



1. Stand des DiDaT Projekts zum Abschluss der Initiierungsphase

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Die Zielsetzungen des Projekts DiDaT finden sich in der Broschüre vom Oktober 2018. Newsletter 01 widmet sich der dem Projekt DiDaT zugrunde liegenden transdisziplinären Methodologie. Dieser Newsletter 02 informiert über den Stand des Projekts zum Abschluss der Initiierungsphase (siehe Abbildung 1, S. 4). Die ersten beiden Artikel diskutieren die zentralen Vulnerabilitäten und „Unseens“, hier insbesondere die Frage, warum aus Sicht der Nachhaltigkeit und aus der Perspektive systemischer Risiken die Behandlung von Vulnerabilitäten und Opportunitäten unauflösbar miteinander verbunden sind.

Zudem finden die Leser Beiträge über die Ergebnisse eines Projekts zur Behandlung digitaler Daten in verschiedenen Rechtssystemen (EU, USA, Hongkong; Gabriel Lentner) und zwei Beiträge, die DiDaT in den Rahmen einer Internationalen Diskussion zu Nachhaltigkeitstransformationen einordnen und sich kritischen Aspekten der globalen Entwicklung stellen (Alan Borning und Lance Bennett; Dirk Helbing).

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Entwürfe der Grobpläne und rund die Hälfte aller Teilnehmenden bestimmt

Das Initialprojekt DiDaT schliesst mit der 1. Stakeholder Konferenz am 25. Juni 2019 ab. Die wesentlichen Gegenstände hier sind die Konzeption der Leitfragen, die Festlegung der Systemgrenzen, die Identifikation der zu betrachtenden Vulnerabilitäten von sensitiven Stakeholder und Teilsystemen mit Bezug auf Deutschland im Zuge der digitalen Transformation sowie eine darauf aufbauende Begründung der Auswahl der Stakeholder und der Vertiefungsforschung (in der Hauptphase). Alle diese Aufgaben und Leistungen werden in einem transdisziplinären Prozess mit Wissenschaft und Praxis erbracht. In einem Booklet sind von rund 30 Wissenschaftler*innen und 30 Praktiker*innen in einem ersten Schritt *Konzeptskizzen*¹ und darauf aufbauend (erste Fassungen der) *Grobpläne* erstellt worden. Nach einer ausführlichen Diskussion auf der Stakeholderkonferenz werden diese revidiert, der Öffentlichkeit zugänglich gemacht und bis Ende dieses Jahres in Feinkonzepte überführt.

Zum Abschluss der Initiierungsphase sind die Hälfte der Teilnehmenden des transdisziplinären Prozesses bestimmt (siehe Abbildung 2). Die andere Hälfte soll bis Ende des Jahres folgen.

Co-Konstruktion der Leitfrage

Die gemeinsame Suche, Aushandlung und Festlegung der Leitfragen von Schlüsselakteuren der Praxis und Vertreter*innen der Wissenschaft ist wesentlicher Bestandteil eines transdisziplinären Prozesses. Erste Aussagen gingen von der zentralen Botschaft der Europäischen Expertenrunde aus, dass die weitgehende

¹ <https://www.iass-potsdam.de/sites/default/files/2019-06/Booklet%20Konzeptskizzen%20Mai%202019%20V14.pdf>

unverstandene Wechselbeziehungen zwischen „Eigentum, ökonomischen Wert, Zugang, und Nutzung von Daten“, die wesentliche Ursachenquelle von Unseens darstellen². Dabei wurde die Idee verfolgt, dass es unter dem Gesichtspunkt der Resilienz und Nachhaltigkeit von Systemen, diejenigen Stakeholder und Teilsystemen (etwa dem Gesundheitssystem oder den KMUs als wesentlicher Bestandteil der deutschen Wirtschaft und Gesellschaft) besonders zu beachten gilt, die (etwa als Folge disruptiver Prozesse) besonderen Vulnerabilitäten ausgesetzt sind. Am Ende der Initialisierungsphase können wir die Zielsetzung von DiDaT wie folgt beschreiben:

DiDaT verfolgt das Ziel, die adaptive Kapazität von sensitiven Stakeholdern und Subsystemen in Deutschland bei der Nutzung digitaler Daten hinsichtlich der intendierten und unerwünschten Nebenfolgen (Unseens³) zu erhöhen. Damit soll eine sichere, positivere und schlussendlich nachhaltigere Nutzung der Potentiale digitaler Daten und Technologien entwickelt werden. Es gilt, soziale und technologische Innovationen zu entwickeln, die auftretenden Vulnerabilitäten zu identifizieren und durch aktive Gestaltung zu Opportunitäten umzuwandeln.

Vulnerabilität und Zukunftsfähigkeit

Der Begriff der *adaptiven Kapazität* ist ein zentraler Bestandteil des Vulnerabilitätbegriffs. Es geht nicht nur darum, ein *a priori Risiko-Management* für hoch ungewisse unseens (wenn man etw die hohe Anzahl der möglichen Entwicklungen betrachtet) und für in ihren Auswirkungen nicht gut abschätzbaren negativen Ereignissen vorzunehmen. Es geht (auch) darum, betroffene Stakeholder (antizipativ) in die Lage zu versetzen, im Falle wesentlicher Veränderungen in der Lage zu sein, auf diese Herausforderungen angemessen zu reagieren, um ihre Lebensfähigkeit (engl.: *viability*) und Ihre Gestaltungsfähigkeit zu erhalten. Wir sprechen in diesem Zusammenhang auch von Zukunftsfähigkeit.

² Scholz, R. W., Bartelsman, E. J., Diefenbach, S., Franke, L., Grunwald, A., Helbing, D., . . . Viale Pereira, G. (2018). Unintended side effects of the digital transition: European scientists' messages from a proposition-based expert round

Das Verhältnis von Vulnerabilität und Opportunität

Im Bereich der Technikfolgenabschätzung ist es gängige Praxis, die berechneten oder vermuteten Wirkungen der Einführung und Verbreitung von Techniken in Chancen und Risiken aufzuteilen. Chancen zeigen beabsichtigte und nicht beabsichtigte, aber gerne angenommene positive Nebeneffekte auf, Risiken deuten auf in Kauf genommene oder unbeabsichtigte (häufig auch nicht im Voraus gesehene, im englischen Sprachraum als „Unseens“ bezeichnete) negative Auswirkungen hin. In beiden Fällen, bei den Chancen und den Risiken, geht es meist um die Abschätzung von Wahrscheinlichkeiten, dass diese als positiv oder negativ identifizierten Auswirkungen unter bestimmten Rahmenbedingungen eintreffen oder nicht.

Bei den Digitaltechnologien ist diese Strukturierung, so einleuchtend sie auf den ersten Blick erscheint, problematisch. Denn hier ist der Gestaltungsraum so groß, dass die jeweils gewählte und umgesetzte Architektur Chancen und Risiken erst erzeugt. Anders als bei traditionellen Technologien, wie etwa von Kernkraftwerken oder genetisch veränderten Lebensmitteln, geht man nicht von *einer* technischen Neuerung aus und fragt danach, was sie an Chancen und Risiken mit sich bringen kann, um dann Modifikationen einzuleiten, welche die negativen Nebenwirkungen reduzieren. Bei den digitalen Techniken manifestieren sich die Folgen bereits im Entstehungsprozess. Hier von Nebenwirkungen zu sprechen, ist schon vom Begriff her problematisch, da bei vielen komplexen Technologieinnovationen schon auf dem Reißbrett Risiken und Chancen entstehen: sie sind unvermeidbarer Bestandteil des Gestaltungsprozesses. Viele Chancen ergeben sich erst, wenn klar ist wie mögliche Risiken angegangen werden, und umgekehrt. Von daher macht es hier Sinn, sich zunächst die möglichen Risiken vorzunehmen und die möglichen negativen Auswirkungen und Vulnerabilitäten zu identifizieren, die angegangen werden müssen, damit sich die Chancen überhaupt realisieren können. Man könnte

table. *Sustainability*, 10(6), 2001;
<https://doi.org/10.3390/su10062001>.

³ Unseen ist ein Akronym für Unintended Side Effects.

¹ Scholz, R. W., & Kley, M. (2019). *Stocks and Flows-based Stakeholder Analysis of Digital Data – Basic concepts, tools for analysis, data, and the role of digital data infrastructure providers*. Kreuzlingen: STTM. Dieses Papier resultiert aus einer Kooperation mit dem ÖFIT, Fraunhofer Fokus, Berlin.

hier auch von „opportunities and risks by design“ sprechen. Dies bedeutet, dass – aus Nachhaltigkeitssicht – bei jeder digitalen Innovation die Fähigkeit von Stakeholdern, mit den Risiken, Unseens und Vulnerabilitäten angemessen umgehen zu können, einen Teil des Innovationsmanagements darstellt.

Um diesem Umstand Rechnung zu tragen, sprechen wir bei DiDaT auch nicht von Chancen und Risiken, sondern von Vulnerabilitäten und Opportunitäten. Beide hängen eng miteinander zusammen und bedingen sich gegenseitig. Dabei ist es von der Logik dieses Ansatzes sinnvoll, zunächst die Vulnerabilitäten zu bestimmen, um Gestaltungsmerkmale für Opportunitäten zu gewinnen. So kann z.B. die Vulnerabilität für Verletzungen der Privatsphäre Opportunitäten für die Entwicklung von Produkten zur Verschlüsselung, zur Nachverfolgung von Daten und zur Absicherung gegen fremde Eingriffe schaffen. Im internationalen Kontext mit unterschiedlichen Sensibilitäten für diese Verwundbarkeit können auch regional spezifische Märkte entstehen, um das unterschiedliche Sicherheitsbedürfnis optimal zu bedienen (etwa Europa versus USA oder China).

Alle von DiDaT bearbeiteten Vulnerabilitätsräume behandeln damit auch Opportunitäten; es ist sogar eines der wesentlichen Ziele des transdisziplinären Prozesses, aus Vulnerabilitätsräumen mit Hilfe der Gestaltungskraft aller einbezogenen Akteure so weit wie möglich Opportunitätsräume zu generieren.

Welche Stakeholder sind welchen Vulnerabilitäten durch unverantwortliche Nutzung von Daten ausgesetzt?

Anworten auf diese Frage und die damit zusammenhängende Frage, welche sozialen und technologischen Innovationen dazu beitragen können, eine bestmögliche Nutzung digitaler Systeme zu ermöglichen, müssen noch erarbeitet werden und werden sich im geplanten Weissbuch Mitte des Jahres 2020 wiederfinden.

Die Arbeitsgruppen zu den Vulnerabilitätsräumen sind gegenwärtig dabei, erste Listen und Strukturierungen von Vulnerabilitäten und den unterliegenden Prozessen zu erstellen. Wir können erkennen, dass eine

Vielzahl von kritischen Wirkungen mit der Frage, wer darf welche Daten wann wie nutzen (also zu der Allokation der Datenhoheit) zu tun hat. Hieraus ergeben sich bezogen auf eine Nutzung etwa folgende Fragen;

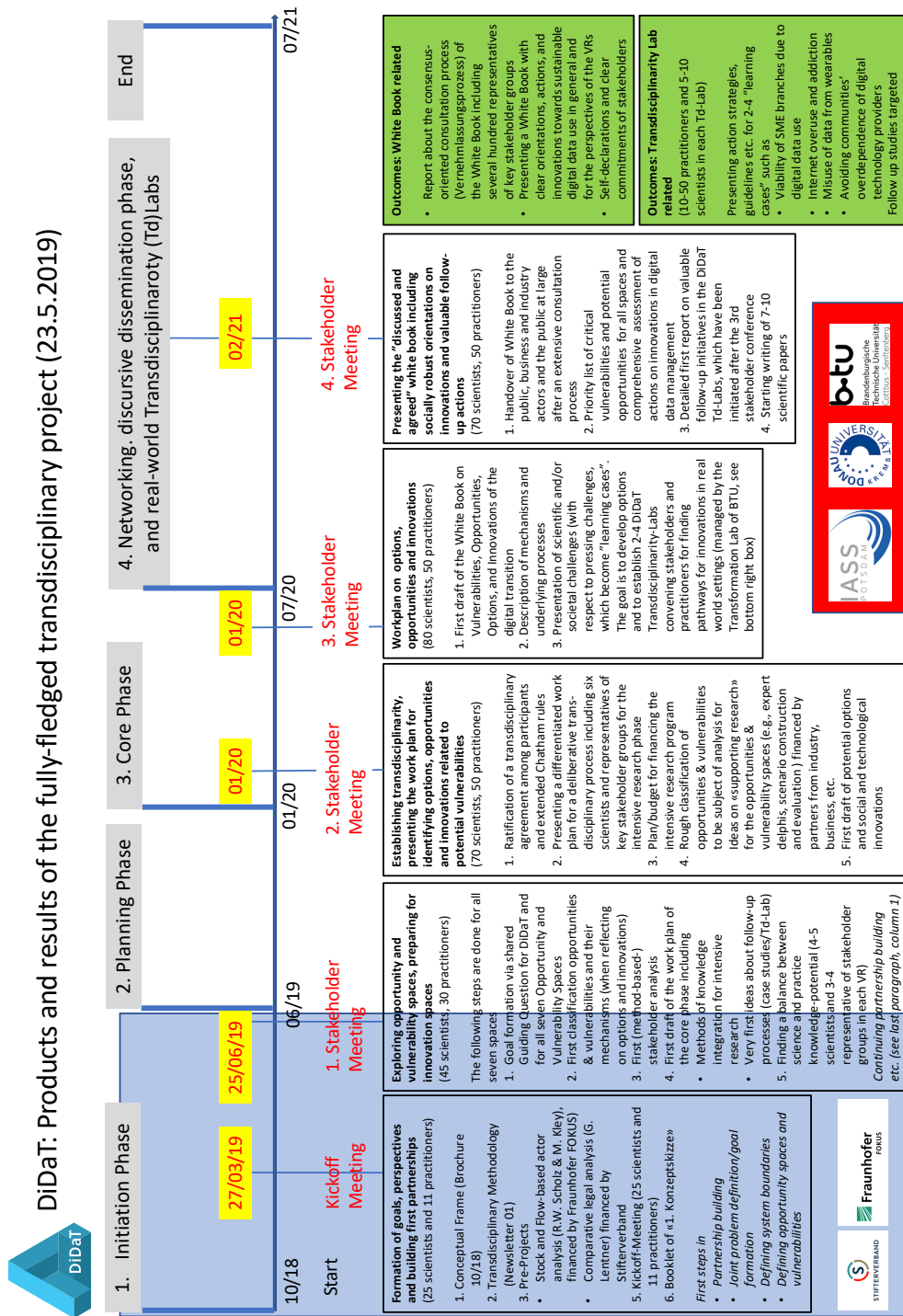
- Wer hat Zugang zu den ökonomischen Daten der Konsument*innen und wer darf Sie wann wie (z.B., zur personalisierter Werbung, Consumer Nudging, Risikomanagement von Versicherungen) nutzen?
- Nach welchen Grundsätzen werden welche medizinischen Daten erhoben? Wann werden sie welchen Akteuren unter welchen Auflagen zugänglich gemacht?
- Political Surveillance: Darf man das politische Verhalten des (Staats-)Bürgers, welches etwa aus dem Verhalten in Suchmaschinen erschlossen wird (welche man als eine digitale Infrastruktur betrachten kann) erheben und verkaufen?
- Welchen Zugang haben Handelsplattformen über die Aktivitäten von Unternehmen. Dürfen Sie dies für eine Entwicklung kompetitiver Businessstrategien (etwa zur besseren Abschätzung des Wertes einer Firma, etc.) verwenden?
- Welche technologischen oder Verhaltensänderungen helfen, um sich etwa vor kriminellen oder zerstörerischen Motiven (etwa beim Cyberstalking, erpresserischen Handlungen, psychisch gestörter Angriffe auf kritische Infrastrukturen) zu schützen.

Diese Punkte sind insbesondere auch unter dem Gesichtspunkt zu betrachten, dass die Daten in den Besitz globaler Softwarefirmen kommen, die in Ländern Ihren Firmensitz haben (wie den USA), die keine vergleichbaren Datenschutzrechte besitzen wie Europa (siehe dazu den Artikel auf S. 10). Es gibt viele weitere Gesichtspunkte, die ein breites Spektrum von Risiken und/oder Vulnerabilitäten eröffnen. Ziel ist es, bei diesen Vulnerabilitäten die spezifischen und generischen Aspekte zu benennen, um Strategien für einen verantwortungsvollen Umgang mit digitalen Daten zu entwickeln.

Da die digitalen Infrastrukturen und der Zugang zu einem grossen Teil digitaler Daten in der Hand weniger grosser Infrastruktur-Provider liegen, spielen die informationstechnologischen Regelungssysteme (z.B., welche Form von Encryption liegt zu Grunde) und das Verhalten der Nutzer*innen des Internets bezogen auf Sicherheit eine grosse Rolle⁴.

¹ Scholz, R. W., & Kley, M. (2019). *Stocks and Flows-based Stakeholder Analysis of Digital Data – Basic concepts, tools for analysis, data, and the role of digital data infrastructure providers*. Kreuzlingen: STTM. Dieses Papier resultiert aus einer Kooperation mit dem ÖFIT, Fraunhofer Fokus, Berlin.

Abbildung 1: Gesamtschau des Projekts DiDaT



¹ Scholz, R. W., & Kley, M. (2019). *Stocks and Flows-based Stakeholder Analysis of Digital Data – Basic concepts, tools for analysis, data, and the role of digital data infrastructure providers*. Kreuzlingen: STTM. Dieses Papier resultiert aus einer Kooperation mit dem ÖFIT, Fraunhofer Fokus, Berlin.

Organigramm / DiDaT: Organizational Chart

Abbildung 2. Organigramm des Projekt DiDaT (etwas weniger als die Hälfte aller TeilnehmerInnen sind zu gegenwärtigen Zeitpunkt bestimmt).

Science		Practice	
Facilitators and project leaders			
O. Renn (IASS) und R.W. Scholz (IASS und Donau Uni Krems)*/ N.N- N.N. Practice			
Steering Board			
Speakers		Speakers	
C. Eckert (LMU, Fraunhofer AISEC)		N.N.	
M. Mißler-Behr (BTU)		N.N.	
Members		Members	
D. Helbing (ETH Zürich), G. Gigerenzer (MPI für Bildungsforschung, Berlin), J. Hofmann (Wissenschaftszentrum Berlin), M. Latzer (Uni Zürich), R. Neuburger (Münchener Kreis), P. Parycek (Fraunhofer Fokus, Donau Uni Krems, Deutscher Digitalrat), C. Woopen*/M. Friele (Uni Düsseldorf; *Deutscher Ethikrat)		T. Clausen (Edelmann Media), H. Gleiss (Netz, tbc), S. Ober (NABU), T. Thiele (DB), H.-J. Sippel (Stiftung Mitarbeit), N.N., N.N.	
Project Team			
1. Project management: V. v. Zyl-Bulitta (IASS), D. Marx (BTU), G. Lentner (DUK, Deputy Facility)			
2. Administrative staff: J. Weissbrich (IASS), K. Schuster (Donau Uni Krems)			
Vulnerability Spaces			
Impact-oriented vulnerability impacts			
Science	Topics/Facilitators	Practice	
Mobility			
W. Canzler, (WZB), T. Kessel (EICT Berlin), J. Maesse (Uni Siegen), W. Palmethofer, (Open Knowledge Foundation), L. Schebek (TU Darmstadt, tbc)	K. M. Hofmann (Network Institute)	D. Beilschmidt (DB), Teille (VW), F. Krummheuer, (Detecon/Telekom), I. Gerhäuser (Städtetag, BW) E. Fischer (VDV)	
Health			
G. Antes (Uni Freiburg), G. Glaeske (Uni Bremen), F. Tretter (LMU)	H. Köckler (HSG Gesundheit Bochum), L.A. Rosenberger (Uni Wien)	M. Friele (UK Köln), M. Weigand (APS) M. Weller (Spitzenverband der Krankenkasse)	
SME and digitalization			
D. Baier (Uni Bayreuth), G. Müller-Christ (Uni Bremen), A. Reichel (Zukunftsinstitut, Karlsruhe)	R. Czichos (DUK, CTN); interim R.W. Scholz (DUK/IASS)	W. Hofmann (TMG) L. Probst (IHK Erfurt)	
Agro-food chain			
R. Brunsch (Leibnitz ATB Potsdam), Christian Reichel (Leibniz IBZ)	J. Zscheischler (Leibniz ZALF)	H. Buitkamp (VDMA Landtechnik), H.-W. Griepentrog (DLG, Digitalisierungsausschuss, Uni Hohenheim, DLG, tbc), W. Haefeker (DBIB)	
Value- and impact-oriented			
Social media			
C. Montag (Uni Ulm), C. Sindermann (Uni Ulm)	P. Sellke (IASS)	F. Ebner (Mecodia), H. Gleiss (Netz), B. Thull (LFK Stuttgart) L. Simon (Cyberstalking)	
Institution- and regulation oriented			
Reliable and trustworthy ecosystems			
R. Jaster (HU Berlin), A. Kaminski (Uni Stuttgart)	K.H. Simon (Uni Kassel)	S. Hallensleben (VDE), M. Fuchs (Blogger und Politikberater), S. Thürmel (München)	
Cybercrime			
A. Panchenko (BTU), D. Labudde (HS Mittweida)	E. Albrecht (BTU); V. Hagen (BTU), D. Marx (BTU),	H. Wu (Huawei), H. Voelker (Deutsche Bank), M. Fröhlich (IT Compliance Solutions)	

2. DiDaT: Transdisciplinary sustainability research on the use of digital data: Goals, key concepts and methodology of the DiDaT project

Roland W. Scholz & Ortwin Renn

Suggestions for defining key concepts

To fully understand *unintended side effects* (UNSEENs) of digitalization, DiDaT has to deal with the broader and structural issues with regard to the underlying economic system, the effects on the natural environment, and its connection with politics and democracy. As the theory discussion will show, it seems that certain problems and vulnerabilities discussed within DiDaT are, in fact, deeply rooted in the present legal and economic system and will require structural change to be adequately addressed. We should think about not only treating the symptoms but getting at the roots of causalities of unintended side effects. The theory discussion thus opens up a space for a more critical engagement with very unsustainable systems we sought to change.

This working paper is written to support a coordinated and harmonized preparation of the Grobkonzept (rough concept) of the seven Vulnerability Spaces and to suggest definitions, which are used by all vulnerability spaces. It provides also some information (1) about **subject, goals, and guiding question**; (2) the definition of *core concepts* (such as **vulnerability** or **UNSEENs**) and ideas about a transparent, traceable, reasoned identification and selection of representatives of stakeholder groups.

What are the goals of DiDaT

As indicated by the phrasing “Responsible use of **Digital Data** as subject of a **Transdisciplinary Process**” (**DiDaT**), the project deals with the generation, transfer, (technical) operation, storage, retrieval and social use of digital data. The project takes a systemic sustainability perspective and starts from the key message of a European science expert roundtable on **unintended side effects** (UNSEENs). The message stated that main perils on sustainable

development emerge from the insufficient understanding and management of the interaction among “ownership, economic value, use and access of data” [1]. DiDaT is a follow-up process of the European Expert Round Table.⁵

DiDaT is constructing and describing social and technological innovations that increase the ability of sensitive and responsive stakeholders and subsystems (of Germany) to cope with unintended and unwanted side effects (UNSEENs) of the ongoing digital transition.

The goals of **DiDaT** may be phrased by the following (version⁶) of the guiding question.

DiDaT is contributing to sustainability research. The project is following a systemic definition of sustainability and sustainable development [2]. In this definition, sustainability is conceived as an **ongoing inquiry**⁷ on systems of management in the frame of **inter- and intragenerational justice** (or other normative criteria) and ecological boundaries.

Ongoing inquiry means that sustainability is a process in which what is conceived as (un)sustainable is continually (re)defined depending on the (**scientific**) **knowledge** about whether critical boundaries causing system vulnerability and resilience are exceeded and whether the societal normative values, standards, ideals, goals of a humane development process within the respective governance level (i.e., community, society or nation state⁸ or the global world community) are violated.

⁵ The European Expert Roundtable was cofunded by the German Ministry of Education and Research and of Danube University of Krems.

⁶ As DiDaT is a transdisciplinary process, the construction of the guiding question is subject of a theory-practice dialogue, which started with the initiation phase in 10/2018 and will be finalized with the end of the planning phase.

⁷ This definition emerged out of an inquiry of the understanding of 21 project leaders of scientists from MIT, Harvard University, ETH Zurich and Chalmers University in the frame of the Alliance of Global Sustainability initiative.
⁸ Relevant system boundaries of DiDaT are Germany, Europe, and the global world. In some questions, subsystems of Germany (e.g. Alte und Neue Bundesländer –

Why do we use the vulnerabilities and not the risk concept?

We refer to a technical concept of vulnerability as it emerged in risk research.

Risk can be defined as a function of **exposure** and **sensitivity**.

Exposure is the likelihood that a target such as person or an ecosystem is affected by the risk. Exposure is usually operationalized by the probability that a negative event or threat T_i happens to a specific target.

Sensitivity is operationalized by the extent of loss, harm, damage, peril, injure etc. resulting from the manifestations of possible threats T_i ($i \in I$). Usually, sensitivity is operationalized by a loss of a utility (or value) function.

In general, risk assessment and risk judgments are provided before a negative event takes place. We speak about **a priori** judgments or assessments.

There are many ways to calculate risk scores. One common option is to assess the probability that a certain “unacceptable damage” is going to occur. There are many quantitative and (semi)qualitative ways to construct, calculate, assess, etc. risk scores. An “unacceptable risk” is a potential damage that is deemed unacceptable. There is no objective threshold for setting the boundary between acceptable and unacceptable risks. It always relies on a normative judgment.

When looking at future negative events on the system level or on a stakeholder group S , not only the prior judgment about the riskiness (or harmfulness, destructiveness, etc.) of a threat T_i is of interest. From a practical perspective, it is of interest that a system shows **adaptive capacity** to cope with the negative impacts of a threat T_i when it actually has taken place. Adaptive capacity takes an **a posteriori** perspective.

Vulnerability describes the degree to which a risk agent can cause damage to the target system. It is a composite assessment of the **adaptive capacity**.

Whose UNSEEs, vulnerabilities, and sensitive stakeholder groups and subsystems

An **unintended side effect** (UNSEE) is a positive or negative outcome resulting from a decision maker’s (D_j) action of a decision A_j . This UNSEE differs from

province level separating Germany into two parts) may be considered.

the (planned) intended action. The UNSEE is often known (and sometimes unknown). If the UNSEE is known, we often find a tendency to overlook or discount it, because it is not part of an “actor’s primary business model.”

From systems theory, UNSEEs are secondary feedback loops. They could also be termed rebound, boomerang, or backfire effects (see Figure 1). DiDaT focusses on negative UNSEEs.

What is **intended, unwanted**, negative or positive depends on the decision maker and on the perspective taken. Digital innovation, such as all or most technological innovations, are Janus-faced in the sense that they may include ambivalent and uncertain impacts (i.e., be ambiguous). This becomes even more valid if more than one decision maker or stakeholder is involved.

Unintended side effects by example: If a farmer is cropping, the primary goal is to produce cereals, beans etc. From a farmer’s perspective, the harvesting is causing an unintended negative effect. The nutrient content of the soil system is reduced and the next year, yield will decrease unless proper interventions (I) such as fertilization are introduced to the system.

The term **stakeholder** emerged from business science [3]. In other contexts, one can also speak about interest groups (German: Interessens- oder Anspruchsgruppen). In the context of DiDaT we suggest the following definition: “A stakeholder is ... any individual, group, organization or other human system, who/which can affect or is affected by the access and use of digital data in the frame of the guiding question.”

Who and what is considered as a stakeholder (and a sensitive stakeholder group) in the frame of DiDaT is determined by the German constitution and the Charta of human rights. Interests which are not coherent with these legal reference systems, such as groups, which construct malware by criminal economic activities, are not considered stakeholders.

When talking about “**sensitive stakeholders**”, professions (such as industrial branches or professions such as interpreters) or **subsystems of society** (such as critical infrastructures, the gambling business) are included, which are facing disruptive innovation and potential losses. Also components of cultural patterns [4], such as values, norms, rules of interaction and verbal and nonverbal language (such as hate speech), may be viewed as subsystems.

Another critical issue in this context is the **change of power relations**. The turn from the industrial to the digital society is linked to fundamental changes of

the system of social, political, and economic structures. As in any system transition, winners and losers will emerge. Whether losers will be protected (e.g., by mitigation, subsidizing, public programs, etc.) is widely a matter of the social values and legal requirements.

The term UNSEEN and the attributes unintended and unwanted are coined from a societal perspective of technology innovation. This is done from a positive and anthropocentric conception of human systems. We postulate that from a **societal perspective** the digital transition (and the technologies for using digital data) are designed, constructed, and implemented to serve societal needs (such as welfare⁹, wealth, convenience, etc.). Thus, the construction of a genuine malware interpreted as a product of criminal, destructive, or pathological malware is not seen as a primary function of societal activities.¹⁰

The notion of **sensitivity** is applied in the DiDaT project in two ways. One is a **descriptive** way which may be viewed as being (widely) free of values. It refers to the dynamics in degree and speed to which a stakeholder group may be exposed to major vulnerabilities that may threaten the existence of stakeholder groups or the services of a (sub-)system unless timely and effective adaptations are initiated. The other is a normative use of the term sensitivity, which refers to structures that society wants to maintain. The concept of “cultural landscape preservation” in the field of environmental science may be taken as an example.

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3. Hauptergebnisse der vergleichenden Analyse der Behandlung „digitaler Daten“ in den Rechtssystemen der Europäischen Union, den Vereinigten Staaten von Amerika und den USA

Gabriel Lentner

EU (inkl. Ö und D)

Die viel diskutierte neue Verordnung (EU) 679/2016 zum Schutz natürlicher Personen bei der Verarbeitung persönlicher Daten und zum freien Datenverkehr (Datenschutzgrundverordnung, DSGVO) sieht ein Verbotprinzip vor, d.h. die Verarbeitung personenbezogener Daten ist verboten, wenn sie nicht ausdrücklich erlaubt ist. Sie beinhaltet sieben allgemeine Grundsätze, die hauptsächlich Einwilligung, Transparenz und Verarbeitung von Daten adressieren. Dabei geht es um

Grundsätze für die Verarbeitung personenbezogener Daten (Art.5 DSGVO), der Rechtmäßigkeit der Verarbeitung personenbezogener Daten (Art.6 DSGVO), Bedingungen für die Einwilligung (Art.7 DSGVO) und Bedingungen für die Einwilligung eines Kindes in Bezug auf Dienste der Informationsgesellschaft (Art.8 DSGVO).

Besondere Vorschriften bestehen für die Verarbeitung besonderer Kategorien personenbezogener Daten (Art.9 DSGVO), der Verarbeitung von personenbezogenen Daten über strafrechtliche Verfolgung (Art.10

⁹ Warfare, secret services, and public services are excluded from DiDaT (by different reasons).

¹⁰ Highly simplified, e.g., the construction of malware as warfare means (e.g., by the secret service as a decision

maker) is considered in a frame of societal protection and not seen in the frame of societal aggression

DSGVO) und die Verarbeitung, für die eine Identifizierung der betroffenen Person nicht erforderlich ist (Art.11 DSGVO).

Die DSGVO gilt nur für personenbezogene Daten. Das heißt, dass unter bestimmten Bedingungen die Anonymisierung von Daten durchaus die Möglichkeit bietet, dem Anwendungsbereich des Datenschutzrechts (und somit auch der DSGVO) zu entgehen. Allerdings ist hier im jeweiligen Einzelfall kritisch zu hinterfragen, ob tatsächlich eine ausreichende Anonymisierung bzw. Pseudonymisierung vorliegt oder nicht. In der Praxis zunehmend wichtiger werden damit Verfahren, die eine Anonymisierung hinreichend zuverlässig sicherstellen, so dass niemand mehr in der Lage ist, die entsprechend bearbeiteten Informationen einer konkreten Person zuzuordnen. Damit ist auch die Anonymisierung/Pseudonymisierung ein wichtiger Baustein bei der datenschutzkonformen und -freundlichen Planung und Realisierung von Big Data- und Industrie 4.0-Prozessen.

Regelungslücken, die die EU Kommission mit einem neuen Rechtsinstrument zu schließen gedenkt, sind ein Datenproduzentenrecht und ein Konzept für Daten-Zugangsrechte mittels Zwangslizenzen.

Die Verordnung über den freien Verkehr nicht personenbezogener Daten in der EU (14. November 2018) soll mit Inkrafttreten im Mai 2019 Hindernisse wie Beschränkungen der Datenlokalisierung abbauen und damit die Entwicklung einer europäischen Datenwirtschaft fördern.

Derzeit gibt es in einigen Bereichen noch Datenlokalisierung durch Behörden in Mitgliedstaaten und Rechtsunsicherheit bei der grenzüberschreitenden Datenspeicherung- und -verarbeitung sowie Schwierigkeiten beim Wechsel von Service Providern (z.B. Cloud) aufgrund von Vendor Lock-in Praktiken.

Generell hat die EU mit der DSGVO einen Raum für den starken Schutz personenbezogener Daten geschaffen, der teilweise auch auf andere Rechtssysteme (wie z.B. USA oder sogar Hong Kong) Einfluss nimmt. Demgegenüber erscheint der Raum für eine Datenökonomie (insb. der Handel mit nicht-personenbezogenen Daten) erst in einem Entwicklungsstadium.

USA

Trotz vieler Bemühungen seitens der US-Regierung besteht bis heute kein Datenschutzgesetz auf Bundesebene, welches mit dem Datenschutzniveau der EU vergleichbar ist. Verschiedenste Regelwerke auf Staaten- und Bundesebene (insb. Kalifornien, dazu sogleich)

sowie Rechtsprechung und unternehmensinterne Datenschutzregelungen machen eine abschließende Beurteilung des Rechtsbestandes in den USA schwierig.

Mit dem Publikwerden der Überwachungspraktiken des US-Geheimdienstes NSA (National Security Agency) und dem System PRISM, wurde das Ausmaß der Überwachung deutlich. Dies zeigte insbesondere auch die Überwachung weltweiter Onlinekommunikation.

Zum Schutz persönlicher Daten hat Kalifornien im Juli 2018 das umfangreichste aller Datenschutzgesetze in den USA verabschiedet, den California Consumer Privacy Act von 2018 (gültig ab 1. Januar 2020). Dieses Gesetz orientiert sich an der DSGVO der EU.

Hongkong

In Hongkong ist die zentrale Rechtsvorschrift zum Datenschutz die Personal Data (Privacy) Ordinance (Cap. 486 of the Laws of Hong Kong). Diese Norm regelt die Erhebung, Verwendung und den Umgang mit personenbezogenen Daten und basiert auf einer Reihe von Datenschutzgrundsätzen. Sie wurde 1996 als Reaktion auf die EU-Richtlinie 95/46/EG (Datenschutzrichtlinie) erlassen und deckt weitgehend den gleichen Bereich wie diese ab, wenn auch mit einigen erheblichen Einschränkungen. Die Verordnung wurde 2012 grundlegend reformiert, vor allem um spezifische Bestimmungen und Beschränkungen für die Verwendung und Bereitstellung personenbezogener Daten im Direktmarketing hinzuzufügen. Staatliche Überwachung wurde für diesen Bericht nicht näher untersucht. Es ist aber wichtig auf Berichte über chinesische Überwachungspraktiken in Hong Kong hinzuweisen.

Vulnerabilitäten

Zusammenfassend hat die Studie folgende Vulnerabilitäten identifiziert: nationale und internationale Governance (im Hinblick auf Territorialität der Rechtsordnungen, Zugang zu Daten, datenunterstützte Entscheidungsprozesse, Rechtsstaatlichkeit und Demokratie); Datenschutz und Big Data; Konsumentenschutz; Wettbewerbsrecht.

Comments and Interaction

Section

The DiDaT Project and Integrated, Systemic Problems in Sustainability: A Commentary and Collegial Suggestions

Alan Borning¹¹ and Lance Bennett¹²

The DiDaT project, with its focus on both the opportunities and the undesired consequences of digitalization, concerns a core topic in the overall study of sustainability. We make three suggestions for the DiDaT project evolution in this commentary: first, to situate the project in an overall view of what is really needed to move toward sustainability; second, to put additional emphasis on questions of democracy and digital data, in particular with respect to social media; and third, to broaden the topics concerning the economy.

Our starting point is the observation that quality of life for growing numbers of people on the planet is threatened by a set of integrated, systemic problems in the environment and our economic and political systems. These problems are deep-rooted and will require major change to be addressed. For example, the defining environmental issue of our time is climate change. Addressing it effectively will require a different economic system, one that is fundamentally shaped by recognizing the limits of our natural world. But even touching the issue of fundamental economic change seems to be politically impossible for mainstream parties and organizations at present – hence the connection with politics and democracy.

We are two of the founders of the SEED project (Solutions for Environment, Economy, and Democracy), which is an evolving international network of scholar/activists, advocates, and practitioners who seek to address these integrated, systemic problems in a similarly integrated fashion. For more information please see the SEED website at <https://seed.uw.edu> or the SEED Manifesto [1]. We are working at multiple levels in SEED. One is a high level: seeking to develop simple communication strategies, focused on basic

and enduring questions such as “how can we live within the limits of the planet” and “what kind of democracy do we want.” Another, more specific, level involves working through the details of policy and exploring how this vision could actually unfold in terms of economics, laws, and so forth. The projects at the different levels mutually inform each other: keeping the basic, enduring questions in mind focuses the policy work and gives it a chance of being relevant, while doing the policy investigations keeps the basic questions grounded in ones that have a larger chance of making societal impacts and helps make the visions more concrete.

In terms of current activities, Lance is writing a book entitled *Communicating the Future: How Societies Can Create Better Solutions for Environment, Economy and Democracy*, as part of his current activities as a fellow at IASS. This book looks at the SEED themes at a high level: understanding how communication (and politics) helped get us in the current troubles, and how to better communicate realistic political solutions to them. Another activity involves investigating how the SEED ideas play out in the Information Technology sector, in particular looking at the current business model (“surveillance capitalism”) of companies such as Google, Facebook, and Twitter, which involves intensive gathering and cross correlation of personal information, and increasingly manipulation of behavior as well, in providing “free” services to the end users at a steep price for society; and investigating alternatives. Reference [2] is a workshop paper that describes some of our current thinking on this.

We suggest that these SEED ideas can provide a useful framing for the work of DiDaT and its working groups. For example, the Digitalisation and Impacts on Sustainability page at IASS (<https://www.iass-potsdam.de/en/research/digitalisation-and-impacts-sustainability>) asks two questions:

1. Can digitalisation create sustainable economies?
2. Does e-governance foster participation?

As they stand, these are worthwhile research questions. But we suggest reframing them as:

1. Suppose we have an overall vision for a sustainable economy that works for the planet and people. What are good roles for

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digitalization in this new economy? What happens to the nature of work?

2. In a world of this sort, what kind of democracy and governance do we want? And what is a good role for online communication in that?

This reframing thus starts with the idea that fundamental change in our economy and politics is needed, and then explores how this plays out for specific topics. This mirrors the logic of working between a higher-level vision of sustainability and the more specific policy levels for the SEED project described above.

We could develop a similar reframing for each of the seven focus areas (vulnerability spaces) in the current DiDaT research program. For all of these we start from the standpoint “Suppose we have an overall vision for a sustainable economy that works for the planet and people.” Then for example for Agroecosystems, we could ask “In such an agricultural sector, which has at its core the values of respecting and living within the natural world, what are good roles for digital data and information technology to help support it?” And similarly for SMEs – here we would also draw on the ethos and values of the Mittelstand enterprises in the German-speaking countries and how they might evolve within this broader framing, not just the statistical characteristics of SMEs.

Our second suggestion is to put additional emphasis on questions of democracy and digital data, in particular with respect to social media. The current “social media and values” space includes a number of different topics that arguably are too important to lump together in what could easily become a “catch all” or “other” category. Minimally, we suggest adding another focus area on “Democracy and IT.” Here the focus would be on good roles for IT and social media in moving toward democracies that actually function to represent the interests of their citizens, and that are capable of tackling the enormous challenges we face. With the exception of the radical right, which is often critical of the climate science that underlies much of the sustainability work, most conventional parties are far behind in uses of social media to mobilize and shape the thinking of their potential supporters. For example, it seems important to explore what can be done in the area of party attention to sustainability, and better interactive communication with voters. Another potential focus of this space would be on “alternatives to surveillance capitalism” – investigating ways to rein in the forces of surveillance capitalism and to develop alternatives, since the current business model

has such disastrous and wide-reaching implications for privacy, democracy, and individual freedom and dignity.

Our third suggestion is to configure the economic category of DiDaT to include economic issues beyond the Mittelstand. That is certainly important, but the technology-driven economy represents far broader economic challenges, including: unrealistic growth levels, promoting the illusion of clean consumerism, inequitable distribution of economic dividends, and underpublicized levels of energy and material consumption (witness the current Silicon Valley speculation frenzy over blockchain technologies or Internet of Things). These and other features of the digitalized economy also merit our consideration, whether as a separate category, or a broadening of the current focus on small and medium enterprises.

Finally, we can relate these suggestions to DiDaT’s concern with vulnerability and risk. It is possible that we are incorrect regarding the need for fundamental restructuring of our economic system, or the need to change the ways in which democracies engage citizens in thinking about the future. Perhaps the problems related to future sustainability can be addressed by more modest moves, involving some additional laws and regulations that do not require basic restructuring. However, we believe that there is a significant risk of catastrophic failure unless we at least can imagine more basic economic and political restructuring. So the risk assessment and mitigation perspective at the core of DiDaT argues for doing just that.

Our overriding question about DiDaT is whether it is aimed at modest examination of how digitalization can work better within existing social, economic and political paths, or whether there is also room for some re-visioning of those paths. Our sense is that DiDaT may make a bigger impact if it can do both.

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2. Marvin Landwehr, Alan Borning, and Volker Wulf. “The High Cost of Free Services: Problems with Surveillance Capitalism and Possible Alternatives for IT Infrastructure.” To appear, Proceedings of the Fifth Workshop on Computing within Limits, 2019. Preprint available online at <https://homes.cs.washington.edu/~borning/papers/landwehr-limits-2019.pdf>

Mastering Humanity's Grand Challenges¹³

A note by

Dirk Helbing (ETH Zurich/TU Delft/Complexity Science Hub Vienna)

Since about “The Limits to Growth” report in the early 70ies, we know that our economy is not sustainable and that societal and economic collapse in the 21st century is a realistic possibility, at least according to a large number of experts (even though the discussion is still on-going and controversial). The proposal of the business world to handle the sustainability problem was largely based on globalization, liberalization, and free global trade. However, those measures have almost reached their limits, and sustainability challenges are still huge, as the debates on climate change and water scarcity show. Moreover, there is a serious distribution problem of resources. Some countries suffer from obesity, while others suffer from hunger. Hence, the United Nations has called for urgent action under labels such as “Agenda 2030” and “Sustainable Development Goals”.

To achieve these goals, many have proposed a data-driven and AI-controlled approach. When resources are expected to fall short, it is proposed that one needs to know exactly where all resources are located and who is using them. Furthermore, one should be able to steer the use of all these resources. The data would be centrally collected and an optimal plan worked out by means of a “world simulator”, which is based on detailed digital doubles of everyone (an example is the “Sentient World” simulation). Moreover, people’s behavior would then be steered by nudging or neural manipulation, and deviations from the desired behavior would be punished, as known from the “Chinese” Social Credit System or Citizen Score. (Note that the British secret services CHGQ has developed a similar program under the name “Karma Police”, an extension of Predictive Policing approaches.)

This approach has been widely criticized as totalitarian. Not only does mass surveillance violate the human rights of privacy and human dignity. Behavioral experiments with humans and social engineering without

well-informed consent is as problematic as most digital methods of propaganda and censorship. An AI system that supposedly acts like a “benevolent dictator” and applies predictive policing to punish deviations from imposed conformity shares elements of fascist systems. Moreover, by means of constructed dilemma situations such as “trolley problems”, some experts are trying to establish new ethical principles for “moral machines”, which undermine the equality principle on which many societies are based. Research shows that autonomous systems judging over humans might discriminate certain people (e.g. women or people of color, elderly, poor or ill people), and they may relativize human rights. Some researchers have even started thinking about AI systems for euthanasia in an unsustainable world. In other words, something like a digital holocaust is conceivable, if autonomous systems are used against people.

As an alternative approach, we have recently developed concepts that go beyond open data, open source, open access, open innovation, making, crowd sourcing and citizen science. These concepts include global systems science and a network of digital hubs (“digital lab”), peace rooms, digital empowerment, data platforms enabling informational self-determination, democratic capitalism, digital democracy, City Olympics, participatory resilience, socio-ecological finance, participatory sustainability, and open source urbanism. Here, co-learning, co-ordination, co-operation, and co-evolution are the expected success principles to benefit our economy and society. Unleashing collective intelligence would boost societies, combinatorial innovation would fuel the economy, and digital assistants would empower people. Most of these concepts are shortly described in some detail below, and links to articles are provided.

1. Global Systems Science

Today’s strongly connected, global networks have produced highly interdependent systems that we do not understand and cannot control well. These systems are vulnerable to failure at all scales, posing serious threats to society, even when external shocks are absent. As the complexity and interaction strengths in our networked world increase, man-made systems can become unstable, creating uncontrollable situations even when decision-makers are well-skilled, have all data and technology at their disposal, and do their best. To make these systems manageable, a fundamental redesign is needed. A ‘Global Systems Science’ should create

¹³ The complete text can be found here: <http://futurict.blogspot.com/2019/04/mastering-humanitys-grand-challenges.html>

the required knowledge and paradigm shift in thinking.¹⁴

2. Inspired by the MIT Media Lab, it is suggested to create a European Digital Lab

In order to prepare the tools to counter our societies' existential threats, a large-scale initiative, a kind of Apollo project, is urgently needed. We propose to establish a Digital Lab – a European MediaLab, such that a sizeable progress can be made on a short time scale. The Digital Lab could be staffed with leading international experts (many would even return from the USA, if working conditions were competitive). It is a matter of political will and action to kick-start and support the activities that would foster and integrate cutting-edge research in various specialized digital hubs all over Europe and form a scientific collaboration network, the European Digital Lab.

Informational self-determination should be or is a human right. The slide below proposes a platform for informational self-determination, which would give control over our digital doubles back to the people. With this, all personalized services and products would be possible, but companies would have to convince us to share some of our data with them for a specific purpose. The resulting competition for consumer trust would eventually promote a trustable digital society.

The platform would also create a level playing field: not only big business, but also SMEs, spinoffs, NGOs, scientific institutions and civil society could work with the data treasure, if they would get data access approved by the people (but many people may actually select this as a default). Overall, such a platform for informational self-determination would promote a thriving information ecosystem.

Data management would be done by means of a personalized AI system running on our own devices, i.e. digital assistants that learn our privacy preferences and the companies and institutions we trust or don't trust. Our digital assistants would comfortably preconfigure personal data access, and we could always adapt it.

Over time, if implemented well, such an approach could establish a thriving, trustable digital age that empowers people, companies and governments alike, while

¹⁴ Dirk Helbing (2013), Globally networked risks and how to respond, Nature volume 497, pages 51–59, <https://www.nature.com/articles/nature12047>

¹⁵ <https://www.morgenpost.de/web-wissen/web-technik/article213868509/Facebook-Skandal-Experte-raet-zu-digitalem-Datenassistenten.html> ; <http://futurict.blogspot.com/2018/04/nudging-tool-of-choice-to-steer.html> ; <https://www.japantimes.co.jp/opinion/2018/04/30/commentary/world-commentary/stop-surveillance-capitalism/> ;

making quick progress towards a sustainable and peaceful world. The concept fits the concept of a European Science Cloud well.¹⁵

4. Creation of “Peace Rooms” to address the world’s grand challenges better

The resurgence of terms such as 'cold war' and 'clash of cultures' in the media reflects a dangerous social dynamic that could drive societies to the brink of recession, civil war and societal collapse. We suggest that a more modern, open and scientific strategy might help to prevent history from repeating itself.

Today's strategic 'war rooms' use big data, artificial intelligence and cognitive environments to manage conflicts and crises or run big business. Recasting them as 'peace rooms' would be better in tomorrow's world — they would then be more democratic and would operate with greater transparency for legitimacy. This would help to build trust and expose flaws in the system.

Peace rooms could be run by interdisciplinary, international scientific teams to integrate the best available knowledge. They would rely on input from multiple stakeholders — including cities, civil society, non-governmental organizations, citizen scientists and crowdsourcing — to find solutions that work for as many people as possible. The rooms would be supervised by ethics experts to ensure that innovative outcomes are used responsibly.

This is in line with approaches such as democratic capitalism and digital democracy. Peace rooms could change how strategic decisions are made in crisis situations, guiding us from uncontrollable conflict to the sustainable development that the world needs now.¹⁶

5. Creation of a platform for participatory, digital democracy, i.e. a digital upgrade of democracy to foster collective intelligence

Digital democracy is aiming to foster collective intelligence to find solutions to complex societal issues that result in better outcomes by integrating different perspectives and solutions. On a digital platform, the various arguments on the subject would be collected, structured and summarized in different perspectives.

<https://www.theglobalist.com/capitalism-democracy-technology-surveillance-privacy/>

¹⁶ Dirk Helbing & Peter Seele (2017). Turn war rooms into peace rooms, Nature volume 549, page 458, <https://www.nature.com/articles/549458c> ; <https://www.theglobalist.com/technology-big-data-artificial-intelligence-future-peace-rooms/>

After that, the main representatives of the various perspectives would come together at a roundtable and deliberate on innovative, integrated solutions that would work for as many different groups of people as possible. Only then one would vote – namely on the set of best integrated solutions.¹⁷

6. Development of a "design for values" and "responsible innovation" approach

Responsible innovation is needed to address the grand challenges of the 21st century. It requires pro-actively addressing relevant moral and social values already in the design phase of new technologies, products, services, spaces, systems, and institutions.

There are several reasons for adopting a design for values approach:

- (1) the avoidance of technology rejection due to a mismatch with the values of users or society,
- (2) the improvement of technologies/design by better embodying these values, and
- (3) the generation or stimulation of values in users and society through design.¹⁸

7. Creation of the framework for a real-time feedback and coordination system for a sustainable management of complex systems (socio-ecological finance system)

Using the Internet of Things, one could now quantify the impact of human action on the environment and others in a multi-dimensional way. Noise, stress, CO₂, waste and other effects that one would like to reduce would be measured by various sensors. The same applies to effects one would like to promote, such as the recycling of resources. Such a multi-dimensional real-time measurement and feedback system would be able to incorporate the values and goals of our society. For example, environmentally-friendly and social production methods could be made profitable and attractive. In this way, the emergence of a sustainable circular economy and a sharing economy could be promoted by a novel socio-ecological finance system, which one may call "Finance 4.0+". Such a system would bring the Internet of Things and Blockchain technology together to

¹⁷ https://www.huffingtonpost.com/entry/how-to-make-democracy-work-in-the-digital-age_us_57a2f488e4b0456cb7e17e0f ; <https://www.nature.com/news/society-build-digital-democracy-1.18690>

¹⁸ <http://designforvalues.tudelft.nl/> ; <https://www.weforum.org/agenda/2018/03/engineering-a-more-responsible-digital-future> ; <https://www.tudelft.nl/en/tpm/research/projects/engineering-social-technologies-for-a-responsible-digital-future/> ; <https://standards.ieee.org/industry-connections/ec/ead-v1.html> ; <https://ethicsinaction.ieee.org>

reach the UN 2030 Sustainable Development Goals more quickly, in a participatory way.¹⁹

8. Development of a City Olympics concept as participatory format to address global challenges

"City Olympics" or "City Challenges" could boost innovation on a cross-city level involving all stakeholders. They would be national, international or even global competitions to find innovative solutions to important challenges. Competitive disciplines could, for example, be the reduction of climate change, the development of new, energy-efficient systems, sustainability, resilience, social integration, and peace. The solutions would be publicly funded and should be Open Source (for example, under a Creative Commons license) in order to be reused and developed further by a multitude of actors in all cities i.e. by corporations, SMEs and spin-offs, researchers, NGOs and civil society. In this way, the potential of trends such as Open Source Movement, Hackathons, Fablabs, MakerSpaces, Gov Labs and Citizen Science would be raised to an entirely new level, creating the potential for civil society solutions. The new success principles would be collaborative practices such as co-learning, co-creation, combinatorial innovation, co-ordination, co-operation, co-evolution, and collective intelligence.

Increasing the role of cities and regions as drivers of innovation would allow innovative solutions and initiatives to be launched in a bottom-up way. All interested circles could contribute to City Challenges. Scientists and engineers would come up with new solutions and citizens would be invited to participate as well, e.g. through Citizen Science. Media would continuously feature the efforts and progress made in the various projects. Companies could try to sell better products and services. Politicians would mobilize the society. Overall, this would create a positive, playful and forward-looking spirit, which could largely promote the transformation towards a digital and sustainable society. In the short time available, the ecological transformation of our society can only succeed if the majority of our society is taken on board, and if everyone can participate and profit.²⁰

¹⁹ <http://www.coss.ethz.ch/education/BETH.html>

²⁰ <https://www.csh.ac.at/event/csh-workshop-city-games/> ; <https://www.csh.ac.at/event/csh-eth-workshop-1st-city-olympics/> ; <https://www.bloomberg.org/program/environment/climatechallenge/> ; <http://www.eib.org/en/projects/sectors/urban-development/city-call-for-proposal/index.htm> ; https://wwf.panda.org/our_work/projects/one_planet_cities/one_planet_city_challenge/ ;



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https://www.youtube.com/watch?v=X_HXkFVXV5k ;

Swissnex just organized a meeting in Bangalore, India, on
this: <http://futureictforum.com> ; <https://m.facebook.com/Future-ICT-for-Sustainable-Cities-Forum-340105613248552/>



Verantwortungsvoller Umgang mit digitalen Daten: Digitale Daten als Gegenstand eines Transdisziplinären Projekts (DiDaT)

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