *NIKOS* (the Netherlands Institute for Knowledge-intensive Entrepreneurship), and the Department of Design, Production, and Management (the ET (Engineering Technology) faculty)

AMBITIONS AND FUTURE OBJECTIVES FOR 2019 AND 2020

The faculty of Behavioural, Management and Social sciences at the University of Twente (the Netherlands) proposes the following ambitions and future objectives to signal our attention to uphold and develop our role among PRME (Principles for Responsible Management education) signatories.

EDUCATION

Competency Profiles project (BSc and MSc)

As is apparent from this first BMS SIP report, there are many SDG-related activities within the faculty. Most degree programmes develop the capabilities of students and encourage them to become future generators of sustainable value for business and society at large, and to contribute toward an inclusive, as well as a sustainable global economy. There are many courses, which focus on SDG-related topics.
Unfortunately, this attention to SDGs is not always apparent from the intended learning outcomes (ILO's) of the degree programs and from the learning objectives of the courses. That is why the faculty wants to start a project in this area in the coming years.
Responsibility, sustainability, and ethics within education do not have a "one-size-fits-all" approach. It depends on the competencies that each programme strives to impart to students.
Faculty, content, and learning objectives can change quite often, thereby affecting the project outcomes. In order to enable adapting the dynamic academic environment, the project will be organized such that it is flexible and phase-based. That is why it will be affiliated with training courses, which are designed to adapt ILOs or learning objectives. We will also investigate systems in which it is good to keep up with change.

BSc Honour's track on entrepreneurship and business development
The Executive board of the University of Twente has insisted on developing a BSc honour's track in the field of entrepreneurship and business development. Discussions are being currently held. Idea is to start with the track, which will be coordinated by Martin Stienstra, in September 2019. One of the components will be to also pay attention to SDGs.

BSc MS&T

In the coming year, the BSc programme MS&T will participate in the EnschedeLab project, which will run its second pilot from February - July 2019. In **EnschedeLab**, students from the university – together with students from the Academy of Art and Design, of the University of Applied Sciences and vocational education – will work in mixed teams to design solutions for urban challenges in the city of Enschede. In this project, students will work closely with civil servants, practitioners, and citizens to explore the challenge at hand and define possible new solutions, which are co-designed with relevant stakeholders and end users. By participating in EnschedeLab, students will improve their teamwork, as well as their professional and designing skills. MS&T students consider participation in the concept of co-designing urban solutions very relevant.

Student activities

On the 15th of March 2019 at the Van der Valk Hotel in Enschede, the participants of the University of Twente Purchasing Conference, **UTPC 2019,** will explore the personality traits and diverse purchasing strategies, which a successful purchaser require. Various organizations will provide workshops in which we will especially discuss the soft skills benefit not only the future purchasers, but also the experienced purchasers. With this topic, we target goals, such as gender equality, economic growth, and partnerships.

UTPC Board 2019 v.l.t.r. Jorieke Masselink, Esmée van der Veen, Elisa Vincent, Henrike Fitschen, Bregje Walraven, Laura Frank & Teun Troostheide

STRESS Symposium "innovations and sustainability" on 31 January 2019

On the 31st of January (2019), the participants of the Study Tour Stress will present what they have been doing the last 10 weeks. This includes all their literary findings they found in the first six weeks of the module, but it also includes their findings at the actual Singaporean companies. They will show what the relationship is between all the different sectors they have examined and will also discuss how each of the sectors influence the others. This presentation will finalize their module, after which a drink will be held. During this drink, there is the opportunity for external people to ask questions specifically and to discuss with the participants certain outcomes and/or interesting topics.

Research themes

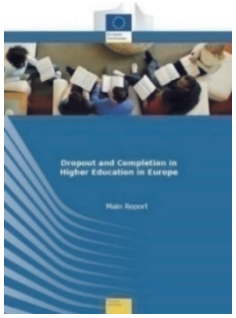
1 Health

https://www.utwente.nl/en/bms/research/bms-research-themes/health/

The health, well-being, and technology domain uses a cutting-edge and interdisciplinary approach to gain more insight into the conditions and mechanisms, which make personalized health technologies effective in promoting health and well-being. It also addresses new forms of governance for integrated healthcare, the inclusive and cost-effective implementation of which are called for. The domain has a close collaboration with healthcare organizations to develop, implement, and evaluate health technologies by including perspectives of all stakeholders (patients, healthcare providers, healthcare managers).

We apply new approaches to promote health and well-being in societies. The first approach is *public health prevention*, which has recently become even more important due to an increase in the population's number of healthy years. Public health prevention creates an environment in which healthy behaviors prevail. The second approach involves individuals in *self-management and shared decision-making* when it comes to health-related matters. Increasingly, individuals take responsibility for their own health; therefore self-management and shared decision-making are crucially important. The third approach is a shift towards *adaptation and acceptance*. Although prevention, early diagnosis, and optimal treatment remain important, it is highly unlikely that a cure is always possible for every disease and illness. The shift to adaptation and acceptance is necessary, since this is expected to lead to a positive well-being – even with chronic illness.

2 Learning



CHEPS (Center for Higher Education Policy Studies) aims to further develop its previous work on study success, dropout, and study switch. We have a particular interest in addressing the following question: What can governments and universities do to help students from less advantaged backgrounds be successful in their studies? Disadvantaged students, for example, include non-national, low-income, and first-generation students. CHEPS has a number of goals. First, students need to select subjects that match their capacities and interests. Second, switch and dropout should be prevented. Finally, the factors and instruments for supporting study progress needs to be determined.

3 Resilience

Jan Maarten Schaagen (Chair): When it comes to the resilience theme, our goals for the next two years are:
(1) to embed resilience thinking in design and engineering;
(2) to quantify and measure resilience in sociotechnical systems, particularly on longer time scales and using (real-time measurement of) social interactions and information diffusion through networks;
(3) develop technology-oriented methods, tools, policies, and practices that engage citizens and professionals in enhancing trust, safety and security, and reducing vulnerability; and
(4) train (part of) the 100 Resilience Fellows.

Example: Tools and Training for Inclusive Local Democracies (TILDE)
Bas Denters, Giedo Jansen, and Marcel Boogers
This project is based on a partnership with four universities, *BZK* (Ministry of Internal Affairs), the *VNG* (Association of Dutch Municipalities), and relevant organizations of local political office-holders.
Societal resilience requires inclusive governance, wherein citizens and civic organizations are actively involved in making and implementing strategic decisions on how to develop and adapt communities to fundamental socio-economic, ecological, and technological challenges. This project aims at:
(1) Understanding the positive and negative effects of inclusive governance;
(2) Developing tools for inclusive governance in living labs; and
(3) Sharing knowledge with relevant communities of practice.

4 Industry

https://www.utwente.nl/en/bms/research/bms-research-themes/industry/

In the next period (2019), the Smart Industry Group aims to apply for funding in the following areas:
- One group project proposal to be submitted for the next round of the *NWO* (Netherlands organisation for Scientific Research) *NWA* (Dutch National Research Agenda) call (https://www.nwo.nl/financiering/onze-financieringsinstrumenten/nwa/nationale-wetenschapsagenda---onderzoek-op-routes-door-consortia-nwa-orc/nationale-wetenschapsagenda---onderzoek-op-routes-door-consortia-nwa-orc.html), most probable for the routes "*Logistiek en Transport in een energieke, innovatieve en duurzame samenleving*" and "Smart Industry" Topic: Adoption Unmanned Cargo Aircraft Technology;
- One individual program proposal to be submitted (Iacob/Yazan) on the circular economy topic;
- One individual submission for the TKO Dinalog Toeslag call https://www.dinalog.nl/tki-toeslag-call-2018-2de-call-nu-open/ (Iacob/Mes/Piest) on the topic of using artificial intelligence for efficient planning; and
- One group also aims at stimulating publications that emerge from the group's vison. We therefore plan – for the short term – a paper submission on the BMS's Smart Industry Research Agenda.

5 Emerging technologies

Research projects in the Emerging Technologies and Society theme focus on the interactions between technology and society at the micro-level of users, the meso-level of social practices like education and healthcare, and the macro-level of societal and political structures. Their focus is typically not only on analysis and conceptualization but also on normative research and questions of governance. Examples of research projects at these three levels that will be further developed are:

- The SIENNA project, led by Philip Brey (2017-2021, budget € 4.0 million), involving 13 international partners, on the ethical and human rights aspects of emerging technologies, including human genomics, human enhancement, robotics and artificial intelligence.
- The ERC-funded project "Processing Citizenship: Digital registration of migrants as co-production of citizens, territory and Europe" (2017-2022), led by Annalisa Pelizza
- Michael Nagenborg's work on resilience and urban justice, affordable housing and slum detection, in collaboration with the scholars from the department of urban and regional planning and geo-information management at the ITC faculty of the UT, including the NWO-funded BRIDE project (BRIdging Data in the built Environment, 2018-2022), targeted at the responsible development of new forms of smart urban space.

Other activities

SDG award for BMS students

The Faculty of Behavioural, Management and Social sciences (BMS) embraces the United Nations' Sustainable Development Goals. In order to encourage students to also embrace the Sustainable Development Goals and develop their capacities to create sustainable value for business and society, the BMS faculty has set an **SDG award**. https://www.utwente.nl/en/bms/sdg/sdg-award/. The prize will be awarded for the first time in March 2019.

The intention is that students from other UT faculties can also compete for the prize in the coming years.

SDG festival (12 or 13 March 2019)

An SDG festival will be organized in March 2019. At the festival, students and teachers will work together on the elaboration of various SGD-related challenges. The SGD award will also be presented at the festival.

RIET MARTENS (REDACTIE)
SANDRA VAN WEZEL (LAY-OUT)
UNIVERSITEIT TWENTE
FACULTY BEHAVIOURAL MANAGEMENT
AND SOCIAL SCIENCES (BMS)
DECEMBER 2018
WWW.UTWENTE.NL/SDG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