DiDaT NEWSLETTER
01 | FEBRUARY 2019

DE | Digitale Daten als Gegenstand eines transdisziplinären Prozesses
EN | (Short) Version | Digital Data as a Subject of a Transdisciplinary Process

Subject, objectives and methodology of the project DiDaT

Ortwin Renn and Roland W. Scholz

Digitalization is changing our lives. Social, economic, political and technological processes are undergoing change in all sectors. As with the Industrial Revolution, the Digital Revolution is not only associated with undoubtedly positive and universally endorsed innovations, we are also experiencing a number of undesirable side effects. Sustainability research now faces the challenge of identifying the «unintended side effects» («unseens») of the digital transformation. The central objectives of the DiDaT project are to identify the most important challenges arising from the «*interactions of ownership, economic value, use and access to digital data*». Furthermore, to make visible and to evaluate the multitude of societal effects and to develop strategies to enable individuals, businesses and other social systems to deal appropriately with these undesirable effects.

Newsletter 01 Contents

Cooperation between science and practice at all levels and in all phases

DiDaT works in a transdisciplinary mode. This means that knowledge from *practice* and *science* is integrated and that the different values and perspectives of various stakeholder groups are collected, considered, processed, and if possible integrated at all levels and in all phases of the project. This alignment of science and practice-based processes and access to needs and knowledge allows the project team and involved stakeholders to properly acknowledge and discern societal values.

Development of orientations for science and practice

We, Ortwin Renn and Roland Scholz, do not see ourselves as the (content) directors of DiDaT. We consider it our task to facilitate and actively promote a transdisciplinary process. We assume the role of facilitators. The objective of the DiDaT process is to develop *socially robust orientations* for the responsible handling of digital data that are comprehensible to all participants and stakeholders concerned. These *orientations* should therefore have a high potential for social acceptance. We also regard it as important that the foundations (i.e., the knowledge, the lack thereof, the uncertainties), from which the orientations are developed, are reflected and communicated in a transparent and comprehensible manner.

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Tasks for the year 2019

In order to achieve the aforementioned objectives, DiDaT focuses this year on three activities. Firstly, domains of society are to be identified in which specific groups are exposed to major vulnerabilities (i.e., major risks and/or inadequate adaptive capacities) that emerge in the course of the digital transformation. We call these domains *vulnerability spaces* (see pp.10). This is a primary issue of a discursive process in the first half year of 2019. Secondly, representatives of the most important stakeholder groups and scientific domains will be recruited and motivated to participate in vulnerability spaces or in the steering board in order to work on the identification and analysis of the vulnerabilities in different categories. How this transdisciplinary process will be structured and who will be involved will be discussed at the *1st DiDaT Stakeholder Meeting* in the middle of this year. Thirdly, the work plan for the main phase (in the first half of 2020) will then be drawn up in a dialogue between scientists and practitioners participating in the vulnerability spaces.

Box 1: Unique selling points from a sociology of knowledge perspective (Ortwin Renn)

In simple terms, the *sociology of knowledge* investigates how knowledge is created and used by which social actors in which form and for what purpose. Scholars in this area study processes of how knowledge is generated, transformed and used. For the project DiDaT, we apply methods and procedures of this research tradition to investigate processes that deal with the consequences of digitalization. It is our goal to provide:

- an interdisciplinary orientation, integrating theory and practice, for the topic of digital transformation (here the interactions of property, economic value, use and access to digital data), and to analyze the present structure which is characterized by largely rule-independent, non-harmonized and situation-specific norms and which is therefore not sustainable in its present form (thus there is an acute need for action);
- a research design that, based on the analogy of the raw material and resource market, construes digital data as raw materials in a value chain (commodity) with a value network and processing steps based on the analogy with the raw material and resource market that develops rights, duties and rules (tracking, property rights, etc.);
- a platform (created by a transdisciplinary process) that generates and evaluates suitable instruments for complex tasks and differentiated goals together with representatives of stakeholder groups. These instruments include voluntary agreements, regulations, regulatory provisions, incentive systems, education and information programs, etc.;
- a transdisciplinary approach that integrates scientific and practical knowledge across disciplines and that is both research-based and evidence-informed, bridging knowledge and action; the outcomes are action-relevant and decision-oriented;
- A methodology that relies on a deliberative discourse, that explores win-win strategies, develops a rationale for justifiable «impositions» (in the sense of regulations that are acceptable from a personal and social point of view) and is oriented towards mutual understanding;
- A process that, on the one hand, produces operative results in terms of concrete action and regulation, including the identification of time spans necessary for implementation as well as the number of actors involved, and, on the other hand, also identifies gaps and needs in research and ideally new methodological forms and contents of scientific inquiry on (highly complex) digital transformations.

Important outcomes and consequences

So-called *white books* will be produced by the participants of the vulnerability spaces. The contents of the white books will be developed in various working groups (with half of the members from practice and the other half from science) and will be presented at a *DiDaT Stakeholder Conference* in the second half of 2020. The content is developed – ideally – with the involvement of all relevant stakeholders. The white books are written for decision-makers, stakeholders, and the general public. The results of this conference must then be edited and processed in a way that is appropriate for the various target groups, so that they can be used by broad sections of society and are helpful as orientations or guidelines for practice and science. For this reason, it is important, for example, to obtain feedback («*reviews*») from many representatives of practice and science before publication.

With this first newsletter we want to give you a broader and more in-depth insight into DiDaT and the transdisciplinary way of working of this project. Our newsletters will appear about 3-4 times a year. All participants and interested parties are invited to contribute through comments or articles. We will set up an electronic platform for this purpose. Further information on what DiDaT is striving for and what transdisciplinarity means can be found in the DiDaT brochure of October 2018.[1] In the boxes of this article we intend to answer the following two questions:

1. What are the unique selling points of DiDaT? (Box 1)
2. What are the special characteristics of a transdisciplinary process? (Box 2)

Collective search and formulation of the guiding question

The joint development, negotiation and formulation of a «guiding question» is a central task for the project. The guiding question describes the system boundaries, the key targets, goals and products of the project. A broad discussion on the guiding question will take place in May 2018 as a means to prepare for the *1st DiDaT Stakeholder Conference*.

Box 2: Special characteristics of a transdisciplinary process (Roland Scholz)

The conception of transdisciplinarity used in the DiDaT project goes back to the Zurich 2000 concept of transdisciplinarity[2]. There are a number of special features that distinguish transdisciplinary processes from other forms of science-practice collaborations. These are already described in the brochure «DiDaT: The Use of Digital Data as the Subject of a Transdisciplinary Process»[3]. Thus, we only list these features below briefly sketching core aspects:

- **Co-leadership by practitioners and scientists** at all levels of the project
- **Science defines itself as serving the public good;** which stands in **contrast** to other conceptions such as that of the «science activist» or «commercialized third mission»
- **Recognition of the otherness of the other**, of his/her role, values, way of thinking, etc.
- **Differentiation of roles** and presentation of perspectives and interests both between and within science and practice
- **Appraisal of scientific knowledge and practical knowledge** as different but of the same value
- **Co-creation of the goals, problems/challenges, problem representation, perspectives of evaluation** etc.
- **Common definition, representation and transformation** of identified problems
- **Mutual learning** between science and society and among stakeholder groups is a basic principle of the transdisciplinary discourse

[1] See: https://www.iass-potsdam.de/en/output/publications/2018/didat

[2] Klein, J.T., et al., eds. *Transdisciplinarity: Joint problem solving among science, technology, and society. An effective way for managing complexity*. 2001, Birkhäuser: Basel.

[3] See: https://www.iass-potsdam.de/en/output/publications/2018/didat

- **Method-based integration of knowledge** (epistemics; i.e., ways of knowing) and of theory-practice collaboration
- **Creating a protected discourse arena** in which preliminary thoughts can be formulated, discussed and developed and out of the box thinking may take place
- **Deliberative, evidence-based, scientific analysis** for poorly understood problems
- **Presentation of the limitations of knowledge**, i.e., the uncertainties, ignorance, context dependency, etc. of statements
- **(Socially robust) orientations** instead of (long lists of) recommendations
- **Sponsoring** instead of contract-based research
- **Facilitation** of the discourse between scientists and practitioners

These characteristics can be seen as the basis for the design of a kind of «rules of procedure for a transdisciplinary process» (also called extended Chatham rules). They developed in the course of twenty-five years of experience with transdisciplinary processes[4]. They will be discussed, adapted and, if necessary, supplemented at the DiDaT stakeholder conferences.

Information on the working methods and the schedule of DiDaT[5]

Roland W. Scholz and Verena van Zyl-Bulitta

1. Initiation phase (10-2018 to 06-2019)

In the preparation and initiation phase (see Figure 1 and Table 1), foundations are laid at content and organizational level. This includes two (smaller, externally funded) projects, whose objective is to aid the development of a system model. One project is called «Stakeholder-based Stock and Flow Analysis». The aim is to develop a form of representation for the *generation*, *storage*, *transmission* and *use* of digital data that is comprehensible to practitioners and experts and to which the working groups on vulnerability spaces can refer. This project is carried out in collaboration with and with the support of Fraunhofer Fokus, Berlin. Information about this project can be found on page 14.

In a second pre-project, a comparative country analysis on the design of digital law in different countries (D, A, EU, USA and Hong Kong) is carried out (see Box 3). This project aims to increase the ability to assess whether and which vulnerabilities in global digital data flows can arise from different country laws and due to missing global regulations. The work in this project is financed by the Plettner Foundation (member of the Stifterverband) and is carried out at IASS and the Danube University Krems.

Box 3: Information on the objectives of the pre-project «Comparative legal analysis of digital data» (Gabriel Lentner)

The aim of this legal analysis is to examine the existing legal framework with a view on vulnerabilities arising in connection with the handling of digital data. There are different approaches to this in the different legal systems. Thus, legal systems of Europe (Austria and Germany) will be compared to those in the USA and Hong Kong. In the context of this comparison, it is examined in what way vulnerability may emerge and what constraints may help to avoid vulnerabilities due to missing, insufficient, ambiguous or fuzzy legal regulations. Of course, the international legal

[4] Scholz, R.W. and G. Steiner, *The real type and the ideal type of transdisciplinary processes. Part II - What constraints and obstacles do we meet in practice?* Sustainability Science, 2015. **10**(4): p. 653-671.

[5] The course and phases of the project are presented in graphic form in Figure 3 of the DiDaT brochure (October 2018).

framework (such as cross boarder intellectual property rights) also plays an important role in this. But up to now, this provides only rules in general terms and addresses the cross-border trade in data and the associated enforcement problems.

In conjunction with and building on the stakeholder and stocks and flows analyses, the vulnerabilities and possible solution approaches are worked out and evaluated with the legal analysis. Thus, on the one hand, the legal analysis serves to present the legal status quo, i.e., the currently valid framework conditions in which actors (can) act. On the other hand, the contribution aims to develop a conception to identify vulnerabilities and make them legally comprehensible, thus creating a basis for the construction and proposition of appropriate regulations.

An important task in the initiation phase is to motivate practitioners and scientists to participate in DiDaT and to take over certain functions (e.g., the facilitation of a vulnerability space). This is an ongoing process, which is initially performed by the facilitators and then increasingly coordinated with the team of representatives from science and practice.

Other important tasks are the construction of a transdisciplinary project architecture as well as the definition of the main topics of the vulnerability spaces. In this way, the project becomes in an interactive process. Since October more than 100 people, companies, and institutions from science and practice have been approached. The results will be presented, discussed, improved and, if necessary, amended at the Kickoff Meeting and especially at the 1st Stakeholder Conference. This ensures that relevant topics are selected for the topic «Responsible handling of digital data» and that sufficient expert knowledge from science and practice is integrated for developing socially robust orientations.

This work also serves to provide the facilitators of the entire project, Ortwin Renn and Roland Scholz, a better basis for successful third-party funding. The DiDaT project is dependent on public and private research funding. In addition, the project aims to acquire sponsorship to support the transdisciplinary process. At present, the facilitators are in the process of clarifying the situation with research funding providers and the writing of applications for funding, which should secure the work after the initiation phase.

Two important dates are scheduled for the coming months, a **project kickoff meeting** on 27 March 2019 and the **1st DiDaT Stakeholder Conference** on 25 June 2019 (the second date is still subject to the availability of additional funding). If you are interested in working with DiDaT, please contact us to find out how to participate and where your suggestions can best be integrated. The discussion on the topics of vulnerability spaces will be a focus of the kickoff meeting.

At the 1st DiDaT Stakeholder Conference, the project leaders, a large part of the Steering Board (we anticipate about 5 members each from practice and science then), a large part of the facilitators of the vulnerability spaces (see Figure 2), as well as important members of the vulnerability spaces should be present. We hope that we can affiliate a sufficient number of colleagues and people from practice till then. At the 1st DiDaT Stakeholder Conference, the topics of the vulnerability spaces should be finalized, because the application for and allocation of financial resources depends on the number of vulnerability spaces.

An essential topic of the *1st DiDaT Stakeholder Conference* will be to outline the *Guiding Question* of the transdisciplinary process. A first version will be presented at the latest after the Kick-off Meeting. The guiding question will be finally defined and adopted at the 2nd Stakeholder Conference.

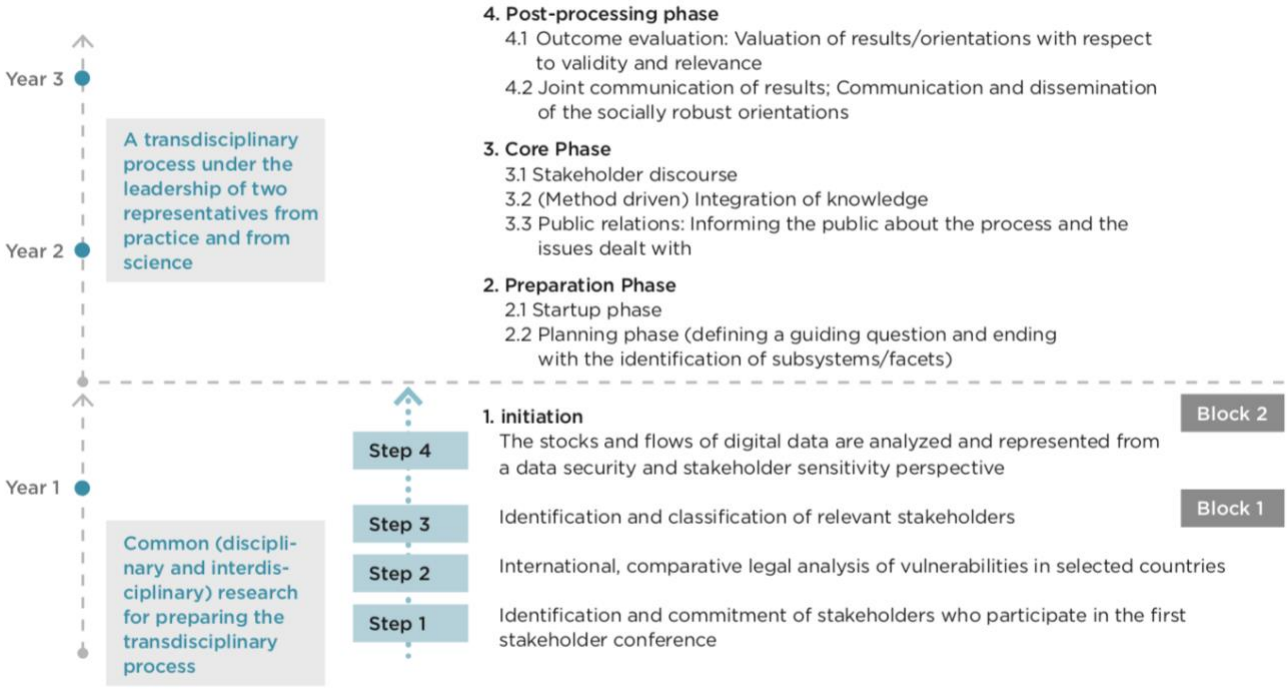

Figure 1: Steps and course of the project (from the DiDaT brochure, October 2018)

2. Preparation phase (06-2019 to 12-2019)

Ideally, the preparation phase begins immediately after or even with the 1st Stakeholder Conference. The vulnerability spaces that will have been chosen by then, have to be defined and outlined in a discursive process. The work schedule has to be planned and elaborated for the core phase. The (sub-) Guiding Questions for the vulnerability spaces will be constructed and a plan is specified for the discourse, the work, the required research, and the outcomes of the individual vulnerability spaces. It is critically important that qualified scientists and practitioners participate in and take co-leadership of this process in the vulnerability spaces. This is a successive process in which – guided by the facilitators – the range of the covered topics in the vulnerability spaces is examined and specified step-by-step in interaction with a growing number of stakeholders.

The first activities have already begun on three of the vulnerability spaces mentioned in Figure 2. The two facilitators, Renn and Scholz, are currently approaching key people for the so far selected topics. If you, as a reader of this newsletter, have suggestions on the main topics of the vulnerability spaces or on (representatives of) important stakeholders, please send them to Verena van Zyl-Bulitta. At the kickoff meeting at the end of March, 2019, a first broader dialogue on the topics and the people involved will take place. The agenda of the 1st Stakeholder Conference includes a first complete selection of the topics of the vulnerability spaces. The aim is to present first drafts on the (sub-) Guiding Questions of the vulnerability spaces and to discuss goals and contents as well as thoughts on the methods used in the main phase for knowledge interaction and for supporting the deliberative process (e.g., scenario construction and evaluation by stakeholder groups).

The selection of the topics of the vulnerability spaces has so far been carried out under two aspects. First, in what areas do we find relevant unseens that are important for the resilience of subsystems and components of society (e.g. the preservation of the privacy, autonomy and digital sovereignty of the individual citizen or the preservation of democracy)? Second, with what cluster of vulnerability spaces can we gain insight into the wide spectrum of (ir-)responsible use of digital data? For reasons of complexity, the facilitators have excluded questions on

the use and processing of digital data in the public sector/administration, the military and the secret services from the (core) subjects to be dealt with.

The previous thoughts on the choice of topics were led by the idea that, with the existing selection sufficient insights can be gained into mechanisms of the unseens and an irresponsible/critical use of digital data. Germany (or the area to which German law applies) is regarded as the boundary of an (internal) open system. Since digital data are the subject of global networks, other actors outside Germany must be appropriately classified. This will be the subject of our discourse and learning.

Table 1: The 4 phases of the DiDaT project in tabular format

Phase (year)	**Time Frame**	**Contents**	**Processes / activities**	**Comments**
Initiation phase (1)	10/2018 - 06/2019	Acquisition of infrastructure for science-practice interaction, establishment of common steering mechanisms	Pre-studies (stock and flow-based stakeholder analysis, comparison of jurisdictions and principles of digital law), approach/organization of collaborations and participants in the transdisciplinary process (main actors from practice, science, promotion of science), examination of the goals and feasibility of DiDaT	Disciplinary and interdisciplinary work is carried out before the transdisciplinary process starts
Preparation phase (2)	06/2019 - 12/2019	Official start and planning phase, formulation of the guiding question, shared problem definition	*1st DiDaT Stakeholder Conference*, project planning, organization, communication, resources	Structuring and identification of subsystems
Main/core phase (3)	01/2020 - 06/2020	Discourse with/involvement of stakeholders, knowledge integration	*2nd Stakeholder Conference* with broad access/impact, application of transdisciplinary methodology, public relations/communication, white books along the vulnerability spaces and overall results, *3rd Stakeholder* Conference (conclusion of the main phase)	External communication about challenges
Closing/ post-processing phase (4)	07/2020 - 06/2021	Evaluation and revision of the results, planning of follow up processes in science and practice	Evaluation and communication of the significant and relevant results, feedback on the *white books,* "implementation" *4th DiDaT Stakeholder Conference*	Common communication of the shared understanding of *socially robust orientations*, dissemination of results, preparation of follow-up projects and implementations

The main tasks of the preparation phase are the elaboration of precise comprehensive guiding questions, working plans, the incorporation of representatives of important stakeholder groups from relevant fields of knowledge, as well as, if necessary, the acquisition of additional funds to carry out scientific investigations that determine the deliberative discourse in the vulnerability spaces. These results are to be discussed at the 2nd Stakeholder Conference in January 2020 and will be adapted, amended and supplemented if necessary.

3. Core phase (01-2020 to 06-2020)

According to current plans, the main phase should begin in January 2020 and last 5-6 months. The phase starts with the *2nd Stakeholder Conference*. As a prerequisite for this, the planned application for funding must have been successful. The main phase will be concluded with a *3rd DiDaT Stakeholder Conference*. The subject of this *3rd DiDaT Stakeholder Conference* will be the presentation of vulnerabilities (Unseens) for sensitive stakeholders or (subsystems) of Germany. Special attention will be given to the assessment of the extent of the impacts as well as the significance of impacts and the possibilities of dealing with these undesirable (and often unintended) side effects, the Unseens.

Following the *3rd DiDaT Stakeholder Conference*, the first (preliminary) results will also be presented to the public in a target-oriented and broad manner. The presented results will be submitted to a detailed review by scientific and expert opinions. We strive to write a white book for each vulnerability space (approx. 20 - 30 pages each) and to publish the overall results in a compact, easily understandable form that includes the most important results.

4. Closing phase (approx. 07-2020 to 6/2021)

All project work after the *3rd Stakeholder Conference* is considered to be part of the final phase. The core is the creation of a white book integrating all vulnerability spaces. The insights and results achieved are discussed with a larger number of stakeholders and feedback is obtained. This review is to be carried out through direct contacts, discussion events as well as old and new media (electronic discussion forums).

The task of feedback with the key actors is to anchor the results in practice and to launch follow-up initiatives, projects or processes for sustainable handling of digital data. At the end of the closing phase, a *fourth Stakeholder Conference* is to take place, in which ways for a sustainable handling along the guiding principle of «*socially robust orientations*» are to be pointed out and concrete options for follow up projects and action are to be determined. This includes the determination of who can and should advance the implementation of the orientation using which means, instruments and regulations.

Organizational structure and functions of DiDaT

Roland W. Scholz and Ortwin Renn

Which roles and functions exist?

The organizational structure of the DiDaT project is outlined in Figure 2. As in all transdisciplinary projects, a distinction is made (certainly in a simplified manner) between science and practice. Within the framework of DiDaT, co-leadership is aimed at on all levels. The members of the DiDaT project perform various roles. The roles include:

- 2 *project leaders* each from science and practice
- 2 *facilitators* (Ortwin Renn and Roland Scholz; Gabriel Lentner supports these facilitators in case of unavailability)
- 5-7 members each of the *«Steering Board»*
- *Project management* (external sponsoring and accompanying research at IASS). There will likely be doctoral candidates, postdocs and other scientists at various universities who will carry out research within DiDaT. Further "research assistants" can (after approval of the management) become members of the project.
- *Facilitators* for the *Vulnerability Spaces*
- One scientist and one practitioner each as leaders of every vulnerability space

To be seen not as a member of DiDaT, but only as associated with DiDaT are the members of the political monitoring group (also called «observers»). They are informed in detail about DiDaT's goals, planning,

progress and results. The primary concern here is to make the knowledge acquired in DiDaT continuously accessible to federal parliamentarians (especially the Digital Committee).

Also, the scientists of the group «Experts in Law and digitalization» (organized by Gabriel Lentner, Donau University Krems) are not operative members and belong to a group of associated experts, who answer questions which cannot be solved by the members of DiDaT.

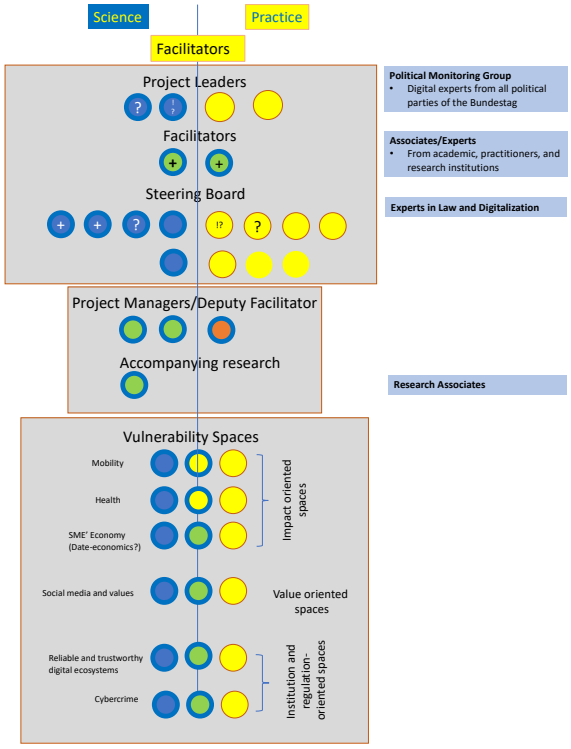

Figure 2: Organizational scaffold (with topics on vulnerability spaces, as of January 2019. This graphic is continuously being modified)

Why do we need facilitators?

A common procedure in many transdisciplinary processes is that the initiators (from science or practice) take the role of co-leaders. We (Renn and Scholz) have decided not to take on such a role. The main reasons are:

a) understanding, mutual learning, integration of knowledge from science and practice
b) moderating the dialogue between the various disciplines involved; and
c) the mitigation of interests of different (cultural) values and perspectives among different stakeholders

These represent such a great challenge that the two functions of content management of the project and simultaneous facilitation of the process must be separated.

Global TraPs[6], a global transdisciplinary project on sustainable phosphorus management with about 250 participants/members, has been very successful in gaining experience with the role of transdisciplinarity facilitators.

Facilitators serve to structure the project through a transdisciplinary communication and negotiation structure. They assume responsibility for the conceptualization and methodology of knowledge integration. In particular, they contribute to the search for promising ways to achieve the goals (to be negotiated in the initial phase) and to be specified and thus to answer the *«Guiding Question».*

Thus, facilitators represent a form of management. They support and initiate the exchange processes among the scientists (see b) and the discourse among the stakeholder groups (c). They also organize, methodically supported, processes of mutual learning between science and practice. Furthermore, facilitators can be found at the level of vulnerability spaces.

The four project leaders are responsible for the content of the results presented in the integrative white book and in the summary of the respective vulnerability spaces (especially the socially robust orientations). Together with the Steering Board, they assess whether the project has an appropriate content orientation and whether scientific knowledge and the spectrum of stakeholders are adequately represented.

The leaders and facilitators are both responsible for managing the overall project.

The aim is that in the main phase six scientists and six practitioners will be active in each vulnerability space.

[6] See: http://www.globaltraps.ch

The functions in DiDaT are initially occupied by persons selected by the facilitators. A selection of the fellow members for the vulnerability spaces, as well as other fundamental questions on the selection of topics in the vulnerability spaces, will be presented and discussed at the stakeholder meetings in order to make any necessary additions/changes and after detailed discussions have taken place. A more detailed description of the functions will be developed up until the *1st DiDaT Stakeholder Conference* and should be adopted there by mutual agreement if possible.

Vulnerability space: A terminus technicus with double background

Roland W. Scholz

In the organization chart of the DiDaT brochure[7], the term «vulnerability space» was used as the «description of the working groups on thematic focal points». Vulnerability in colloquial language stands for «weakness», «sensitivity» and/or «violability». Vulnerability, however, is also a technical term used in risk research (and other scientific disciplines). It describes the susceptibility of a system to developments and disturbances that threaten its functionality or lead to unnoticed negative side effects. In the DiDaT project which focuses unintended side effects (unseens), the term vulnerability space also stands for «subsystem or facet» of the «system of digital data in Germany». The latter subsystem view also roots in research on «complex real-world systems». This section briefly explains both these references in order to convey more clearly how this term is used in the context of DiDaT.

From risk to vulnerability

The term vulnerability has been used for some time in risk research [8] and environmental science [9]. Vulnerability is understood as an extension of the concept of risk. In environmental medicine/toxicology, the risk of an event is understood as a function of exposure and sensitivity of persons or population groups (hereinafter referred to as «actors»). Simplified this can be described as

Risk (*Event*) = *r* (*Exposure, Sensitivity*)

Usually, «Exposure» is operationalized via the probabilities of negative outcomes associated with an event. And the «*Sensitivity*» via a (quantitative) evaluation of the uncertain negatively evaluated results. For risks, an a priori perspective is taken. It is a matter of carrying out an assessment of future uncertain damages or losses.

Vulnerability complements the a priori perspective with an a posteriori perspective. One considers, models and evaluates whether and how an «actor» is able to deal with the (bad) negative consequences of an «event». This is called «adaptive capacity». Vulnerability can be simplified as follows:

Vulnerability (*Event*) = vul (*Exposure*, *Sensitivity*, *Adaptive* Capacity)

A vulnerability assessment thus includes both an a priori and an a posteriori assessment of the uncertain consequences of a possible event. This is described in Box 4 using an example.

[7] See Figure 3 in the brochure https://www.iass-potsdam.de/en/research/didat

[8] Scholz, R.W., Y.B. Blumer, and F.S. Brand, *Risk, vulnerability, robustness, and resilience from a decision-theoretic perspective.* Journal of Risk Research, 2012. **15**(3): p. 313-330.

[9] Kelly, P.M. and W.N. Adger, *Theory and practice in assessing vulnerability to climate change and facilitating adaptation.* Climatic Change, 2000. **47**(4): p. 325-352.

Box 4: Medium risk, but high vulnerability in certain forms of Cyberstalking (Verena van Zyl-Bulitta & Roland Scholz)

Cyberstalking is a frequent and serious event and an example category of violence facilitated by information and communication technology and can have a sexual component. This is planned to be addressed in DiDaT in the vulnerability space «Cybercrime» (this is still a working title of a vulnerability space). It represents a specific form of digital (domestic) violence.

Technological tools can be used to control and exert psychological pressure, whether anonymous, public or private, or using hybrid or mixed forms. Health consequences - short and long term - go hand in hand with such forms of the violation of interpersonal borders, privacy rights and self-determination. Depending on the definition and severity of cyberstalking, it has a prevalence of 6-15%.[10] Less severe forms of the crossing of borders in relation to digital violence are more common than its more serious forms. Particularly serious forms include activities such as secret photography or «Revenge Porn» (the nonconsensual distribution of intimate images or the threat of such images for the sake of revenge). This form of cyberstalking sometimes takes place together with «Doxing» (the disclosure of personal information with malicious intention). Revenge taking partners post (e.g., secretly recorded) video recordings of sexual acts on the web to harm the ex-partner. This form of act has occurred so often in the USA that legislation includes these acts (cyber civil rights initiative[11]).

Looking at all female or male persons (and the average frequency with which someone from the total population is affected), the probability (i.e., the exposure) of such an extreme event is small. The damage is usually very considerable – even if the action is discovered quickly. If such an event has occurred, however, the «adaptive capacity» is often extremely low. This is especially true if the stalking video has been fed into «Revenge Porn» via foreign Internet service providers. Here a deletion is often not possible for the police or other legal ways to protect the person. In addition, the anonymity still granted can be lost in cancellation applications, which makes it more difficult for the person concerned to intervene and can lead to passivity and helplessness.

[10] Dreßing, H., Bailer, J., Anders, A., Wagner, H., & Gallas, C. (2014). Cyberstalking in a large sample of social network users: Prevalence, characteristics, and impact upon victims. *Cyberpsychology, Behavior, and Social Networking, 17*(2), 61-67.

[11] https://www.cybercivilrights.org/revenge-porn-laws/

Surveys on the frequency of online violence against women drift apart given international and German statistics [12]. According to the Federal Government, only 0.33% of telephone requests for assistance from the Federal Office for Family Affairs and Civil Society Tasks are related to digital violence. According to a request by the party Die Linke about digital violence against women to the federal government, whether it can be assigned to the category Cybercrime, and if so, which police or judicial offices are responsible for this, the answer was as follows: «*Since digital violence is not related to criminal actions directed against the Internet, data networks, information technology systems or their data, it cannot be classified as the phenomenon of cybercrime in the narrower sense.*» *(Nov. 2018, Drs.-Nr. 19/6174)*

From this small insight into the variety of social and personal damages that can be constructed in digital space, the added value that DiDaT can provide appears significant. A space could be created to prevent such actions per se and to mitigate the consequences in the form of damage mitigation.

«Vulnerability spaces» as a tool for the management of complexity

The responsible handling of digital data (in Germany) is a highly complex subject, in which «Unintended (and unwanted) Side Effects» («*Unseens*») of digital transformation are considered. Scholz and Tietje [13] have constructed an «architecture of knowledge about complex cases» from epistemological and from cognitive-psychological perspectives. This architecture is based on the following four forms or levels of knowledge.

Level of experience: In order to investigate or control a «complex system», one needs experience gained through direct, holistic, personal experience, perception, familiarity and being familiar.

Level of understanding: Based on the experience, the functioning of the system, the advantages and disadvantages, and *Unseens* are understood. Understanding includes conscious and unconscious components as well as the ability to empathize with an area and to recognize essential characteristics («cues, signs, sign-significates»).

Level of comprehension: Once one has comprehended something, one can describe the main consequences, components, subsystems, effects, etc. in terms of terminology and language. These subunits are also called *facets* and the process of finding and defining these facets is called «faceting». In relation to the *Unseens* of dealing with digital data. Understanding leads to the identification of essential domains of society in which critical unseens take place and which allow for a comprehensive overall picture of types and impact of unseens. In a first step, we distinguished between (i) impact spaces, (ii) value spaces and (iii) institutional and regulatory vulnerability spaces. On this basis, further facets/vulnerability spaces (to take up the term vulnerability defined above), are now identified. Figure 2 provides an overview of the six vulnerability areas

Level of explaining: By explaining, we mean the comprehensible description of causal mechanisms of action, carried out with the help of propositional (if-then) logic, so that a scientific validation of statements made possible by inductive or deductive methods becomes possible. The identification, description and – as far as possible – validation of mechanisms of action leading to Unseens is a major task of the work of vulnerability spaces. To this end, scientific work will also support the answering of questions on mechanisms of action.

[12] https://media.ccc.de/v/35c3-10023-stalking_spy_apps_doxing_digitale_gewalt_gegen_frauen#t=1181

[13] Scholz, R.W. and O. Tietje, *Embedded case study methods: Integrating quantitative and qualitative knowledge*. 2002, Thousand Oaks, CA: Sage.

The DiDaT group at the Danube University Krems

The Danube University Krems played a central role in the development and initiation of the project. The *European Expert Round Table Sustainable Digital Environments* (SDE) [14] (https://www.mdpi.com/2071-1050/10/6/2001) was initiated and held in 2017 by Roland Scholz, Peter Parycek and Gerald Steiner. The roundtables were jointly financed by the Danube University (Krems, Austria) and the Federal Ministry of Education and Research (BMBF, Berlin, Germany).

The Project DiDaT was founded by the IASS (Renn) and the Danube University of Krems (Scholz) based on the recommendation of the Roundtable. The Transdisciplinarity Lab Sustainable Digital Environments of the Donau Universität Krems[15] which has been operating since 2016, is an important partner and co-applicant in the ongoing pre-projects and upcoming subprojects of DiDaT.

At this point we will inform you briefly about the project participants at the Danube University and their intended tasks and roles in the project. In this DiDaT Newsletter 01, the contribution to «News and Events» describes the successive occupation of functions and the process of the definition and formation of vulnerability spaces. These positions are to be discussed at the first two DiDaT Stakeholder Conferences this year and led to a «consultation (German: *Vernehmlassung*)» (i.e., a discussion on adequacy).

According to the project planning two full positions support the project team in the preparation and core phase as well as during the post-processing phase.

	Functions (relevant for DiDaT)	**Prospective role in DiDaT**
Barbara Brenner, Prof. Dr.	Head of the Department Business and Management Sciences	Member of the vulnerability Space 'SME-economy (data economics)'
Barbara Hartl, Dr.	Post Doc researcher	Research associate for the vulnerability space 'SME-economy (data economics)'
Gabriel M. Lentner, Ass.-Prof.	Assistant Professor of international law	Assists in facilitation, organizes the "Experts in Law and Digitalization" group and will participate in one "Vulnerability Space"
Peter Parycek, Prof.	Head of the Department of e-governance; leader of competence center public IT at Fraunhofer Fokus; member digital council of German government	Member of the science steering board
Satalinka, Liliya, Dr.	Post Doc researcher	Research associate for the vulnerability space 'SME-economy (data economics)'
Roland W. Scholz, Prof. em. ETH Dr.	Chief senior scientists and guest professor	Facilitator and co-initiator of DiDaT
Gerald Steiner, Prof.	Dean of the Faculty Economy and Globalization and head of the Department Knowledge and Information Management	Facilitator or science-leader of the vulnerability space 'SME-economy (data economics)'

[14] See: https://www.mdpi.com/2071-1050/10/6/2001

[15] See: https://donau-uni.ac.at/sde-tdlab

Box 5: Information on the objectives of the pre-project «Stocks- and Flows-based Stakeholder-Analysis» (Roland Scholz and Markus Kley)

In a first step, the project «Stocks- and Flows-based Stakeholder-Analysis of digital data» describes the foundations and key players of global information technology on generating, storing, using and transmitting digital data. The aim is to develop a common representation of the national and global digital infrastructure for the overall DiDaT project as well as for the vulnerability areas. The objective is to support the communication between scientists (e.g., from computer sciences) and practitioners as well as between the different vulnerability spaces in terms of data technology.

There are two ways of identifying stakeholders. In the first step, the central actors of the digital infrastructure are identified «bottom up», based on an information technology analysis. Here it is shown that

- Internet nodes and providers (i.e., the companies responsible for data transmission),
- Certificate providers (forming the basis for the encryption of data transfer),
- Web browsers and search engine providers (as a digital software-based interface between people and [Internet-based] digital data) as well as
- Providers of social networks as well as consumer and sales platform operators

represent a global form of «digital infrastructure delivering / providing» stakeholders, namely «*Digital Data Infrastructure Providers*» (DDIP). This analysis includes a (first) rough identification of problems related to security technologies that may affect individuals, the economy or the public sector.

On the other hand, «top down», it is worked out which groups result from a social science stakeholder analysis, if usage, security and capability profiles or other stakeholder characteristics are chosen as a starting point.

Notes on project funding

We distinguish between the financing of the pre-projects (phase 1) and the phases 2 to 4. The project was initiated by activities of Ortwin Renn IASS and the Danube University (Department for Knowledge and Information Management). It received financial resources from the Plettner Foundation (Stifterverband [16]) for the feasibility study and the comparative legal analysis. The second pre-project on a stakeholder-based stocks and flows analysis is carried out in cooperation with and with financial support from Fraunhofer Fokus[17].

For phases 2 to 4, funds will be raised from several funding agencies. The public sector, research funding (foundations) and the participating private sector will be addressed. As shown in Box 2, the funding must not correspond to the narrower criteria of contract research, since the exact questions and methods in a transdisciplinary process largely result step-by-step from the joint development between practitioners and scientists. The funding must also make it possible to adequately involve the entire spectrum of stakeholders.

[16] https://www.stifterverband.org/english
[14] https://www.fokus.fraunhofer.de/en

News and Events

Verena van Zyl-Bulitta: New member of the DiDaT project team

Verena van Zyl-Bulitta started as a research assistant at IASS on a half-time basis. Her education (BBA, International University, Germany) focused international business studies, systems sciences and computer science. During her master studies (MComm, University of Stellenbosch, South Africa) she specialized in quantitative finance, and wrote her masters thesis on the same topics. Subsequently, she studied and practiced methods of sustainability assessment, modelling and complexity theory. During her engagement with the initiation phase of DiDaT, she is in the process of completing her doctoral thesis in the field of innovation and a bottom-up energy system analysis at the University of Leipzig. Her areas of interest include social change processes, theoretical ecology, nexus assessment between socio-technical and socio-ecological systems, transdisciplinarity and econophysics.

For Verena van Zyl-Bulitta, the DiDaT project is «an academically attractive and practically relevant opportunity to implement her knowledge in the field of innovation, scenarios, and participation for the development of sustainable future scenarios under common pool resource logic» (RS).

Figure 2: Verena van Zyl-Bulitta supports the current core project team consisting of Ortwin Renn, Roland Scholz and Gabriel Lentner

Dates and Events

Current upcoming events

March 27th 2019: DiDaT kickoff meeting at IASS in Potsdam

June 25th 2019: 1st Stakeholder Conference at IASS in Potsdam

Responsible handling of digital data: Digital Data as Subject of a Transdisciplinary Project (DiDaT)

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ViSdP:
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