

## Appendices

### 14 Detailed Topic Descriptions

This section provides more details on the topics mentioned in Section 7.3 above. *This list of topics represents a first selection of topics of interest to the members of the working group. The list does not intend to be complete or prescriptive for DSI topics. The actual set of topics will develop in the interactions within the initiative.*

#### 14.1 Smart Living in a Smart City

Three quarters of the Swiss population lives in cities and urban areas. Projections by the UN and others suggest that the proportion of people living in urban areas worldwide will grow to 70% by 2050.<sup>21</sup>

*What will sustainable urban living mean for most of the Swiss population by 2050?*

A growing number of (increasingly open) digital data streams including sensor networks, social networks, mobile data streams, the Internet of Things (IoT), and respective Big Data developments in the private and government sectors are being developed to help cities address impending societal and environmental challenges lying ahead to transform cities into “smart cities”.

There are various definitions of a Smart City:<sup>22</sup> A city can be defined as ‘smart’ when investments in human and social capital, traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources, through participatory action and engagement.<sup>23</sup>

Thus we need a better understanding in key aspects of smart cities including for example: smart governance, smart energy, smart living, smart mobility, smart infrastructure, smart technology, smart healthcare, and of course smart citizens.

- What does “smart” actually mean?<sup>24</sup>
- What are the characteristics of a successful and sustainable smart Swiss city, and what does it mean to live in a smart city for a smart citizen by 2050?
- How can we improve people’s sustainable and smart living in a smart city?
- How do we ensure citizen’s privacy within a democratic state given that smart cities are increasingly relying on smart citizen sensing technologies for city monitoring and city indicator predictions?

<sup>21</sup> <http://urbansdg.org>

<sup>22</sup> Rob Kitchin states (p. 1): „‘Smart cities’ is a term that has gained traction in academia, business and government to describe cities that, on the one hand, are increasingly composed of and monitored by pervasive and ubiquitous computing and, on the other, whose economy and governance is being driven by innovation, creativity and entrepreneurship, enacted by smart people.” (Kitchin, 2014)

<sup>23</sup> see e.g., <http://www.smart-cities.eu>

<sup>24</sup> This includes as discussion of the epistemological assumptions of a digital society

- How do we maintain smart living within rapidly changing environmental and societal conditions?

This DSI topic includes legal, societal, technological, and environmental aspects covering fundamental and applied aspects that might be broadly interesting for many people across all faculties of the UZH.

## 14.2 Digital Cultures

Computing, modeling, simulating, programming, hacking and the building of databases are cultural techniques shaping both science and society. Since the 1980s some new emerging field in the Humanities (especially Film and Media Studies and Science and Technology Studies) started to study and analyze digital cultures as new forms of human-apparatus relations (Haraway, 1985; McLuhan, 1962; Star, 1995; Turkle, 1984). The emerging promises and problems today like Big Data, Privacy, Sharing Economy, circulation and re-appropriation of cultural artifacts—visual art, film, music, literature—and other new forms of digitally mediated social interaction need a deeper historical understanding of their technological, social and aesthetic dimensions. Today's society is deeply informed by the digital turn, it is a technomorphic society. Convergence cultures break up traditional societal formations by deeply altering the ways of cultural production and consumption.

Cultural norms such as property or privacy but also cultural techniques like image and text interpretation (Manovich, 2013; Moretti, 2013) or writing practices are fundamentally challenged by the binary code, the hypertext or collaborative working environments. Digital cultures form a new digital ecosystem that challenges traditional norms of knowledge formation and circulation.

The Humanities can offer a variety of methods to study the epistemology of data and the socio-technological relations in Digital Cultures as for, e. g. the cultural anthropology of call centers, the business history of start ups, the ethics of copying and hacking etc. The digital turn leads as well to new encounters of scientific and scholarly research (resulting in the sketchy umbrella term “digital humanities”) and thus makes necessary a closer understanding of those cultures not only within universities (e.g. regarding the logic and infrastructures of digital editions or text corpus analysis) but also in the broad field of cultural heritage (archives are not only digitizing wide masses of documents but also publish the structure of their holdings in databases; museums are developing virtual expositions; and both are in need of human resources with a humanities and an information technology background).

The topic wants to closely look at the ways of how cultures are shaped by the influence of digital practices within economical, scholarly as well as institutional frameworks.

## 14.3 Individualized and Optimized Health Care Pathways

As healthcare treatments become increasingly complex they are usually a succession of a combination of multiple treatments in contrast to a single intervention. As such the individualized planning and coordination of such a health care pathway<sup>25</sup> becomes an increasing approach for increasing the quality and monitoring of treatments as well as saving health care expenses.

<sup>25</sup> <http://www.ijic.org/index.php/ijic/article/view/812/1894>

The goal of this topic is to actively **imagine and investigate the requirements and approaches that enable individualized and optimized health-care pathways.**

This topic raises issues such as:

- *Planning*: How can one help care providers in the planning of complex treatment pathways. *Provider Sensemaking*: How do I help all the various care providers to understand the specific treatment of the individual. *Patient Sensemaking*: How do I help the patient to understand what the steps mean and what they mean for her as an individual?
- *Coordination*: How does one optimally coordinate all the providers. Note that this sense of coordination entails the coordination of multiple, possibly conflicting goals: optimizing the treatment, the expenses, the effort for the care providers, etc. *Adaptation*: A treatment plan may have to adapted due to changing circumstances.
- *Legal Issues*: include the privacy considerations in sharing treatment plans with multiple care-givers, a series of principal-agent when it comes to choosing the criteria for optimizations, and the question of privacy-ensuring data aggregation for care-provision optimization
- *Ethical Issues*: clearly include how to choose priorities in the optimization as well as the how information is refused for overall optimization of the care-provider system.

This topic is especially pressing, as health care is a sector on which Switzerland spends 10.9%<sup>26</sup> of its GDP and runs (per capita) the most expensive health care system in the world. A report published by the Swiss Federal Office of Public Health (Brüngger et al., 2014) suggests that optimizing health services provisions by centering them around the interests of individuals instead of around diagnoses could save a minimum of 6% in health care costs, i.e., about 4.5 billion CHF per year. The newest WHO definition of health (WHO, 2015) calls exactly for research determining systematically the possible pathways to stabilizing the functional ability of individuals. This requires completely different study designs compared to the current large clinical studies that derive population estimates of risk or protective factors that, however, do not apply to any single individual within the population examined.

Hence, this topic affects many people (both in and outside Switzerland), is in dire need of innovation, and that can lead to massive savings or efficiency gains.

#### 14.4 Big Health Data combined with Small Health Data

Big Data offers new opportunities to optimize health care decisions by centering these decisions around the individual patients' needs. The combination of "big" (anonymized) with "small" (non-anonymized) health data has the potential to provide systematic empirical evidence for patients and health care providers to inform treatment decisions. Such evidence could be gained with the aid of a publicly controlled **online individualized health data bank (iHealthDB)** that allows for the combination of big and small health data.

Today's **data protection laws** hinder the efficient use and combination of big and small health data. The proposed project aims to overcome these barriers by developing a framework that makes the combination of big and small health data in an individualized health data bank possible and acceptable to patients, health care providers, politicians, and the public at large. We propose to

<sup>26</sup> [http://www.bfs.admin.ch/bfs/portal/en/index/themen/14/05/blank/key/internationaler\\_vergleich.html](http://www.bfs.admin.ch/bfs/portal/en/index/themen/14/05/blank/key/internationaler_vergleich.html)

coordinate and integrate results about the legal, technical, health, ethical and social aspects of such a framework. The main outcome of the proposed project will be an integrated framework and specific recommendations on how to proceed to implement such a framework. Key questions include the cost, the advantages, the risks, the efficacy, and the acceptance, data ownership, data autonomy, and data interpretation authority of such a health data bank.

The **research approach** is interdisciplinary, combining the methods and findings from all disciplines that are relevant for the development of the proposed framework, i.e., law, informatics, health, ethics, and sociology. The methods include conceptual analysis, theoretical development, qualitative research, and quantitative research. The research follows a sequence of phases of disciplinary research and interdisciplinary exchanges and collaboration. Every disciplinary phase will be followed by an interdisciplinary phase that will be kicked-off at a workshop bringing together all researchers and the members of an interdisciplinary expert committee that will advise the researchers throughout the project. The disciplinary research will be carried out in work packages according to the established methods of every discipline. As a result, the project will combine theoretical, qualitative, and empirical methods.

The **main output** of the project will be a regulatory framework for an individualised health data bank (iHealthDB) that contains solutions for all issues that need to be considered for establishing such a data bank. Two versions of this framework will be developed: A high-level version is addressed at decision makers and members of the public at large; a more detailed version will be published in the form of an integrated recommendatory report, i.e., white paper. This report will consist of a commentary of the proposed framework and contain the research results of the different disciplines. In addition to the two versions of the framework, all researchers will provide disciplinary output.

## 14.5 Mobility

Mobility in a digital society might be vastly different:

- autonomous driving (which is heavily data based), with assisted driving and connected cars as mile-stones on the way to fully autonomous vehicles
- data based mobility services such as Uber or others, which allow for seamless mixed-mode commuting (using two or more modes of passenger transportation in a journey)
- tele-presence may change the settings, where mobility is even necessary

To address, understand, and help develop Mobility in a digital society is a grand challenge that needs an interdisciplinary approach as mobility is driven by and simultaneously affects the following fields and their interrelation:

- Economy and business
  - Google and Apple are working on autonomous cars. Will these and other 'digital' firms that excel in capturing, aggregating, storing, and analyzing massive amounts of data dominate tomorrow's automotive industry? Will they, thus, shake up an industry and its supply chain that has been stable for the past 100 years?
  - TomTom (and other mapping companies) is scanning the streets and mapping street data for the development of high-resolution maps needed for autonomous driving.<sup>27</sup> What other supplementary services are needed to enable autonomous driving as part of a new

<sup>27</sup> The firm's lasers capture 700'000 data points per second when driving and capturing street data.

- mobility? What other uses will this detailed data have?<sup>28</sup> What other businesses will be transformed as a result of autonomous cars?<sup>29</sup>
- We see Uber revolutionizing the Taxi business. And we see leasing and insurances offer pay-as-you-drive contracts, based on the actually driven km. How will business models transform as they build more and more on digital data?
  - Sociology,
    - People are running errands with cars rented by the hour (with Mobility or Zipcar) and bikes from a bike share or take rides from people they have never met before (with Uber), just as they stay at strangers' apartments (with Airbnb) or stream music instead of owning it (with Spotify). Hence, will we own autonomous vehicles or will we share them? Will the city own them or will they become part of the public transport system (such as bikes in many cities)?
    - Will society trust and thus accept (autonomous) cars in the future? Whilst older people are often not among the early adopters of radical innovation autonomous cars might become handy to an aging society.
    - Will our commute and travel behavior change? Will it increase because now we can work, sleep or have breakfast on our way to work? Will we have more or less congestion or parking problems in cities? What will be the penetration of autonomous vehicles compared to traditional vehicles in the future?
  - Technology,
    - The amount of data captured exploding. Will we be able to make sense of this data and transform it in a meaningful way? How will artificial intelligence (AI) coevolve with developments in the mobility sector?
    - Despite the digitalization of the car and the use of augmented reality, autonomous or connected cars do not match yet the human ability to anticipate traffic situations. Will systems, e.g., be able to learn the cultural differences in driving behavior between countries?
    - Drivers today use only 15% of the systems available in cars (Rührmair, 2015). How will the human- machine-interface of autonomous cars develop without increasing the digital divide and excluding parts of the population (such as the elderly)?
  - Law and regulations,
    - Current regulations generally hold drivers liable for car accidents. What will be the liability regime for autonomous cars? Is it drivers, google, or perhaps insurance companies?
    - Who owns the data collected by the cars and can decide about its use? Data protection rules will have to be established: Under what circumstances can providers be required to transfer data collected by the vehicle to third parties? What requirements must be fulfilled for a user to consent to data collection? What level of data data security should be required and how should that level be ensured?
    - Future requirements to become a holder of a driving license will need to change. What new regulations will be needed?
  - Health,

<sup>28</sup> The ubiquitous availability of satellite has changed many industries such as tourism (as checking the desirability of a hotel or holiday home has become simple) or crime (as possible targets can be looked at without actually visiting them).

<sup>29</sup> Will there be parking garages for self-parking cars? Will car-sharing become more desirable to improve the productivity of the capital bound in the car?

- Will Mobility in a digital society contribute to our health?
- We see an increase in walking and biking in urban areas that have a high walk- or bike-ability (are walk- or bike-friendly), offer car sharing and mixed-mode commuting. Will these affect people's health in a positive or negative way?
- Will autonomous vehicles be electric vehicles and, thus, reduce pollution in urban areas?
- Will elderly enjoy longer independence with autonomous cars and thus, stay longer integrated in the society with a positive effect on their psychological and physical health?

These developments are interrelated<sup>30</sup> and, hence, require a holistic approach that covers the economic, sociological, technological, and legal implications of a digitalized mobility. Only such an interdisciplinary approach allows to measure the digitalization's effects and to understand the mechanisms that drive these effects.

Even though this theme focuses on mobility it is likely to provide insights about the increased impact of machines and automation on various aspects of society other than mobility. As such it covers the following overarching goals:

- Reflect the future of the (digital) society
- Maintain (sustainable) productivity<sup>31</sup>

Switzerland has a history of being innovative with regard to mobility questions. Its public transport system is excellent, electric vehicles have been used as the only means of transport in certain mountain regions and cities for decades (Zermatt: since 1931, Mendrisio: Electric Vehicle test region from 1994 - 2001), and mobility car sharing was one of the first of its kind (with its origins all the way back to 1987). Hence, to pioneer in mobility solutions for the digital society seems almost natural to Switzerland

#### 14.6 Digital Religion – Socially and Politically Influential Player in the Digital Age

While traditional religious communities become less important with regard to membership and political influence in western societies, digital religion has gained in importance significantly. In this regard, digital technology creates new forms of religious virtual communities and digital networks, communication strategies for religious communities, as well as individually practiced religion.

<sup>30</sup> For example, whether Google and Apple will dominate the future automotive industry leveraging novel business models depends on society's acceptance of autonomous driving cars. This, in turn, also depends on the legal protection of personal data created whilst moving from A to B and liability regulations, which will impact the sales and diffusion of autonomous cars, and thus whether the power shifts from incumbent firms to the data based firms (e.g., Google). All of these developments are dependent on the ability or failure to protect but also to handle the massive amounts of (big) data that are generated in the virtue of autonomous driving.

<sup>31</sup> With the development and emergence of autonomous cars, we will see new business models and – most likely – fundamental changes in the supply chain of the automotive industry. Traditionally, we have seen strong manufacturers like BMW or Ford who have dictated the supply chain. With autonomous driving and with Google and Apple entering the market, this might change the industry structure, shifting power to those who have the data and who control the digital interfaces. It is very likely then that we see significant changes in the supply chain, which in turn will affect the supplier industry – also the one in Switzerland – and which offers opportunities and innovation potential to these companies. First, the earlier and the better (Swiss) suppliers are able to understand the complex changes and developments of mobility in the digital era, the better they will be able to build up the needed (digital) capabilities and the better they can position themselves strategically. This will be a foundation for competitive advantage. Second, what can be learned from the digitalization of automotive industry and of mobility overall will likely be of relevance for other industries too, which experience an increasing incorporation of digital capabilities into objects that previously had a purely (or mainly) physical materiality. Examples would be the (still strong) Swiss machine and tooling industry (with industry 4.0) or the MedTech industry. Hence, research on the Mobility in the digital society will contribute to understand the transformation of Switzerland as a whole to a digital economy.

***Creation of new forms of religious virtual communities and digital networks:*** Digital technology enables religious agents and communities to collaborate with people all around the globe without being physically present. This is especially crucial in the context of migration and diaspora.

- With the help of international networks, social media, and virtual space, members of diaspora communities are enabled to maintain their religious routine, even though they're not practising in their customary environment anymore. These new forms of religious virtual communities arise from the need of international affiliation.
- Furthermore, religious groups might gain influence in the diaspora, even though they're locally of little importance. This applies, for example, to their degree of mobilization with regard to political action. In the case of religious groups with anti-democratic agendas, it is all the more important to know more about their use of digital media and how they collaborate with each other in digital networks.

Digital technology provides religious communities with ***new forms of communication strategies.***

- By means of digital technology, established religious communities manage to appear more up-to-date, more accessible. These renewed self-portrayals also carry "new" concepts and practices along – all of a sudden, quotations of the Dalai Lama or gay-friendly sermons are publicly available.
- Religious groups that have not yet the status of established churches use digital technology as a means for communicating inside the group as well as to reach out for possible new members. Hence, digital technology provides for strategies of proselytisation. This is especially decisive regarding religious movements with potential de-stabilising effects on individuals.

Whereas digital technology has clear advantages for religious agents and communities – co-presence is for example no longer a condition for communication – it poses a problem to the nation state. As digital communication is hard to track, there is hardly any governmental control over communication ways and recruitment channels.

***Individually practiced religion:*** Digital technology makes new forms of engaging in ritual practice available. This affects the individually practiced religion.

- Apps, for example, might remind people of the hour of prayer; they might offer new mantras for meditation; or they might confront with questions that are supposed to support the personal growth. Apps, however, are written by someone. Are these apps tools of religious communities for social control? Are some of them even problematic regarding mental health?

Digital religion constitutes an interesting subject of research in as much as it challenges conventional conceptions of religious agency or collectivisation.

Religious communities often obtain strict forms of organisation with relatively large numbers of levels in its hierarchical structure. Social media and blogs, however, are low-threshold media and their "democratic" structure respectively flat hierarchy undermines strictly organised institutions and communities. From this observation arise a set of theoretically promising questions:

- Do social media, such as blogs, that are based on religious communication lead to the emergence of a „parallel community“? And do they apply or undercut established hierarchical structures or even deploy new ones?
- What about religious authority? Is religious authority in social media similar to what we know from conventional religious communities or new religious movements?

- What is the interconnection of digital religion and other, conventional religious communities, or even society? Do they interact?
- With digital religion, "holy scriptures" are easily available for everybody. The same applies to respective comments, interpretations etc. What does that mean for the traditionally important border between religious experts and laymen?

#### **14.7 Information Law for the Digital Society**

The tremendous societal and economic opportunities of information technologies can only be realized if the use of these technologies is enabled by an adequate and future-oriented legal framework. Unfortunately, to date, such a framework does not exist. To the contrary, the existing legal order has generally been developed against the background of an "offline world" and does not always meet the requirements of the information society. One of the most controversial examples is data protection law, which establishes numerous and often unnecessary and unjustified barriers to promising applications of information technologies, e.g. big data applications, thereby stifling innovation and impeding progress.

Although a number of partial reforms have adjusted the legal order in specific areas, e.g. copyright law, the law remains outdated in various areas such as data protection law, competition law, intellectual property law, consumer law, etc. The necessity to reform today's legal systems in order to address the fundamental challenges of the information society has long been identified by scholars and lawmakers. For example, the EU und Switzerland are currently revising their data protection regulations. Despite significant efforts to develop a new set of (adequate) data protection rules, it appears that these rules will hardly establish the necessary regulatory framework for the information society and will – for example with regard to big data applications – already be outdated at the time of their entry into force. As a consequence, these bodies of law will have to be re-revised in the near future. In addition to these present issues, the law is yet far from providing workable solutions for future challenges such as autonomous systems that interact with human beings. Some of the key questions that will have to be addressed by scholars and lawmakers are: (i) the granting of property rights for (personal) data; (ii) the regulation of the use of algorithms; (iii) the liability for automated decisions; (iv) the integration of autonomous systems in the legal order.

Against this background, the Digital Society Initiative should strive at analyzing the current legal order with regard to necessary adjustments and aim at providing new solutions that meet the needs of the information society. Such a legal order would have to ensure that the opportunities of information technologies can be fully realized for the benefit of individuals, companies and the society at large, while also making sure, inter alia, that the individuals concerned and/or third parties are adequately protected against harm, e.g. related to inappropriate uses of their personal data. Although the research would primarily focus on legal issues, a strong interdisciplinary component is key: (i) computer scientists must be involved to ensure that the legal research is based on a future-oriented understanding of the technological aspects; (ii) sociologists are required to ensure that the needs of the information society (businesses, government agencies and the public at large) can be properly analyzed; (iii) the involvement of psychologists is needed to assess the impact of data processing on the mental well-being of individuals; (iv) the involvement of ethicists should ensure that the proposed adjustments of the law meet high ethical standards.



#### 14.8 Participatory Democracy

Switzerland always had a very direct democracy, where individuals can participate in the political process without being politicians. The use of information technology does, however, change the magnitude of this participation. One could imagine elements such as:

- Instant polling of hundreds of thousands on political opinions
- Large-scale opinion-forming with tens of thousands in on-line structured discussions

These capabilities may change democracy as we know it to a much more participatory setting. Note, that these changes may not only be a chance for a wider-spread participation but also dangers, such as overly fast reactions to newly arising topics or groupthink.

This topic is connected to a variety of fields:

- *Legally*: is our legal/constitutional framework ready for these changes?
- *Lobbying*: How does this change the distribution of power in the democratic process?
- *Fragmentation*: economists have predicted that the lower communication cost will lead to a balkanization of society, as one can talk only to people who have the same opinion rather than my neighbors. Another impact of technology is that advanced search techniques may only show results that one may want to see (also called the “filter bubble”) further reinforcing the same effect. How does society counteract the centrifugal allure of this balkanization?
- *Technically*: Are there technical features that favor one kind of bias in decision making over another?

*The goal of this topic is to investigate how digital technology can be leveraged to change democracy and address the opportunities and challenges arising from these changes.*

#### 14.9 Challenges for Policy Makers, Organizations, Customers, and Stakeholders

The unprecedented possibility of accessing and analyzing small- and large-scale organizations, employee and customer data brought by new technologies has created a vast array of new opportunities and just as vast a range of new challenges for individuals/customers, organizations, policy makers, and other stakeholders. These developments can be regarded as the most significant of all changes brought to societies by information technologies and will lead to a digital transformation of markets, business and processes. Possible questions include:

For Individuals/Customers:

- Customers are empowered through information, transparency, and share their opinions and experiences online. How does the transformation change the way customers search and process information?
- How does it change buying behavior?

For Organizations:

- How do organizations interact with current and future customers?
- How do they react on automatization that replaces job routines?
- What do organizations have to do to master the digital transformation?
- What are new business models emerging from the digital transformation?

- What challenges arise for firms handling, and maintaining data?

For Policy-Makers:

- New technologies may lead to unbalanced income distribution. More fortune is created with less work and therefore being distributed over increasingly fewer people. What can policy makers do to cope with this increasing imbalance?
- Who owns the data?
- What can policy makers do to provide data privacy on the one hand and offer surveillance of critical individuals on the other hand without leading into a police state?

For stakeholders:

- How does the movement to transparency via open data change the activist playing field?
- Should share holders push for more transparency to reduce possible principle-agent problems? (After all, cost arguments cannot bar the publication of these data anymore)

*The goal of this topic area is to find answers to the challenges that policy-makers, organizations, customers, and stakeholders face in the light of digitation.*

#### **14.10 The Automation and Democratization of Science and Society**

Developments in Artificial Intelligence (AI) and the formalization of a variety of research domains have lead to an ever-increasing degree of automation in the scientific endeavor. We all use some degree of automation in our work, but the Robot Scientist by Ross King and colleagues was the first example where the whole scientific process was completely automated. On the other end of the spectrum lies the use of a plethora of volunteers in scientific projects via citizen science approaches.

One possible thread of investigation could be how automation and citizen participation radically changes science. Possible questions include:

- How does this change science?
- Will the automation of science lead to a systematic bias in the kinds of questions researched? (Will we see less science done that requires lots of manual work?)
- How can we include *robots* and *citizens* in the very early stages of science where hypothesis get developed?
- Who "owns" the results of these kinds of projects? (this question is especially pertinent in disciplines, where people increasingly patent their results such as the life-sciences)
- How can we "teach" machines to behave ethically in their decisions about scientific experimentation (to avoid situations like the Milgram experiments<sup>32</sup>)?

*So what is the role of scientists and the challenges of opportunities this mix of automation and democratization of science brings?*

<sup>32</sup> See [https://en.wikipedia.org/wiki/Milgram\\_experiment](https://en.wikipedia.org/wiki/Milgram_experiment)

**In a broader sense this topic also addresses how automation and the democratization of all technology (i.e., ubiquitous access to production technologies such as 3D plotters etc.) changes our society as a whole?** This includes questions such as:

- Will there be work in an increasingly automated world?
- What organizational structures will arise when the means of production are accessible even to individuals?
- What governance structures are appropriate, when there is complete information symmetry between all parties in the political and governing process?

#### 14.11 Acting Morally<sup>33</sup>

Digitalization entails that more and more human interactions are mediated through technology – with respect to receiving information (searching and visualization of data), acting in the real world (e.g., through remote-controlled systems) or learning (e.g., e-learning or gamification). Many of these interactions touch upon moral issues by, e.g. involving moral values, causing benefit or harm or by having subtle influences on our moral psychology. Digital technology may have the potential to both increase and decrease moral sensitivity, may enhance or impede moral decision making, and could improve or hamper moral actions through mechanisms like epistemic noise, psychological distancing or nudging using persuasive technologies. To ensure that the increasing digitalization of all spheres of life aligns with an ethical development of society, we need a better understanding on how digitalization influences human morality both directly and indirectly.

To this goal, the research topic *Acting Morally in the Digital Age* aims to investigate research in (empirical) ethics, moral psychology, informatics, information management, data visualization research, decision sciences, law and other related disciplines **to ensure that we can act morally in a digital society.**

Possible research questions include:

- How can morally relevant data be visualized in order to improve moral reasoning?
- How does the character and interpretation of moral dilemmas change when action is mediated through remote-controlled systems?
- What is the potential of Serious Moral Games for training moral competences?
- To what extent can persuasive technologies be ethically and legally justified?
- What is the right balance between the free flow of information and data censoring in a digital age?<sup>34</sup>

## 15 Rationale for Initial DSI Faculty Topical Target Areas

This appendix lists the slightly expended descriptions of the initially suggested topic areas for hiring faculty. The descriptions are kept intentionally short and shall only indicate the rationale for the position for the initiative and society; *not* serve to address the issues typically answered in a “kleiner Strukturbericht.” Note that all topics are cross faculty boundaries.

<sup>33</sup> This topic was contributed by Dr. Markus Christen and Prof. Dr. Carmen Tanner, who were not part of the working group.

<sup>34</sup> See <http://m.heise.de/newsticker/meldung/Revolver-aus-dem-3D-Drucker-feuert-angeblich-acht-Kugeln-ab-3018484.html> for an interesting case describing the publication of a printable model of a gun.