

Advancing Society in a Digital Era

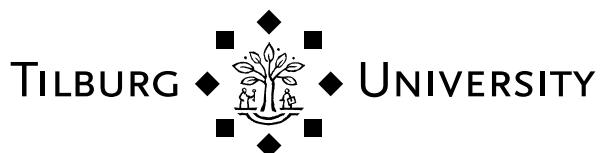
Science with a Soul

A Tilburg University Essay On connecting people and impacting society

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Why?

“Is our task in these times other than in earlier times?” thus spoke Martinus Cobbenhagen, founder of Tilburg University, in 1940. According to Cobbenhagen is the responsibility of each academically trained individual not only to himself, but equally to society.

Cobbenhagen is the founding father of the Roomsche Katholieke Handelshoogeschool, which later became our university. He combined the sciences of economics, management, and finance with the normative values of the social sciences and humanities. In Cobbenhagen's opinion, practicing economics and engaging in ethics go hand in hand. Even today, this idea is one of the foundational principles of our university's identity ^{1 2}.

Ninety years have passed since the inception of our university, and Cobbenhagen's legacy needs to be firmly anchored again in our profoundly changed and rapidly changing society, including the sciences. What seemed self-evident in Cobbenhagen's time as regards the behavior of individual scholars and students now needs to be systematically re-embedded in the university's modern proposition: a university that is still firmly anchored in the region and wishes to remain so but is also vigorously active in the international playing field and its competitive conditions.

Tilburg University chooses—after 90 years—for an IMPACT Program and for an even stronger and more intensive connection with society. This essay explains why, how, and what we will work on. The IMPACT Program is inspired by our observation of and commitment to the major issues and challenges facing our society; a society that is becoming increasingly complex and diverse. The driving forces are well-known. The global markets and economies are inextricably linked involving not only mutual advantages but also the danger of chain reactions or even an economic meltdown in the form of a deep systemic crisis. Technological developments are accelerating and create a digital society with literally unprecedented opportunities as well as unexpected risks with an equally unpredictable character. Just as it is impossible to fully understand the scale and effects of climate change.

¹ Cobbenhagen, M.J.H. (1927) *De verantwoordelijkheid in de onderneming*. Roermond: Romen (Thesis Rotterdam)

² Tilburg University (2016) *Cobbenhagen Essays: De visie van de grondlegger op de Tilburgse universiteit*, p.97 & p.117. Valkhof Pers

THE DANISH MEMBER OF PARLIAMENT IDA AUKEN DESCRIBES
A FUTURE IMAGE OF SOCIETY AS FOLLOWS ³:

Welcome to 2030. I own nothing, have no privacy, and life has never been better. All in all, it is a good life. Much better than the path we were on, where it became so clear that we could not continue with the same model of growth. We had all these terrible things happening: lifestyle diseases, climate change, the refugee crisis, environmental degradation, completely congested cities, water pollution, air pollution, social unrest and unemployment. We lost way too many people before we realized that we could do things differently.

Migration and an aging population upset the structure and composition of the population. Cultural preferences, norms, and values seem to be shared less and less. Social cohesion, holding our society together, is no longer a matter of course. Politics and institutions try to respond to these developments, but the real question is what the intended and unintended effects will be.

Because the various transformations and transitions are linked and, in fact, interact, there is great uncertainty about the future and limited predictability. Disruptions accumulate. The future is not what it once was. Yet, it is clear that we as human beings, as mankind, largely control the outcomes. Will there be an increase in poverty, inequality, deprivation, and lack of health and will prosperity decrease, division grow, and our living environment further deteriorate? With the realization that these outcomes will not just impact people randomly, but particularly people who are already in vulnerable positions as far as income, competences, and living conditions are concerned. Are we able to counter these unwanted consequences and, in fact, significantly improve the quality of life and coexistence? If that is what we want, we will need to think about the question of how we can achieve a positive sum game, a win-win situation, rather than a zero sum game or even a negative sum game, leading to a “winner takes it all” outcome.

Can we continue to define human dignity, solidarity, and distributive justice in a digital society? In an impending situation of singularity ⁴ in which mechanical intelligence will be more powerful than human intelligence, who decides what ⁵? Could digital cultures be equivalent to traditional cultures? In fact, to prevent further disaster, should we not proceed to give the environment a legal personality or sign a “natural contract” between Earth and its inhabitants, as argued by the French philosopher ⁶?

Whilst there are these pessimistic scenarios, there is also a particularly optimistic outlook, in which we end hunger, drought, poverty, and exclusion; prevent or treat life-threatening diseases and establish a sustainable, circular, and shared economy. Scientific inventions will radically change society in the next years. The question is: what will be included in the new ‘Human Agenda’, as formulated by Hariri, as we now have access to so much new technology, “What will we do with all that power?” ⁷

³ Auken, I. (2016) Welcome To 2030: I Own Nothing, Have No Privacy And Life Has Never Been Better. Retrieved from: <https://www.forbes.com/sites/worldeconomicforum/2016/11/10/shopping-i-cant-really-remember-what-that-is-or-how-differently-well-live-in-2030/#3a6c10917350>
20-04-2017

⁴ Kurzweil, R. (2005) The Singularity is Near. Penguin Group

⁵ Floridi, L. (2014) The Fourth Revolution: How the Infosphere is Reshaping Human Reality. Oxford University Press

⁶ Serres, M. (1990) Le Contrat naturel. François Bourin

⁷ Harari, Y.N. (2016), Homo Deus: A Brief History of Tomorrow. London: Vintage.

Many of the problems are man-made, but successfully tackling them is extremely complicated and far exceeds the capacity and problem-solving abilities of individual stakeholders. What is more, the problem of collective action, as described by the economists Adam Smith and Mancur Olson, will clearly present itself: individual rationality can lead to collective irrationality. Innovation is also hard to achieve ^{8 9}. New problems are often addressed using old solutions, says legal philosopher Boaventura de Sousa Santos ¹⁰. But we are convinced we can do a whole lot better now, and new technologies can help us to empower people and organizations. We have got the technology!

So the real question here is how we can help to advance people and society. That is why this essay is entitled *Advancing Society*. Being scholars, we will specifically go into the role of knowledge and knowledge institutions like our University. “Advancing Society” will require specialist social and technological knowledge and an innovative mindset, collective commitment, and co-creation by all stakeholders. In this ‘multi-helix’ approach, educational and knowledge institutions, like universities, play a crucial role and, therefore, have a matching responsibility: *science for society*, the first key aspect of the essay. This requires practicing science with passion, - *excellence with a soul*, in the words of Harry Lewis, former Dean of Harvard College - an even stronger connection between science/the universities and society and its citizens (inside-outside), so that knowledge can achieve impact and add value ¹¹. The Dutch Royal Academy of Science refers to this issue as ‘citizen science’. For a university like Tilburg, this feels far from strange as it builds on the ideas and values of Cobbenhagen.

Simultaneously, it is equally essential and beyond doubt that we need to further develop knowledge, take science to an even higher level of excellence (science for science), and also create the conditions to achieve this. With a view to multi- and interdisciplinary cooperation, stronger connections within science (inside-inside) are essential. It is inherent to major problems that they have a multitude of aspects that need to be studied and explored in relationship to one another. New methods and techniques and ways to collect data need to be developed. Rigor and relevance. This is the second key aspect of this essay.

8 Smith, A. (1982) [First edition: 1776] *An Inquiry into the Nature and Causes of the Wealth of Nations*. Penguin Books Ltd

9 Smith, A (2010) [First edition: 1759] *The Theory of Moral Sentiments*. Penguin Books Ltd

10 Sousa Santos, B. de (1995) *Toward a New Common Sense: Law, Science and Politics in the Paradigmatic Transition*. Routledge

11 Lewis, H. (2007) *Excellence without a Soul: Does Liberal Education Have a Future?* The Perseus Books Group

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- Society is facing challenges of unprecedented complexity. We can only successfully address them if the various stakeholders are prepared to work together.
 - Tilburg University feels this responsibility, also given Cobbenhagen’s principles.
 - Tilburg University takes this responsibility seriously by addressing Science for Society even more systematically, by making Science for Science even more excellent, and by paying attention to the way these two interact in research, in education, and other activities
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How?

This urgently requires a new and successful agenda for action to promote social progress, the good society, in the words of economist John Kenneth Galbraith ¹², also referred to as the social good. Of course, such an endeavor is not new and it is easier said than done. And the relevant question of whether society agrees on what exactly is good and worth pursuing cannot be ignored. What is new and offers new opportunities, in our view, is the renewed commitment and active role that science and the universities can play, without compromising the necessary academic freedom or abandoning the pursuit of excellence: a sense of serving, as referred to by Meindert Flikkema and others ¹³.

Perspective for action

Before we go into the role of knowledge and science, let us pause to identify the most important aspects of an agenda for action.

In a recent book, *The Resilience Dividend*, Judith Rodin, President of the Rockefeller Foundation, has developed a typology aimed at enhancing and reinforcing society's resilience ¹⁴. In the first place, it requires awareness of the strengths, weaknesses, and risks of a society. In Tilburg, we use the motto of *Understanding Society*. That continues to be the basic principle. Secondly, we need to rely on a diversity of resources, capacity, ideas, and technology in society even if elements of our competencies are lost or prove to be outdated. Thirdly, *integration* and coordination are important in order to realize cohesive solutions, share information, and make communication transparent. Fourthly, self-regulation is required to ensure that a society (at a macro, but also at a meso and micro level) can deal with an accumulation of disruptions and contradictions without becoming dysfunctional or collapsing altogether. A society should, in any event, be able to 'fail safely'. Finally, a society must be *adaptive* in the sense that it can develop new plans, undertake new actions, or change behavior. Flexibility is crucial. Existing resources need to be used for new purposes; multiple roles need to be fulfilled.

¹² Galbraith, J.K. (5th Revised edition 1999) *The Affluent Society*. Penguin Books Ltd

¹³ Flikkema, M. (2017) *Sense of Serving: Reconsidering the Role of Universities Now*. Vu University Press

¹⁴ Rodin, J. (2014) *The Resilience Dividend: Managing Disruption, Avoiding Disaster, and Growing Stronger in an Unpredictable World*. Profile Books Ltd

The typologies for a general description of the ‘how’ provide direction: adaptability, coordination, integration, collective goals, values, flexibility, creativity, and innovative capacity. Knowledge, i.e. academic knowledge, is one of the most important sources available to us for making action possible. Faith in science must continue to be fostered – that is a responsibility not only for scholars, who are knowledge producers (integrity) but also for politicians and policy makers (refusing to suggest or accept alternative facts) as users and consumers of knowledge.

The responsibilities of the university

We must realize that more and better knowledge does not automatically produce a directly relatable and better society and quality of life. In a 2012 lecture entitled *Universitas?*, presented in the context of the first lustrum of the Tilburg School of Humanities, George Steiner describes the unique development, growth, professionalization, and capacity of universities ¹⁵. As an anecdote, he points out that the University of Berkeley in California now has a special parking lot for Nobel Prize winners. Cosmology studies the origin and limits of the universe. Elementary particle physics explores concepts of matter and time. And biogenetics is on the trail of the very mechanism of life itself. At the same time, however, Steiner continues, our wars are still equally barbarous; famine, slavery, and forced migration still apply to this day; and late capitalism has plunged into a deep crisis.

So we need more than just knowledge. Universities must continue to aim for excellent knowledge, top rankings, and top publications, but they cannot and should not stop there. Again, they need to engage in an intelligent balancing act between distance and involvement (commitment), as sociologist Norbert Elias calls it, and to be willing, as well as brave enough, to go beyond the full stop at the end of the academic publication ¹⁶. A sound and open connection with society is essential. We also need to realize that empiricism does not have an answer to everything and that, as a result and especially in times of crisis, we need to go back to the normative question: What kind of society do we want? How do we connect people’s very specific fears en worries, often related to their own particular position, to a realistic future perspective? How do we empower people and let them see that they themselves are carriers and designers of the future instead of being subservient to developments that they cannot influence?

This normative perspective, combined with the uncertainty of the role of empiricism in law, offers future challenges for science. How can science contribute to answering this normative question? Do we need interdisciplinary research to answer this question and, if so, in what form? What does empiricism entail? Which methods are available for translating empirical data into legal, normative standards?

¹⁵ Steiner, G. (2013) *Universitas?* Nexus Bibliotheek

¹⁶ Elias, N. (1971) *Problems of involvement and detachment*. Amsterdam: Van Gennep

The context of the traditional European university is changing, both in the area of education and that of academic research. Society, the business sector, the government, and, last but not least, students demand that universities adapt to modern times. Universities are expected to collaborate with the business community, social organizations, and authorities in triple and multi helix cooperation in order to contribute to an innovative and sustainable society. In addition, universities must play an increasingly explicit role in helping to solve social issues.

Science with a soul

For that reason, it is also important to raise the subject of connection and impact within the academic institution itself. Given their academic excellence and “science with a soul”, universities can generate an optimal impact both on their own academic practice and in society. Universities need to develop into fourth-generation universities. Initially, universities were only focused on education (first generation), subsequently on education and research (second generation), and currently on education, research, and valorization (third generation, in the words of the Delft University of Technology Professor and entrepreneur Hans Wissema ¹⁷).

However, the social challenges and the pace in which they are developing require more, a so-called fourth-generation university. In our view, this type of university is open-minded in the sense that it does not just make knowledge available for practical applications in society. It is supposed to be about dynamic, open innovation. There should be “meeting spaces” where the people involved can interact (as the Tilburg University scientists Henk Garretsen and Dike van Mheen argue ¹⁸). An entrepreneurial attitude is important but, in our view, entrepreneurship means long-term *stakeholder* value rather than the narrow meaning of *shareholder* value.

Science has contributed a lot to the well-being of society. Conversely, it is essential that science is aware of this and that researchers are inspired in their work by society’s need for particular knowledge. In addition, society asks for science as far as the grand social challenges are concerned. This increasingly happened in collaboration with companies and social organizations, the so-called triple, or even, the multi helix, to which another actor has been added: society itself (e.g., NGOs, community and local district organizations, and professional networks). This combined effort of science, business, social institutions, and committed citizens is necessary to further enhance the impact of science. Intensifying the connection with all these partners whilst maintaining everyone’s role and responsibility is a precondition for enabling a positive impact on society. Reciprocity is the keyword.

¹⁷ Wissema, J.G. (2009) *Towards the Third Generation University: Managing the University in Transition*. Cheltenham: Edward Elgar Publishing

¹⁸ Tilburg University. Retrieved from: <https://www.tilburguniversity.edu/nl/actueel/nieuws/nieuwsitem-zorg-gezondheidszorg-Tranzo-Garretsen-Mheen-valorisatie-impact/>

ACCORDING TO THE UNIVERSITY OF CAMBRIDGE,
KNOWLEDGE TRANSFER IS ¹⁹ :

“A term used to encompass a very broad range of activities to support mutually beneficial collaborations between universities, businesses and the public sector. It’s all about the transfer of tangible and intellectual property, expertise, learning and skills between academia and the non-academic community. It’s also well recognized by government and funders as an important return on the government’s investment in academic research, one that provides a significant driving force for enhancing economic growth and societal wellbeing. For academics, knowledge transfers can be a way of gaining new perspectives on possible directions and approaches for research. This two-way exchange element of knowledge transfer is at the heart of successful and sustainable collaboration.”

Co-creation

Opting for a University IMPACT Program requires adopting a number of basic principles. Universities have much knowledge but no wisdom to offer. Co-creation is, for that reason, an important point of departure for generating impact. Co-creation starts with a joint effort to map and define problems. It is a form of collaboration in which all participants can influence the process and its results. In co-creation processes, the equality of the participants, reciprocity, openness, and trust are important factors. It is a useful instrument for solving complex issues, for (driving) innovation, and for realizing change.

The choice for co-creation is an obvious one. The transboundary, strategic, multidisciplinary issues that face society, businesses, and organizations cannot be addressed in short-term, disciplinary contract research. Collaboration with and within the University should therefore be characterized by cooperation over longer periods of time. This will enable innovative, multi-, or even transdisciplinary research, which stands the best chance of leading to solutions of these social challenges and can add value to social products, services, and processes, when possible in co-creation with the (end) users. For the partners, this will mean that they have access to the scientific knowledge and expertise, fundamental and otherwise, that meets their needs. For academics, this will mean an opportunity to take their research to a new and challenging level. The keyword here, again, is reciprocity. Together we determine the large issues at hand. Also we decide beforehand how and in which way we will create impact and exactly how we are going to monitor that.

Knowledge transfers

Where connection with society is concerned, we can refer more precisely to knowledge transfers.

“A term used to encompass a very broad range of activities to support mutually beneficial collaborations between universities, businesses and the public sector. It’s all about the transfer of tangible and intellectual property, expertise, learning and skills between academia and the non-academic community. It’s also well recognized by government and funders as an important return on the government’s investment in academic research, one that provides a significant driving force for enhancing economic growth and societal wellbeing. For academics, knowledge transfers can be a way of gaining new perspectives on possible directions and approaches for research. This two-way exchange element of KT is at the heart of successful and sustainable collaboration.”

We explicitly do not perceive knowledge transfer as a technocratic process. As a remit for universities, knowledge transfer has evolved considerably in the past decade. Initially aimed mainly at business development and generating economic value, knowledge transfer used to belong to the realm of the exact and medical sciences. As the importance of creating

¹⁹ University of Cambridge research (2009) In: University of Cambridge Research Horizons Issue 9 ,
Published on Apr 30, 2009 , p.22 Retrieved from: https://www.cam.ac.uk/system/files/issue_9_research_horizons.pdf
25-04-2017

social and civic value increased, so did the awareness that knowledge transfer is not a linear process. Rather than a form of one-way communication whereby science, as it were, presents society with knowledge, it increasingly is a long-term, multi-year, in-depth collaboration between disciplines and organizations to address complex issues and to find new solutions to new problems. The idea that knowledge circulation and valorization do not happen until the full potential of the relevant knowledge has been developed is superseded. Especially at the beginning of the chain and the process, awareness of the need for knowledge and of the possible users of that knowledge is necessary. According to the principles of knowledge co-creation, scholars develop new, practically applicable knowledge jointly with stakeholders in society. In the process, scholars use the unique knowledge and skills of the end users. This latter aspect is both logical and necessary in the social sciences and humanities: these sciences deal with study objects that 'talk back'. Social scientists are in a special position because they both observe and participate. Rather than finding a method to eliminate this element, we might as well use it to our advantage.

Co-creation does not mean that we may not or cannot be critical as regards the roles of the various stakeholders, including science itself. And sometimes co-creation is already possible, from a science perspective, by empowering people by providing knowledge and asking the right questions, allowing them to address their problems independently based on their capabilities ^{20 21}.

²⁰ Sen, A. (1985) *Commodities and Capabilities*. Amsterdam: New Holland

²¹ Nussbaum, M.C. & Sen, A. (1993) *The Quality of Life*. Oxford University Press

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- Increasing the impact of science requires a joint effort by science, businesses, social institutions, and committed citizens. Therefore, we will intensify the connection among all these partners.
 - As part of this connection, it is a precondition that everyone has his or her individual role and responsibility. Reciprocity is the keyword. Therefore, we opt for co-creation as the basic principle of collaboration, co-creation being the successor of the more linear process of knowledge transfer.
 - With long-term, multi-year collaboration projects, we can create the best opportunities to solve social challenges and enable innovative, multi- or even transdisciplinary research.
 - Excellent research and interdisciplinary collaboration are important preconditions.
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What?

What are we going to do in Tilburg? Much of the research conducted at Tilburg University can be qualified as excellent. This fact is borne out by diverse research rankings, in which various Tilburg University Schools and research groups occupy high positions. This is an excellent basis for Tilburg University research to take the next step. In addition to academic impact, our research could also have much more social impact if we use existing academic knowledge and develop new academic knowledge to create a better world. Such meaningful research generates passion and inspiration. Our mission ‘Understanding Society’ will continue to be essential, but we want to argue in favor of the next step: ‘Advancing Society’. Of course we realize that not every problem can be solved by means of science and technology; we are well aware of their limitations. However, we are convinced that science has much to offer in the way of making the world a better place. As stated above, this “societally engaged” vision is in line with the heritage of Martinus Cobbenhagen, the *founding father* of our University, and is clearly part of our DNA.

Collaboration is crucial

In order to take the next step towards “science with a mission”, a connection as referred to above is required. In the first place, this means connecting to the world around us; this is not only necessary for ‘Understanding Society’ but all the more for ‘Advancing Society’. We do not merely refer to transferring new scientific results to society, but also to jointly, in a multi-disciplinary way, addressing concrete, major social issues. In this area, there is much to be gained at our University. It is striking that, at present, there is only limited collaboration between the Schools and that, within various Schools, fences exist between departments. Yet, scholars indicate that conducting monodisciplinary research frequently acts as a constraining factor on truly solving social issues. A strong focus on society enhances the integration of the university towards communities of experts in research, (self-) reflection, and debate, aimed at helping society. This results in surprising and inspiring meetings between colleagues who discover that they are working on identical themes.

It takes some courage to take this step. In academia, you can score with publications in international top journals, and societal impact is not always a criterion for these journals. It takes courage and effort as a researcher to nevertheless choose to do sound academic research that positively impacts society but may possibly be hard to publish. It takes courage as a supervisor at our University to look beyond superficial publication criteria. It takes courage as a scholar to come out of your comfort zone and to truly collaborate with scholars from other disciplines to help solve the major societal challenges.

In Tilburg, we take on the responsibility to develop, in addition to education and research – and not instead of, a third pillar for the university. This pillar will become firmly based in the university and researchers can opt to be an integral part of this. In this context, some researchers will want to contribute considerably to academic impact, whereas others will contribute more to social impact. Such a division in focus is fine, and it takes courage and an open mind to respect and appreciate each other. We can pursue both excellence and impact. There will be no trade-off. In our view, it is more than worth the effort: Tilburg University's research gains a soul!

The Tilburg University IMPACT Program

The Tilburg University IMPACT Program will work with the academic community at Tilburg University on new solutions for new challenges. As part of the IMPACT Program, we will identify challenges and problems together with internal and external stakeholders and, in various settings and jointly develop interventions, tools, and solutions to benefit society. *Changing the game!*

We would like to emphasize that, at Tilburg University, a lot of research with societal impact is already carried out. The IMPACT Program focuses on continuously expanding this research, making it more visible, and starting new initiatives.

Advancing Society and the design of the IMPACT Program will require a clear focus. The Dutch National Research Agenda ²² (NWA), drawn up a number of years ago “to generate more synergy in research as a whole and augment the consistency, efficiency and impact of Dutch research,” has provided Tilburg University with inspiration in this respect. Tilburg University has opted to focus its own impact agenda on three challenging and promising themes:

- “Empowering the Resilient Society” (coordinator: Prof. Dr. Ton Wilthagen)
- “Enhancing Health and Wellbeing” (coordinator: Prof. Dr. Margriet Sitskoorn)
- “Creating Value from Data” (coordinator: Prof. Dr. Dick den Hertog)

Each theme has its own objectives, networks, and dynamics. The greatest added value is in the crossovers between the three themes. The themes relate to the development and resilience of society; the development of the individual and health and wellbeing, throughout the entire life cycle; and the development of data science, using data to achieve better insight, better-informed decisions, and more responsible action. Tilburg University has chosen to combine the three themes into one IMPACT Program: *Advancing Society: Science with a Soul*. Digitalization – both as an opportunity and as a threat – plays an important role in the three themes. We will come back to this below.

The three themes also link up well with the “Societal Challenges” that form the point of departure of the European research program Horizon 2020 ²³, in which health, demographic changes and wellbeing, and an inclusive and innovative society are high on the agenda. We also contribute to the Millennium Development Goals, the Sustainable Development Goals of the United Nations ²⁴.

²² Dutch National Research Agenda: <http://www.wetenschapsagenda.nl/>

²³ Horizon 2020: <https://ec.europa.eu/programmes/horizon2020/>

²⁴ United Nations: <http://www.un.org/millenniumgoals/>

<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Tilburg University will enhance its profile based on the IMPACT Program for the benefit of its stakeholders and society at large. It will be clear what Tilburg University stands for and what can be expected from us. We are an institution with an integral, distinct, and consistent proposition.

As was described above, multi-helix, internal and external interdisciplinary collaboration, and co-creation are essential. We will engage in this at all levels of society: locally (city, neighborhood), regionally, sectorally, nationally, and internationally. In line with the introduction to this essay, coordination and collaboration within Tilburg University will be increased to benefit excellent academic research (*science for science*); external collaboration with the business community, civil society institutions, other research universities of technology and otherwise, and universities of applied sciences will be stimulated and expanded (*science for society*).

We have opted for innovative forms of collaboration and, wherever possible and necessary, also for innovative methods. Cutting-edge forms of knowledge application and innovation will be deployed, such as experiments, testing grounds, or field labs. Where appropriate, new, digital technology will be developed and tested.

Given the interconnected nature of the themes, the coordinators will work on the program in a network setting. Within Tilburg University, they will do so together with the Schools. The way in which the themes, the impact, and valorization as well as their monitoring are organized affects all steps in the process: strategy design and roadmapping, network development and consortium formation, program and project development and execution, evaluation, dissemination and business development, as well as transfer, and, last but not least, creating a societal support base and stimulating new modalities of civil society.

By advancing society in this manner, we will inspire our students, young researchers, and alumni. The themes, the approach, and of course the results will be both instructive and appealing – contributing to knowledge, skills, and character (the elements of the new Tilburg Education Profile) –, and will also provide them with ample opportunity to participate and become involved in a variety of activities, such as internships, outreaching programs, the Tilburg University Society, and *back to campus* initiatives. Of course, having an entrepreneurial attitude applies here as well. In this way, we also contribute in, a very practical way, to our objective of stimulating life-long learning.

Theme 1: Focus on the Resilient Society

With the theme of *Empowering the Resilient Society*, Tilburg University links up with the NWA route “Towards resilient societies.” The objective of this route is to reinforce society with a view to the future, both at a macro level and a local community level. The focus is on developing a new vision and new actions in which society, the economy, and governance play an important role. The European Commission defines resilience as “the ability of an individual, a household, a community, a country or a region to withstand, to adapt, and to quickly recover from stresses and shocks”²⁵. Similarly, the United Nations Development Programme²⁶ explains that resilience depends on “the technical capacities of organizations and institutions at the front lines of crisis response, the overall functioning of country systems, and the governance structures that ‘set the rules of the game’”.

Where resilience is concerned, it is vitally important to break the existing vicious circle. For many people and groups, the ambivalent “megatrends” referred to at the beginning of this essay lead to great uncertainty and negative outcomes. As a result, they lose trust in politics, governance, the financial sector, and society. Even the belief in the ‘European dream’²⁷, a model in which economic as well as societal aims come together, is no longer shared by everyone. Some individuals and groups are excluded from society. As trust diminishes, the basis for reforms and new strategies erodes whilst this basis that does exist in a so-called high-trust society. In the absence of reform, unwanted effects will increase rather than decrease, which will make the position of vulnerable groups even more difficult. It is therefore crucial that research is conducted and new political-administrative, financial, social, human resource management, and legal arrangements are developed in which all social groups do feel included, supported, and represented, as a result of which conflicts can be solved in constructive ways and innovation can get off the ground. Better governance can help rebuild public trust²⁸ and enhance social security in society. Victimization can be prevented or recovered from and undermining crime can be opposed. All this can help to enhance the resilience of a society.

The increasing role of regions and regional coordination, for instance, is interesting. In a region, people are known in their diverse, but also indivisible roles; resident, employee, parent, consumer, patient etcetera. That is why the “(re)integration” of societal subdomains is essential. These subdomains reached a high level of professionalization as well as specialization but delivered only partial solutions, exactly because citizens are undividable. They are at the intersection of the domains.

25 European Commission: https://ec.europa.eu/commission/index_nl

26 United Nations Development Programme <http://www.undp.org/>

27 Rifkin, J. (2004) *The European Dream*. Penguin Putnam Inc

28 OECD (2016) *Resilient Cities: POLICY HIGHLIGHTS of the OECD Report (Preliminary version)*.

Retrieved from: <http://www.oecd.org/gov/regional-policy/resilient-cities-policy-highlights-preliminary.pdf>

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Even in a small and compact country like the Netherlands, there are regional differences, for instance, with regard to the economy and composition of the population. This needs to be addressed (Law of Requisite Variety ²⁹) whereby regions, for that matter, are not confined to national borders. In the proximity of our University, we see the relevance and potential of regional innovation and governance—Midpoint Brabant, Brainport Eindhoven, and the Province of Noord-Brabant—which we contribute to.

Scientific knowledge can improve most aspects of people's living environment (health, sustainability, traffic/logistics, work, and safety) by developing *Smart Districts* based on state-of-the-art insights. The OECD report on Resilient Cities gives insight into which role a university can take up: “universities can form the core of an alliance among municipalities, local industry and citizens”. In this sense, universities can become the hub where integration and multi-level collaboration can take place beyond institutional boundaries” ³⁰. We will contribute to building the best and smartest city of the world.

Research is also urgently required into developing new forms of morality, ethics, meaning, and social cohesion in a rapidly changing digital society, in which the interaction between humans and technology has intensified and affects more and more aspects of life. We can develop an “inclusive robot agenda” towards a technologically *inclusive design* that supports and empowers people, in particular more vulnerable groups, enabling them to find or continue to work and overcome limitations or disabilities in their social functioning. When inequality and poverty increase, demographic changes and alternative families appear, cultural and religious differences are instigated, and the way we feel about public services changes, the more resilience and social innovation is needed.

We need to explore new forms of work, economics, and value creation. We need to find new business models in which the leading principles are sustainability, circularity, social responsibility and a broader concept of prosperity, loss/profit, social return, and work that pays off in social terms. We contribute to the essential energy transition. We must guarantee the resilience of economies and societies by striking the right balance between dynamics on the one hand and inclusion on the other, or *flexicurity*, as *Wilthagen* ³¹ and the European Commission ³² call it. A dynamic society that does not lead to inclusion is as unwelcome as an inclusive society that is no longer dynamic. We pay attention to the security in the old age for everyone by helping to develop sustainable and vital retirement systems.

29 Ashby, W.R. (1956) *An Introduction to Cybernetics*. Chapman & Hall

30 OECD (2016) *Resilient Cities: POLICY HIGHLIGHTS of the OECD Report (Preliminary version)*. Retrieved from: <http://www.oecd.org/gov/regional-policy/resilient-cities-policy-highlights-preliminary.pdf> 25-04-2017

31 Wilthagen, T. and F. Tros (2004), ‘The concept of ‘flexicurity’: A new approach to regulating employment and labour markets’, *Transfer, European Review of Labour and Research*, 10, nr. 2 (Summer), 166-186

32 Europese Commissie (2007), *Towards Common Principles of Flexicurity: More and better jobs through flexibility and security*. Brussel

We emphasize the importance of human capital, education, and development. Even in the Netherlands, 1.7 million people aged over 16 years (which is 10% of the population) have a low level of literacy. They have trouble reading long and complex texts and performing arithmetic tasks. We need a strong learning culture and more equality when it comes to skills ³³, to prevent these groups from being unable to connect to the changing and more demanding labor market. Since the learning-performance is increasing in other countries, these people will be at a disadvantage.

The future belongs to the young. This is our inspiration to devote additional attention to the young generations. We are aware that their future will be more complex and uncertain than that of earlier generations: they will have to work and remain productive for many more years than those before them. Their careers will require much flexibility because the economy will transform from a job-based economy to a task-based economy, i.e. their competencies, 21st century skills, will be tested to the limit and they will regularly have to update their knowledge and skills and reinvent themselves. With our knowledge, we can contribute to an integrated approach for young people in the area of the employment market, education, work experience, care, and support. We will help young people who now remain below the radar – no job, no qualifications, and no money – to get on their feet again. We will make sure that labor market information, at competency level, becomes much more transparent and more ‘real time’ than before, providing job seekers and businesses with a sound navigation system for the employment market. Together with all stakeholders, we will develop new forms of social security, that move in parallel with people on the employment market.

33 SER (2016) *Nationale Skills Strategie*.

Retrieved from: http://www.ser.nl/~media/files/internet/publicaties/overige/2010_2019/2017/nationale-skills-strategie.ashx 25-04-2017

Theme 2: Focus on Health and Wellbeing

The theme of *Enhancing Health and Wellbeing* links up with various NWA routes, first of all with the route of “Health care research, sickness prevention and treatment”. Prevention, rapid diagnosis, and the effective treatment of the chronically sick are high priority areas in medicine. The aim is to realize a better quality of life for more people, allowing them to continue to participate in society. Sustainable care, in terms of affordability, quality, and access, is crucial. The theme also links up with the “Personalised Medicine” route, the aim of which is to provide every individual patient with the right type and amount of care and doing so at minimum cost and as close to home as possible. To realize this ambition, in times when the number of chronically ill patients is increasing, considerable investments are needed, both in technological and methodological developments and in a sound data infrastructure.

We connect the theme of health and wellbeing with relevant social sciences, data sciences, and legal disciplines. The growing preventive, diagnostic, and curative possibilities lead to a changed view on health and disease, like the way patients view themselves and the way they are treated by the people surrounding them. A rapidly changing society challenges the individual and affects the position and resilience and thus the health of the individual in that society.

We now know that the development of brain parts related to the prefrontal cerebral cortex strongly influences behavior that determines the quality of health on many fronts. The skills associated with this brain part and related structures are called executive skills. These are skills such as focusing your attention, regulating emotions, protecting yourself from addiction, understanding the relationship between cause and effect, being flexible and resilient, bearing responsibility, learning from feedback, motivation, self-reflection, and moral behavior. These skills enable us to become healthy and survive in the complex age in which we live. However, in the current world, full of distraction and short-term rewards, it is difficult to develop these skills, which means that we will more easily fall back onto short-term choices and behaviors. This causes many health problems (e.g., addiction, money problems, unhealthy ways of living and non-compliance with treatments). Research shows that we are able to develop the prefrontal cerebral cortex and the related skills that can promote healthy behavior.

Data science too, contributes to a better insight into health: it can help detect patterns early, make more efficient use of resources, or improve care. Developments relating to innovative care and wellbeing have ethical and privacy implications. Is everything that is technologically possible also allowed?

By connecting health and wellbeing with these disciplines, Tilburg University contributes to possible solutions for this particular social challenge. We also emphasize the relationship between education, human and financial capital, and health, in view of the many possibilities for prevention and intervention, given the fact that differences in health are linked to social

inequality. Co-creation, the way in which the various parties work together, in partnerships and in interdisciplinary teams, is important here.

Improving people's health and wellbeing over an increasingly longer lifetime is one of the major social challenges of our times. Since Tilburg University has the relevant expertise available, the University wants to contribute to solutions and applications for these challenges and become a leader in the area of health and wellbeing research. We will achieve this by doing the following things:

1. We want to address the growing challenges in health care, for instance, by focusing on physical, mental, and social health in a rapidly changing society. Our multidisciplinary approach will help us to obtain more insight into at *what time* the patient really is central, what types of tailored treatment are possible, and how data science can contribute to this. Thus, we link up with the various routes and fields of the European and national research agendas in the area of health and wellbeing.
2. We want to explore new methods that better enable us to map and improve people's health and wellbeing. Developing accurate measuring methods and techniques such as *experience sampling* and *remote monitoring* will enable us to better monitor and predict changes in health and wellbeing. All kinds of innovations in the area of e-health, communication, stress management, decision-making, and other forms of behavioral interventions can contribute considerably to the subjective experience of health and wellbeing by people with chronic physical or mental problems.
3. We will look for possibilities in the area of prevention, health, and personal care through innovative health research. There is more to health than its ‘biological’ definition. Therefore we will study the organizational, social, and professional dimensions of health. More specifically, we will look at how to gear this to the relevant individual's circumstances and life phase. In addition, we will focus on the development of executive skills in different (vulnerable) groups in society to make them more committed to taking responsibility for their own health. This will increase health-promoting behavior that is beneficial for both the individual and society and reduces costs regarding treatment and assistance.

The program *Enhancing Health and Wellbeing* focusses on innovative methods to map health and wellbeing of people and on interventions that stimulate healthy behavior. Other focus points are integral customized care, putting people at the center, and data-science as a means of improving care.

Theme 3: Focus on Value Creation from Data

The theme of *Creating Value from Data* contributes to the NWA route of “Creating value through responsible access to and use of Big Data.” Digitalization and data are two sides of the same coin. It is clear that the amount of data that we generate in our Digital Society is increasing exponentially. Via social media, the internet, loyalty cards, financial transactions, wearables, cameras, etcetera, much human behavior is increasingly recorded in enormous amounts of data, every day. Financial/accounting, administrative, and logistic ERP (Enterprise Resource Planning) software systems contain an abundance of data that are valuable to businesses. Moreover, the value of these data is even greater when different data sources are linked. The processing power of computers has also increased dramatically, and increasingly powerful algorithms are developed that allow large amounts of data to be analyzed. Frequently, computing power and efficient algorithms are also very important in Big Search Space, i.e., when the best solution must be found from among a very large number of alternatives. It is therefore not surprising that data scientists are in high demand. Data science in general and big data in particular play an important role in almost all scientific disciplines.

Despite their great value, terms like data science and big data have negative connotations for many people. This is understandable given the potentially negative impact for groups in our society. A popular, recently published book even refers to “Weapons of Math Destruction”³⁴. As part of this theme, we also want to conduct research into Responsible Data Science for a Better World. We not only want to develop new, better data science techniques but also pay attention to transparency, reliability, and fairness. Or like our Tilburg University colleague Linnet Taylor explains: “Data science should be defined by more than its methodological characteristics: it should articulate its direction and aims in relation to the social world in which it is embedded”.

In order to achieve this, we will join forces with all the disciplines involved in Data Science, most of which are present at Tilburg University. The Schools employ dozens of researchers who are experts in algorithms: statistics, predictive and prescriptive analytics, visualization, machine learning, and data, text, and video-mining. A great deal of expertise and research capacity is also available concerning the legal and ethical aspects of the use of data. Several Tilburg University scholars specialize in information systems and there is ample domain knowledge in such relevant fields as finance, economics, logistics, HR & the employment market, and health. We want to connect these scholars even more to enable them to jointly develop responsible techniques and tools that will improve certain aspects of society in order to contribute to solving major social problems. Data Science to cooperate in achieving the Sustainable Development Goals (SDGs).

³⁴ O’Neil, C. (2016) *Weapons of Math Destruction*. Crown Publishing Group

The Digital Society

Tilburg University has opted to combine the three themes under the concept of the Digital Society to contribute to and give shape to the ambitions of the joint Dutch universities (VSNU)³⁵. Further to the National Research Agenda, the objective is to position the Netherlands as a leading country and testing ground for human and society-oriented digital technology. It is a strategic investment in one of the largest transitions of our time. The ultimate challenge is to make the digital society a better one than the ‘analogous’ society. This will not happen automatically.

Therefore we will make the Digital Society the topic that connects the three themes. Data science contributes to insight into and potential applications of digitalization. The Digital Society impacts the resilience of individuals (Health, Wellbeing) as well as the resilience of societies (Resilience). The central question is how digital technology can be used to stimulate resilience at all levels, i.e., from the individual to society as a whole, and create new value.

In doing so, we will not ignore the fact that the Digital Society may have an ambivalent impact. It does not only offer opportunities (for climate change, the circular economy, education, healthcare, the manufacturing industry, etc.), but also involves great risks in the area of security, the employment market, the democratic state under the rule of law, privacy, and discipling people. The Dutch Rathenau Instituut, which promotes the formation of political and public opinion on science and technology, has recently argued in a report entitled *Opwaarderen. Borgen van publieke waarde in de digitale samenleving*³⁶ that the government, businesses, and civil society organizations are insufficiently equipped to protect our fundamental rights. According to the researchers, we regularly update our apps, our software, and our technologies, but we have forgotten to update our society.

In the opinion of the Rathenau Instituut, it is time to acknowledge the impact of digitalization on society³⁷. Data and software affect behavior and decisions. Fake news plays a part in elections. Platforms like Airbnb, Facebook, and Uber collect information about us and try to influence the choices we make. Smart dolls and smart TVs listen in on what we do. Care robots raise the question of whether we are entitled to human contact. Virtual and physical worlds are becoming completely interwoven. Still, the public debate is mainly about privacy and security. There is much less attention for other public values that are equally under pressure as a result of digitalization, such as equal treatment, human dignity, and the power asymmetry. Let alone that we think comprehensively and in a wider perspective about how

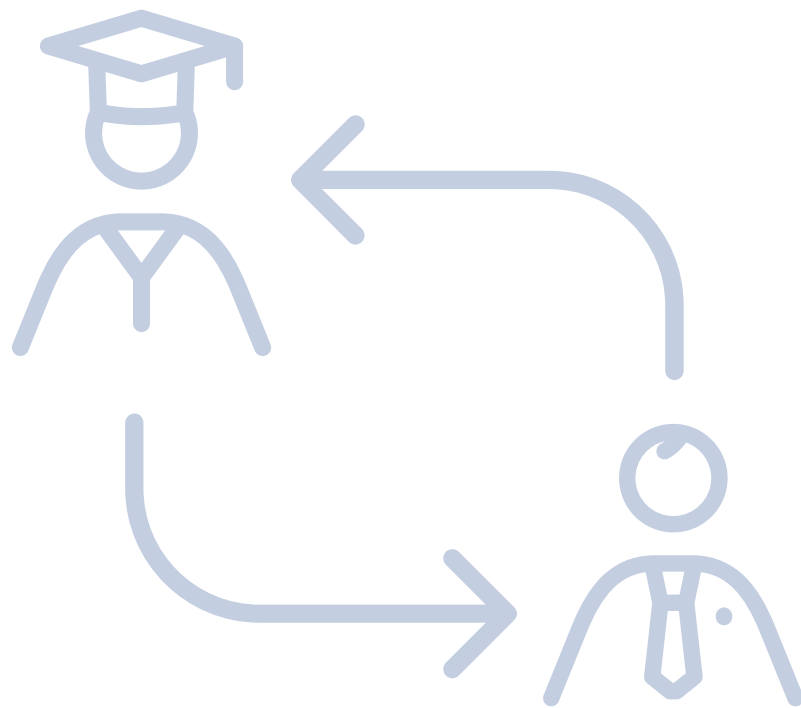
³⁵ VSNU, vereniging van universiteiten: <http://www.vsnu.nl/>

³⁶ Nederlandse Rathenau Instituut (2017) *Opwaarderen. Borgen van publieke waarde in de digitale samenleving*. Retrieved from: <https://www.rathenau.nl/nl/publicatie/opwaarderen-borgen-van-publieke-waarden-de-digitale-samenleving-25-04-2017>

³⁷ Nederlands Rathenau Instituut (2017) *Human rights in the robot age : challenges arising from the use of robotics, artificial intelligence, and virtual and augmented reality*. Retrieved from: <https://www.rathenau.nl/nl/publicatie/human-rights-robot-age-challenges-arising-use-robotics-artificial-intelligence-and-15-05-2017>

digitalization can contribute to the diminishing power-inequality and the creation of new forms of a sustainable and sustaining society.

So we need to find a new form of connectivity and prevent that digitalization turns into a disaster scenario by seeking far-reaching integration of technological and social scientific knowledge.



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- In addition to impact in science, our research can have even more impact in society by using existing research results and developing new ones for a better world. Such meaningful research creates passion and inspiration. ‘Understanding Society’ will continue to be necessary, but also a logical next step: Advancing Society (or: science for science plus science for society)
 - We will establish an IMPACT Program with a clear focus, inspired, among other things, on the Dutch Research Agenda and based on our expertise.
 - That focus is Empowering the Resilient Society, Enhancing Health and Wellbeing, and Creating Value from Data. The themes relate to the development and resilience of society, the development of the individual, health and wellbeing throughout the life cycle, and the development of data technology and science. The impact of the three themes is increased by anticipating and responding to the challenges of the Digital Society.
 - Linking social, psychological, cultural, legal, economic, ethical, and theological knowledge to technology will particularly yield added social value.
 - We will foster collaboration with parties at all levels of society and among Schools and institutes/departments. Together we will define important research questions and find solutions.
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In conclusion

Like all universities, our university is also undergoing a transformation. Just as society as a whole, the University needs to adapt as well as the academic professionals. With its IMPACT Program “Advancing Society,” Tilburg University aspires to transform ambivalence, uncertainties, paradoxes, and challenges into opportunities and progress wherever possible. We will do so in an academically responsible way, reliably, independently, professionally, and based on excellent research and excellent knowledge. We will reinforce the connections within science and between science and society.

And we will do so with enthusiasm – with a soul!

COLOPHON

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