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**E-Democracy and Values in
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E-Democracy and Values in Information Systems Design

Abstract: In this paper I demonstrate the utility of a Values in Design (VID) perspective for the assessment, the design and development of e-democracy tools. In the first part, I give some background information on Values in Design and Value-Sensitive Design and their relevance in the context of e-democracy. In part 2, I analyze three different e-democracy tools from a VID-perspective. The paper ends with some conclusions concerning the merits of VID for e-democracy as well as some considerations concerning the dual tasks of philosophers in assessing and promoting value-sensitive technology design.

Keywords: E-Democracy, E-Government, E-Participation, E-Voting, Values, Information Systems, Design, Transparency, Privacy, Security, Trust, Bias

I. Introduction

The goal of this paper is to demonstrate the utility of a specific line of research for the analysis and design of e-democracy¹ tools: *Values in Design* (VID). *Values in Design* refers to a field of research which has its origins at the intersection of computer ethics, science and technology studies (STS) and critical computer science. Empirical research from STS has shown that societal values often are – explicitly or implicitly – being inscribed into technologies in the process of their design and development, and that technologies in turn may retroact on societal values. *Values in Design* (VID) as a broader term, respectively *Value-Sensitive Design* (VSD) as a concrete methodology, provide a practical turn of these insights by arguing that technologies must not only be assessed and analyzed with respect to the values embedded and reinforced through them. It should further be possible to *intentionally* inscribe desired values into technological artifacts in the process of design and development.

Taking a look at debates and developments in the field of e-democracy, it becomes obvious that democratic values, such as transparency, accountability, trust, or secrecy, and the way different tools support such values is a central topic. Based on this observation, I want to show in this paper that a *Values in Design* perspective provides an ideal *analytical* framework to assess existing e-democracy tools as well as well as *normative* framework which can provide guidance for the development of new e-democracy tools.

¹ I use e-democracy as a generic term for electronic tools that aim to support different democratic processes. As such it is meant to encompass other more specific terms, such as e-participation, e-government, e-voting, etc.

The paper is structured as follows. In the first part, I give some background information on *Values in Design* and *Value-Sensitive Design* and its relevance in the context of e-democracy. In part 2, I analyze three different e-democracy tools from a VID-perspective. The paper ends with some conclusions concerning the merits of VID for the assessment and design and e-democracy tools as well as some considerations concerning the dual tasks of philosophers to engage not only the critical assessment of e-democracy tools, but also to engage in their design and development.

PART 1: Values in Design and E-Democracy – Theoretical Considerations

II. Why to Think About Values and Information System Design?

1. Values and Technologies

The article “Do artifacts have politics?” published by Langdon Winner in 1980 is one of the most influential texts in the field of Science and Technology Studies (STS). In this widely cited article, Winner argues that technologies are by no means neutral, but instead have political properties by embodying “[...] specific forms of power and authority”.² Referring back to Lewis Mumford’s differentiation between authoritarian and democratic technologies, Winner offers a diversity of examples to support his claim that artifacts have politics. While the political nature of the atom bomb may be straightforward, Winner’s other examples appear much more innocent at first sight: the mechanical tomato harvester, cotton-spinning mills, automobile assembly teams, Baron Haussmann’s re-structuring of Paris as well as Winner’s most famous - or infamous – example: Robert Moses’s parkway bridges in New York.

Winner’s empirical starting point for his analyses on the politics of artifacts has been the observation that the parkway bridges in New York are “extraordinarily low”.³ The person in charge of building those bridges was Robert Moses, “[...] legendary political entrepreneur, who has shaped the physical form of New York in this century and beyond as no other person”.⁴ Departing from this seemingly innocent empirical observation about the height of the parkway bridges, Winner argues that Moses *intentionally* had those bridges built that low to “discourage the presence of buses on his parkways”. By this trick he was able to “[...] limit access of racial minorities and low-income groups to Jones Beach, Moses's widely acclaimed

² Langdon Winner, Do Artifacts Have Politics?, *Daedalus* 109(1), 1980, 121.

³ See Winner (note 2), 123.

⁴ Bernward Joerges, Do Politics Have Artefacts? *Social Studies of Science* 29(3), 1999, 412.

public park”.⁵ Winner argues that the design of those parkway bridges reflects “[...] Moses's social-class bias and racial prejudice”⁶ and concludes: “Many of his monumental structures of concrete and steel embody a systematic social inequality, a way of engineering relationships among people that, after a time, becomes just another part of the landscape”.⁷

Almost 20 years later, Bernward Joerges refuted Winner’s famous case study. Based on correspondences with US civil engineers, Joerges argues that due to various requirements “Moses could hardly have let buses on his parkways, even if he had wanted differently”,⁸ therefore refuting Winner’s central claim about the parkway bridges as an example of social engineering. Yet, irrespective of these methodological flaws and the questionable conclusions, Winner’s example is a success story and it’s been recited in many accounts of STS. How is that possible? Despite his thorough critique of Winner’s story as a rhetorical device, Joerges himself concludes that Winner’s story serves a specific purpose rather well: “to resituate positions in the old debate about the control of social processes via buildings and other technical artifacts – or more generally, about material form and social content”.⁹

What was so promising and inspiring about Winner’s case is that he delivered a simple and strong case for the inscription of societal values into technology and the societal effects of such biased technologies. It is this insistence on the *political* character of artifacts and the possibility of *social engineering through technology* that hit the *Zeitgeist* of critical science and technology scholars. Winner initiated a discussion about the politics of artifacts by refuting the assumption that technologies are neutral or follow some inner-technological rationality. Instead he stressed the societal environment with all its values, prejudices and assumptions that get inscribed into these artifacts. In Moses’ case – and that makes this specific example even more seductive – there seemed to have been this powerful man who intentionally inscribed his views into technology, who quite literally carved his racial prejudices and societal inequalities into stone, made them durable, solidified them in artifacts, and ensured their enduring societal impact.

Nonetheless, it soon became obvious that focusing only on allegedly intentional social engineering may not suffice to understand the political nature of technologies. Rather, even seemingly innocuous design decisions may also have societal effects, i.e. even without assuming a racist, sexist or similarly motivated designer, design decisions by definition make

⁵ See Winner (note 2), 124.

⁶ See Winner (note 2), 123.

⁷ See Winner (note 2), 124.

⁸ See Joerges (note 4), 419, italics in original.

⁹ See Joerges (note 4,) 411.

“differences that matter”.¹⁰ Hence, to my mind a crucial role not only for STS-scholars, but also for philosophers consists in the critical assessment of technologies with respect to the ethical, social or political values they embody as well as their ethical, legal, social or political consequences. Yet, is there more that can be done than “only” to analyze existing technologies? Can those insights be made fruitful also for the design of technologies in the broadest sense of the word?

2. *The Pragmatic Turn: Values in Design*

One field of research that attempted to make this constructive or pragmatic turn is labeled *Values in Design*. Its goal is to play a more constructive role within the process of technology design and development instead of only revealing which biases and prejudices have already been inscribed into existing technologies. According to Flanagan, Howe et al. such a “[...] pragmatic turn [...] sets forth values as a design aspiration, exhorting designers and producers to include values, purposively, in the set of criteria by which the excellence of technologies is judged”.¹¹

Values in Design as conceived here is not a clear-cut program with a distinct set of methods, theories or scholars. Its roots lie in STS, just as much as in applied ethics and critical design practices within computer science and the term is rather meant to refer to a broader set of approaches that twists the insights obtained from STS and critical technology studies into developing guidelines or recommendations for technology design.

The publication of the seminal book “Human Values and the Design of Computer Technology” edited by Batya Friedman can surely be seen as a catalyst for the pragmatic or constructive turn in debates around *Values in Design* and may thus serve as a vantage point for this short portrayal.¹² For this anthology, Friedman brought together an interdisciplinary group of acclaimed scholars tackling the issues around values in computer and information system design. In her introduction, she asserts that although designers hardly think about values in their daily business, they “[...] necessarily impart social and moral values”¹³. But if that’s the case, she further asks: “Yet how? What values? Whose values? For if human values – such as freedom of speech, rights to property, accountability, privacy, and autonomy- are

¹⁰ Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Durham, Duke University Press, 2007, 36.

¹¹ Mary Flanagan, D. C. Howe, et al., *Embodying Values in Technology: Theory and Practice*, in: J. v. d. Hoven and J. Weckert. *Information Technology and Moral Philosophy*, Cambridge Cambridge University Press, 2008, 322.

¹² Batya Friedman, (ed.), *Human Values and the Design of Computer Technology*, Cambridge, Cambridge University Press, 1997.

¹³ Batya Friedman, Introduction, in: B. Friedman, *Human Values and the Design of Computer Technology*, Cambridge, Cambridge University Press, 1997, 1.

controversial, then on what basis do some values override others in the design of, say, hardware, algorithms, and databases?”¹⁴

From the list of values above, the relation between *Values in Design* and debates around e-democracy should already become obvious. Freedom of speech, privacy and accountability are key words in debates about the potential advantages as well as the dangers of e-democracy.

3. An Example: Freedom from Bias

In this section I want to give an example of a value which plays and should play a central role in the evaluation and design of e-democracy tools and which also is particularly suited to understand some specificities of information systems design in general: freedom from bias.

Freedom from bias is an important requirement of almost any (information) system and indeed much of the work in STS has focused on detecting and remedying different types of bias. In their article on “Bias in Computer Systems” Friedman and Nissenbaum offer a taxonomy of biases that appears useful not only for analyses of existing e-democracy systems, but also as a guideline for the development of new tools¹⁵.

First of all, what is bias in computer systems? The two authors use bias “[...] to refer to computer systems that systematically and unfairly discriminate against certain individuals or groups of individuals in favor of others”¹⁶. They identify three different categories of bias of relevance for computer systems: preexisting bias, technical bias and emergent bias.

Preexisting bias refers to “bias [which] has its roots in social institutions, practices, and attitudes”.¹⁷ This is the “Winner-type” of bias, the classic case of all those societal injustices or personal prejudices that get inscribed into technology, be it intentionally or unintentionally.

Technical bias however is something different. This type of bias is not rooted in societal values, but rather arises within the process of technology design, when designers make technical decisions in certain ways and not in others, when they opt for one algorithm as opposed to another. The sources of technical bias that Friedman and Nissenbaum list are limitations of computer tools, decontextualized algorithms, methods of randomization, and the biases that occur when human concepts have to be formalized to match the formats

¹⁴ See Friedman (note 13), 1.

¹⁵ Batya Friedman and H. Nissenbaum, Bias in Computer Systems, in: B. Friedman, *Human Values and the Design of Computer Technology*, Cambridge, Cambridge University Press, 1997 21-40.

¹⁶ See Friedman and Nissenbaum (note 15), 23.

¹⁷ See Friedman and Nissenbaum (note 15), 24.

needed for computing, i.e. in the process of translating abstract notions, such as transparency, privacy or trust into functional requirements for programming and finally into code¹⁸.

Finally, the notion of *emergent bias* accounts for the fact that biases might occur later on through usage and appropriation of computer systems. Typically, such bias occurs when either the context in which the system is used changes, a process which Friedman and Nissenbaum describe as “new societal knowledge”.¹⁹ The second reason for emergent bias has its roots in a mismatch between the expertise or values of users and system designers²⁰.

Awareness about the potentiality of technical biases as well as emergent biases is of particular importance for the analysis and the design of e-democracy tools. If we presuppose that most e-democracy tools aim at positive values, such as transparency, empowerment, freedom of speech and information, etc. then the problem of pre-existent bias may still exist but probably not be the most pressing issue. On the other hand, technical decisions as well as changing circumstances and societal contexts which may have detrimental effects appear to be much more dangerous and much more difficult to grasp in the context of e-democracy.

Friedman and Nissenbaum propose different methods and design practices that should help avoiding biases in information systems, such as raising awareness of potential biases, rapid prototyping, the inclusion of different users groups into the design process, formative evaluation, field testing, etc. They conclude their article by stating that “[b]ecause biased computer systems are instruments of injustice – though admittedly, their degree of seriousness can vary considerably – we believe that freedom from bias should be counted among the select set of criteria accord; to which the quality of systems in use in society should be judged”.²¹

4. Developing Methodologies for Critical Technology Design: Friedman ‘s Value Sensitive Design

Later on both Nissenbaum and Friedman together with colleagues developed concrete design methodologies to account for these insights concerning the relationship between values and information technology design and development. In the following, I exemplarily outline Friedman’s methodology, which she labeled *Value-Sensitive Design*, in some detail.

¹⁸ See Friedman and Nissenbaum (note 15).

¹⁹ See Friedman and Nissenbaum (note 15), 26.

²⁰ This aspect is reminiscent of Madeleine Akrich’s analyses of technologies that are used in contexts other than the ones where they have been developed. Cf. Madeleine Akrich, *The De-scription of Technical Objects*, in: W. E. Bijker and J. Law, *Shaping Technology/Building Society: Studies in Sociotechnical Change*, Cambridge, MIT Press, 1992, 205-224.

²¹ See Friedman and Nissenbaum (note 15), 39.

According to Friedman and her colleagues *Value Sensitive Design* is a “[...] theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process. It employs an integrative and iterative tripartite methodology, consisting of conceptual, empirical, and technical investigations”.²²

The notion of *value* is defined rather pragmatically and broad as that “what a person or group of people consider important in life”²³ – a definition that leaves room for a variety of values of different degrees of abstractness. In their decidedly non-comprehensive list of values that may play a role in information system design, they include the following examples: human welfare, ownership and property, privacy, freedom from bias, universal usability, trust, autonomy, informed consent, and accountability²⁴ – many terms which also are frequently encountered in debates around e-democracy.

Their methodology consists in an iterative integration of three phases: conceptual, empirical and technical investigations. *Conceptual investigations* encompass not only the identification of relevant values, but also the identification of different direct and indirect stakeholders. By including indirect stakeholders into the arena of analyses, they aim to amend for the frequent neglect of non-users, i.e. the neglect of groups which may not be considered relevant but which are nonetheless affected by technologies²⁵. Relevant questions in this phase concern the different stakeholders and the ways in which they are affected; the relative importance of different values as well as the trade-offs between conflicting values, etc. Especially, but not only in this conceptual stage philosophers’ expertise is of high relevance, in particular to characterize the specificities of different values. It is for this reason that in a similar *Values in Design* methodology proposed by Mary Flanagan, Daniel C. Howe and Helen Nissenbaum, the authors label this stage *philosophical mode*²⁶. Flanagan et al. stress that in addition to some practical challenges, such as a scarcity of concrete *Value-Sensitive Design* guidelines for designers, there are also enormous epistemological challenges inherent in addressing values in information systems design. Accordingly, the philosophical mode

²² Batya Friedman, P. H. Kahn, et al., *Value Sensitive Design and Information Systems*, in: P. Zhang and D. Galletta, *Human-Computer Interaction in Management Information Systems: Foundations*, New York, M.E. Sharpe, 2006, 348.

²³ See Friedman, Kahn et al. (note 22), 349.

²⁴ See Friedman, Kahn et al. (note 22).

²⁵ See Nelly Oudshoorn and Trevor Pinch, *How Users Matter: The Co-Construction of Users and Technology*, Cambridge, MIT Press, 2005, 67-80. In particular: Sally Wyatt, *Non-Users Also Matter: The Construction of Users and Non-Users of the Internet*, in: N. Oudshoorn and T. Pinch, *How Users Matter: The Co-Construction of Users and Technology*, Cambridge, MIT Press, 2005, 67-80.

²⁶ Mary Flanagan, D. C. Howe, et al., *Embodying Values in Technology: Theory and Practice*, in: J. v. d. Hoven and J. Weckert, *Information Technology and Moral Philosophy*, Cambridge, Cambridge University Press, 2008, 322-353.

consists not only in reflecting upon the nature, the extension and intension of values, etc., it also has to offer some normative orientation in “[...] providing rationale or justification for commitments to particular values in a given device”.²⁷

The *empirical investigations* in *Value-Sensitive Design* make use of a diversity of quantitative and qualitative research methods from the social sciences to analyze how people actually conceive and prioritize different values, which role they play in the actual actions, etc. During this phase VSD’s *performative* understanding of information systems becomes obvious: the iterative, empirical methodology is meant to enable not only design and development, but also usage and appropriation of technological artifacts. That is, only through such an iterative process it can be analyzed whether the values intended in the design process were fulfilled, amended, subverted, etc.

The *technical investigations* as described by Friedman and her colleagues comprise of two different tasks. One task consists in assessing the role values play in existing technologies. This is the *analytic task* of *Values-Sensitive Design*. The second aspect is more interesting and innovative, since it concerns the “[...] proactive design of systems to support values identified in the conceptual investigation”.²⁸

Let me summarize the most important aspects of *Value-Sensitive Design* and how these are relevant in the context of e-democracy. First of all, *Value-Sensitive Design* aims at being proactive in bringing forward the design of new value-sensitive artifacts instead of only analyzing existing technologies. With respect to values, they include a wide variety of moral values, usually not taken into account in technology design. More precisely, they differentiate between moral values and functional values, such as usability and open up the possibility to weigh some values against others. Such value conflicts cannot only occur between functional and moral values, but also between different moral values, such as transparency versus security, accountability versus privacy, etc. Another useful insight of VSD concerns their view on universal or global values. According to them, the question of whether a value is global or local depends in the level of abstractness, i.e. a certain value, such as freedom, may be considered valuable globally. But what is meant by freedom may differ profoundly in different contexts when it gets to the details. This insight is particularly important for the design of e-democracy tools: even if there is a high-level consensus on certain values, such as privacy, the implications of this value for technical decisions and how privacy should be

²⁷ Helen Nissenbaum, Values in Technical Design, in: C. Mitcham, *Encyclopedia of Science, Technology and Ethics*, New York, Macmillan, 2005, lxvii.

²⁸ See Friedman, Kahn et al. (note 22), 352.

weighed against others values are by no means clear as will become obvious in the case studies in part 2.

As an interactional theory, *Value Sensitive Design* emphasizes that “[...] values are viewed neither as inscribed into technology (an endogenous theory), nor as simply transmitted by social forces (an exogenous theory). Rather, the interactional position holds that while the features or properties that people design into technologies more readily support certain values and hinder others, the technology’s actual use depends on the goals of the people interacting with it”.²⁹

Finally, another aspect, which is especially relevant for e-democracy applications concerns their attempt to broaden the scope of analysis by allowing not only for direct, but also for indirect stakeholder and *affected others*, providing a remedy for an overly exclusive focus on those stakeholders involved in the design and development of the artifacts. It is especially here, where power issues come into play, because as has been shown by various STS researchers, different stakeholder groups usually have different amounts of power and topics such as digital divide or equality of access are crucial and yet unresolved topics in debates around e-democracy as becomes obvious also the case studies in part 2.

III. Values in Design & e-democracy

Let’s expand a bit on the links between and the high utility of a *Values in Design*-perspective, respectively methodologies such as the *Value-Sensitive Design* for e-democracy. Taking a look at recent debates in the field of e-democracy it becomes obvious that the term e-democracy is used for quite different topics, goals and strategies. Different concepts about democracy, such as liberal, communitarian, deliberative, epistemic or contestatory concepts of democracy,³⁰ do not only lead to different goals for e-democracy, they also leave their imprints on the design of e-democracy tools. Hence, as van den Hoven notes, “[f]or one person Democracy is all about E-Voting, for another it is all about on-line political debate”.³¹

Despite these controversies, *values – democratic values* in particular – are a central topic for e-democracy, as are possible conflicts between different values. Indeed, a paper by Brewer, Neubauer and Geiselhart entitled “Designing and Implementing E-Government Systems: Critical Implications for Public Administration and Democracy” reads as if written from a *Values in Design*-perspective although it clearly is situated in a very different

²⁹ See Friedman, Kahn et al. (note 22), 361.

³⁰ Jeroen van den Hoven, E-democracy, E-Contestation and the Monitorial Citizen, *Ethics and Information Technology* 7, 2005, 51-59.

³¹ See van den Hoven (note 30), 51.

theoretical discourse as the references indicate.³² In the following I use several longer quotations in order to demonstrate the prevalence of the question of values in the context of e-democracy and to show how a more thorough usage of *Values in Design methodologies* may be utile for very different types of e-democracy initiatives.

Already in the abstract, the authors argue that “[d]emocratic values can serve as design elements and anchors for these [i.e. e-government] systems” and that instead of merely outsourcing the design of such tools public administration should be actively involved into the design of e-government systems in order to “instill democratic values and ensure that democratic processes and outcomes are realized”³³. Reminiscent of the insights from *Values in Design* the authors further state that

[d]esign decisions are not merely technical or even merely administrative. They are political acts that have important implications for the conduct of public administration and democracy. These channels of communication can significantly alter democratic processes and outcomes. Although it may not be possible to force desired outcomes, public officials may be able to facilitate their emergence by using democratic values as design elements. Thus, in this age of increased contracting and outsourcing, public administrators must remain actively involved in designing and implementing e-democracy information systems. However, participation alone is not enough to ensure democratic processes and outcomes. The desired result requires an understanding of how information system design relates to democratic theory.³⁴

To my mind, at least four crucial insights from VID are expressed in this quote:

1. that technologies have politics: “They are political acts that have important implications for the conduct of public administration and democracy”
2. that technologies retroact on society: “These channels of communication can significantly alter democratic processes and outcomes”
3. that once technologies are released, they start a life of their own and may be changed, modified and appropriated through (mis?)usage, i.e. the inscription of democratic values cannot guarantee democratic results: “Although it may not be possible to force desired outcomes, public officials may be able to facilitate their emergence by using democratic values as design elements”
4. that despite these caveats, administrators and other knowledgeable stakeholders should get involved in technology design: “public administrators must remain actively involved in designing and implementing e-government information systems. However, participation alone is not enough to ensure democratic processes and outcomes. The

³² Gene A. Brewer, B. J. Neubauer, et al., Designing and Implementing E-Government Systems: Critical Implications for Public Administration and Democracy, *Administration & Society* 38(4), 2006, 472-499.

³³ See Brewer, Neubauer et al. (note 32), 472.

³⁴ See Brewer, Neubauer et al. (note 32), 472.

desired result requires an understanding of how information system design relates to democratic theory”.³⁵

Finally, even the method, which the authors suggest to guide the participation of administrative personnel in the design of e-government tools resonates well with value-sensitive design. They state: “The design of modern information systems to promote and facilitate democratic processes requires thought, deliberation, and experimentation. The creation of any complex system involves needs analysis, modeling, and technical design. Implementation is likely to be an iterative, incremental process”.³⁶

It seems as if due to this similarity of topics, concepts and goals, a more thorough and explicit application of *Values in Design* ideas and methods can be of great benefit for analysis and design of e-democracy systems. Especially, since not only the debates about the goals, but also those about the limits of e-democracy are discussed with reference to values. In a critical review of e-government strategies of the European Union Gallemore lists privacy, direct participation and indeed transparency as *limits* of e-democracy.³⁷ In particular, he asserts that “there are structural limits to eGovernment’s potential to promote transparency”, because not only will crucial decision-making processes on committee-levels remain opaque, too much transparency may also simply lead to information overload.³⁸ Moreover, he warns there is “no guarantee that individual citizens will be able to increase their voice through direct consultation”, because of a lack of impact of citizen views on legislation, e.g. in the case of e-consultation,³⁹ and finally he asserts that privacy issues yet to be adequately addressed in the context of e-government.⁴⁰

Transparency it seems is a particularly interesting value with respect to e-democracy. Not only do many tools aim at increasing the transparency of administration and politics through different means. Transparency is a value which runs counter different other democratic values, such as secrecy (e.g. in e-voting), privacy (e.g. concerning personal data) or security (e.g. concerning security-relevant data such as the location water supply channels or power plants). Moreover, an empirical study addressing US citizen’s attitudes towards transparency in local government also revealed not only that the term transparency refers to a wide variety

³⁵ All quotes are from Brewer, Neubauer et al. (note 32), 473.

³⁶ See Brewer, Neubauer et al. (note 32), 493.

³⁷ Caleb Gallemore, Of Lords and (Cyber)Serfs: eGovernment and Poststructuralism in a Neomedieval Europe, *Millenium - Journal of International Studies* 34(1), 2005, 27-55.

³⁸ See Gallemore (note 37), 37.

³⁹ Confer for instance the EC-website for e-consultation [last date of access: 15.02.2012]: http://ec.europa.eu/justice/news/consulting_public/news_consulting_public_en.htm

⁴⁰ See Gallemore (note 37), 37.

of different issues – and problems – when applied to governmental information.⁴¹ It also becomes obvious that opinions about which data should be made transparent are bound to different cultural and social factors. In particular, the authors of the study distinguish between *fiscal transparency* and *safety transparency*. Fiscal transparency refers to availability and accessibility of data such as records of government contracts, expense accounts, city budgets, or real estate records, etc. Security transparency refers to information about health inspections at local restaurants, police reports of crimes committed in local communities, the names of people being arrested including the crimes for which they are being charged, the names of sex offenders, etc. In their study, the authors could show that there are systematic differences between citizens requesting either security-relevant or fiscal data. For instance, older individuals with higher income, greater political engagement and those who feel closer to their community had a stronger interest in fiscal transparency. On the other hand, there were gender and regional difference with respect to security related data: women as well as people from the South of US appeared to be more interested in security related data than men and people from the Western parts of the US. Moreover, while both self-identified conservatives and liberals were interested in transparency, conservatives were more concerned about safety-related information, whereas liberals were more “concerned with accessing government information on principle and for good governance concerns”.⁴² Moreover, the fact that publishing information about crime offenders, their names and the crimes they are charged with, was widely accepted in this study also indicates that there is a strong cultural, i.e. national, impact on the perception of which data should be made available and where privacy sets limits to transparency, because such a practices appears to be much more controversial in many European countries.

⁴¹ Suzanne J. Piotrowski and G. G. van Ryzin, Citizen Attitudes toward transparency in local government, *The American Review of Public Administration* 37(3), 2007, 306-323.

⁴² See Piotrowski and Ryzin (note 41), 320.

PART 2: Values in Design and E-Democracy – Three Examples

In order to demonstrate the fruitfulness of this approach and its breadth of applicability I take a closer look at three very different e-democracy initiatives and tools from a VID perspective.

IV. CitySourced – or who reports upon whom?

The first e-democracy tool to be introduced is CitySourced⁴³. On their website, the tool is described as follows:

CitySourced is a real time mobile civic engagement platform. CitySourced provides a simple and intuitive platform empowering residents to identify civic issues (public safety, quality of life, environmental issues, etc.) and report them to city hall for quick resolution; an opportunity for government to use technology to save time and money plus improve accountability to those they govern; and a positive, collaborative platform for real action. A picture tells a thousand words and CitySourced makes it a snap.⁴⁴

Citysourced therefore is meant to a) encourage people to report incidents which are considered problematic to the city hall and b) to do this through a certain platform that enables automated tracking, monitoring, qualitative and quantitative assessment of those incidents. Moreover, even in this short description it becomes obvious, that CitySourced aims at supporting certain values: besides some usability-related values (“simple and intuitive platform”), these are: civic engagement, empowerment, public safety, quality of life, accountability, collaboration as well as efficiency (“cost and time savings”). The same values are reiterated throughout the website. Let’s take a closer look at the website.

The main menu consists of the following headers: About, Download, Neighborhoods, Contact, and Blog. Reading the “client testimonials” in the “About-section” seems to confirm the impression that efficiency is of particular importance in addition to communication and engagement, public safety and quality of life for residents.⁴⁵ In the “Download” section, the software can be found to install CitySourced on Windows 7 phones, I-Phones and I-Pod Toch, Android Phones as well as Blackberry Touch and Non-Touch. Under “Neighborhoods” one can search for reported incidents via a map or through entering postal codes into a search box. Narrowing down the search to cities or regions then leads to a listing of reported incidents including a headline indicating the type of incident (e.g. “Graffiti” or “Abandoned

⁴³ I would like to thank the working group on Government2.0 at the 2010 Values in Design workshop at NYU for bringing CitySourced to my attention. <http://sites.google.com/site/vid2k10workshop/home> [last date of access: 13.02.2012]

⁴⁴ <http://www.citysourced.com/about> [last date of access: 13.02.2012]

⁴⁵ <http://www.citysourced.com/about> [last date of access: 13.02.2012]

Vehicle”) and a picture. Clicking on those leads to the detailed description of the incident including its GPS-location. An example is given below.

The screenshot shows a web browser window displaying a report on the CitySourced website. The browser's address bar shows the URL: <http://www.citysourced.com/report/32659/other-not-listed-please-describe>. The page header includes the CitySourced logo with the tagline "Mobilizing Civic Engagement™" and navigation links for "ABOUT", "DOWNLOAD", "NEIGHBORHOODS", "CONTACT", and "BLOG". A breadcrumb trail indicates the location: "US > California > San Diego County > City of San Diego > Scripps Ranch > Other (Not Listed Please Describe)".

The main content area is titled "Other (Not Listed Please Describe) - Issue Reported in San Diego, CA". It features a photograph of a street scene with cars. To the right of the photo, the following details are provided: "Reported On: 01/26/2012 @ 04:04 PM PST", "Reported By: Citizen67887", "Address: Mercy Road Bp, San Diego, CA 92131, USA", "Latitude: 32.936169", "Longitude: -117.110404", "Direction: West", "Device: Android myTouch_4G_Slide", and "Current Status: Referred To Dept". A description follows: "Description: This intersection was ill conceived. If I wait in the correct lane to get on the freeway South And do the right thing other people more in a hurry get in the next lane and cut into the two left turn lanes. Since there are two left turn lanes, there should be two traffic lanes feeding into them".

To the right of the text is a map titled "Where Is This Report?" showing the location at the intersection of Mercy Rd and Escondido Fwy. Below the map is a "Report Feed" section with one entry: "01/30/2012 @ 09:52 AM PST San Diego, CA has update this report's status from 'Submitted' to 'ReferredToDept'". On the far right, a "Take Action!" section contains four buttons: "Follow this Report", "Share this Report", "Vote Up this Report", and "File a New Report".

Figure 1: <http://www.citysourced.com/report/32659/other-not-listed-please-describe> (date of access: 15.2.2012)

As can be seen from this screenshot, the report of the incident is located on the map. Moreover, the status of the incident is marked: e.g. whether the incident has only been submitted (“Status: Submitted”) so far or whether action has been already taken from the side of the city council. In this case, the incident has already been referred to the responsible department (“Status: Referred to Dept”).

The “Contact” section offers email and telephone contact data, but also targeted information for city officials (about how to use CitySourced in their city) as well as “relevant local data” for media.⁴⁶ Finally, the Blog announces new apps, the uptake of CitySourced in different communities as well as various examples of media coverage.

⁴⁶ <http://www.citysourced.com/contact> [last date of access: 13.02.2012].

Instead of going through all sites in more detail, I want to draw attention to a short video clip “Watch us on Kurt the Cyberguy”, which is prominently placed on the homepage and introduces the main features of CitySourced.⁴⁷ In the following I describe the video in some detail and provide numerous quotes in order to shed some light on the explicit and implicit values as well as some potential biases of CitySourced.

The 2-minute video starts in a TV studio with two moderators introducing a report by “Kurt the Cyberguy”, who is going to “talk about this new app that can help you be the hero of your neighborhood”.⁴⁸ The invisible speaker of the video continues that “urban blight is an epidemic that hits you at home in every city of America”. A woman interviewed in the street is cited to say “[i]n my neighborhood alone once a month we have to have the streets team cleaned – and we have to pay for it.” The speaker continues that “[u]ntil now, there was no safe and easy way for people like you and me to do our part”. We are then asked to “check out this brand new app CitySourced. It’s like a digital police academy right in your pocket.” The video starts playing the melody theme of the American comedy series “Police Academy”, along with short clip from the movie and a scene of a street fight. Showing a blond women in a white dress, raising her eyebrows in disgust at the sight of a graffiti, the speaker continues that “if you see something that does not belong in your neighborhood, like graffiti, potholes, broken streetlights and any kind of vandalism, either water flooding into the street – just take a photo with your smartphone and then CitySourced automatically reaches out for help.”

While the video certainly offers a lot of interesting material, I do not want to overstretch my analysis by asking what it means that urban blight is considered to be an epidemic, etc. Nonetheless, I do think that the way the problems to be reported to CitySourced are *framed*, is important to understand how implicit and explicit values take effect in the design, development and usage of tools such as CitySourced. First of all, it becomes obvious, that saving taxpayers’ money is a major motive behind CitySourced or at least a major aspect for the marketing of CitySourced. This impression from the video is confirmed by the repeated emphasis on time and cost savings in the “About” –Section, especially in the “Client Testimonials” on the website.

A second aspect becomes more obvious when comparing the video with actual reports. Taking a look at the reported incidents at the time of writing this article reveals that most incidents reported refer to graffiti, illegal dumping or street damages. Yet, in addition to

⁴⁷ The video is embedded in the main page. <http://www.citysourced.com/default.aspx>, [last date of access: 14.02.2012].

⁴⁸ Kurt Knutsson, alias Kurt the Cyberguy, has reported on technological developments for various tv stations and newspapers. The video clip referred to here has been broadcasted by KTLA, a Californian TV station. All the quotes in the following section are transcribed from this video.

potholes and broken streetlights, “homeless encampments and nuisances” also belong to those incidents that can be and are reported upon.⁴⁹ Hence, it seems that it is not just graffiti, but also homeless people who are classified as “not belonging in our neighborhood”. Indeed while doing research on CitySourced for a seminar of mine in January 2011, I came across a report in which someone uploaded a picture of someone lying on the street. The picture was taken from the distance, tagged “homeless nuisance” and included the statement “not sure it’s alive”. The incident is not retrievable any longer and it may have been a singular event. Clearly, this example can therefore serve as anecdotal evidence at best, given the fact that I cannot provide further evidence than my own memory - and possibly the memory of my students. Nonetheless, it is easy to see that the sheer possibility of uploading uncategorized issues plus free tagging enables the reporting not only of potholes that are considered a nuisance, but also the reporting of places where homeless people camp. And whenever someone reports *homeless encampments or nuisances* to CitySourced, this report can be found on the website with pictures and the exact location.

Beyond the dehumanizing report above, two more generic problems should become obvious. The first problem concerns questions of agency and power: who can tag and who can be tagged? To being with, a smartphone is the technical prerequisite of being a reporter, while being reported upon is free of requirements. Despite the prevalence of mobile phones, it should be kept in mind that even today not everyone possesses a smart phone and hence non-users are excluded and may be systematically discriminated against. Clearly, the digital divide is nothing specific for tools such as CitySourced. Nonetheless, this digital divide has to be taken into account when thinking about the question who can report and who can at best be reported upon.

The second issue concerns issues of privacy and safety, and in this case the privacy and the safety of the homeless people. Clearly, there is not only no consent from those who are reported upon. Making their location available online, also makes those who are living on the street potentially even more vulnerable to attacks. Now, clearly this comment is not meant to imply by any means that attacks on homeless people are the norm or are being encouraged through tools such as CitySourced. Rather, I want to point to the fact that a) being able to report homeless encampments and b) providing their exact localization on a website that

⁴⁹ On 2/16/2011, the City of Redlands for instance announced the use of CitySourced. Amongst the listed issues to be reported via CitySourced are “homeless encampments or nuisances.” (cf. <http://www.ci.redlands.ca.us/rss/article.php?client=redlands&id=20110216131044>, [last date of access: 13.02.2012]).

makes this information publicly available creates privacy and safety problems which need to be addressed.

Related to this problem is the question as to whether tools such as CitySourced may have the unintended side effect of fostering a detached form of civic engagement, in which personal action (e.g. checking whether a person lying needs help) is replaced by pseudo-engagement (uploading a picture from the distance with the remark “not sure it’s alive”). Assuming that this was an extreme and untypical example of the usage of CitySourced, I nonetheless think that it serves as a good reminder that the best-intended tools can have serious side-effects for certain (non-)users. To conclude: while I see a lot of benefits in tools such as CitySourced, I think they should be handled with more care. VID can remind us not only that different values need to be balanced, but also that there may be unthought-of dangers for affected others that even if they cannot be completely foreseen need to be taken into account when designing, developing and evaluating tools such as CitySourced.

V. Open Government Data – or who knows what?

My second example takes a look at a very different aspect of e-democracy: Open Government Data (OGD) or – with a stronger focus on machine-readability - Linked Open Government Data (LOGD). In contrast to the previous example, where the citizens were asked to provide information to the administration, in this context the government, resp. the administration has some information and is requested to make it publicly available in accordance with certain standards and principles. The following principles are often referred to in Open Government Data initiatives:

Government data shall be considered open if they are made public in a way that complies with the principles below:

- 1.Complete – All public data are made available. Public data are data that are not subject to valid privacy, security or privilege limitations.
- 2.Primary – Data are collected at the source, with the finest possible level of granularity, not in aggregate or modified forms.
- 3.Timely – Data are made available as quickly as necessary to preserve the value of the data.
- 4.Accessible – Data are available to the widest range of users for the wider range of purposes.
- 5.Machine processable – Data are reasonably structured to allow automated processing.
- 6.Non-discriminatory – Data are available to anyone, with no requirement of registration.
- 7.Non-proprietary – Data are available in a format over which no entity has exclusive control.
- 8.License-free – Data are not subject to any copyright, patent, trademark or trade secret regulation.

(Linked) Open Government Data is an international initiative rooted in different communities: the Semantic Web community, the Open Government community as well as the e-democracy community.⁵⁰ All initiatives share an interest in the availability of government data, but for slightly different reasons: while the Open Government initiatives focus on transparency and freedom of information, e-democracy rather explores new forms of participation, open data just being one factor enabling participation. For the Semantic Web community finally, government data are just another important type of data to be processed. Hence, even within the core of the (Linked) Open Government Data community differences in foci, motives and emphasis can be discerned. Moreover, one has to take into account that the members of the (Linked) Open Government Data community – or rather communities – are just one stakeholder amongst others. The most obvious other stakeholders are those involved in politics and administration. Yet, other stakeholders which are not as obviously related to OGD play a role as well, e.g. media, academia, industry or companies, as agents who are interested in the data, who can provide services, etc. Finally, there is an abundance of “affected others”, i.e. all those individuals who are related in various ways to the data to be made publicly available.

In Austria, two initiatives are the main proponents of open government data: Open Government Data Austria and Open3, the former being closer affiliated to the semantic web community, the latter rather to e-Government community. In recent years, the city of Vienna has promoted OGD through various activities. On the website <http://data.wien.gv.at/>, the city provides access to data about Vienna’s population, education, budget, sparetime activities and culture, health, public institutions, social, environmental, administrative and traffic-related issues as well as various city maps. Crucially, much of the location-based data can be displayed within the city maps, i.e. it is possible to see the Kindergartens, construction sites, police stations, public water fountains, etc. embedded in the city map of Vienna. Moreover, links to different apps for mobile phones, such as an I-phone app for parking tickets or an app showing the way to the nearest public restrooms as well as various visualization tools are provided. It is noted that only the data for the apps has been provided by the city administration, while the apps have not been developed by the administration.

Having introduced some background on OGD and some examples of successful collaborations between administration and OGD projects, let’s return to the question of values. It seems as if all proponents share a certain set of values exemplified in the principles

⁵⁰ Axel Kittenberger, Expectations and Austrian Linked Open Government Data, in: IAS-STs 2011: Critical Issues in Science and Technology Studies, Graz, Austria, 2011.

of the OGD. For instance, transparency seems to be an underlying value motivating OGD initiatives from the start. Privacy is another value which in principle appears to be acknowledged by all stakeholders. However, taking a closer look at the principles themselves already reveals some potential for conflicts.

Take the first principle, to make all public data available as long as they are not subject to privacy, security or privilege restrictions. This principle already indicates two issues: First, *all* public data refers to a broad range of very different types of data. That is, it ranges from data about the location of public restrooms to population statistics, from employment rates and crime statistics to financial data about how public budgets are spent (e.g. the UK-based initiative “Where does my money go?”). Moreover, different values appear to be in conflict with one another. That is when publishing data one frequently has to balance between the value of transparency (as a major underlying motivator of OGD efforts) and other conflicting values, such as privacy or security. Moreover, values and the judgments on the respective importance of values may differ between different stakeholders. It has been shown before that different communities do not only differ with respect to the type of data they consider relevant, but also with respect to the ideal balance between the values of transparency and other values, such as most notably privacy.⁵¹ And when it comes to stakeholders: frequently there are *affected others* who are not involved in the decisions-making process about which data are made available in which form. National differences in making criminal records publicly available and the roles of different stakeholders and affected others may just serve as one particularly striking example of differing value judgments concerning the right balance between privacy and transparency here. Even a high-level agreement on values such as privacy can therefore not prevent conflicts on lower levels of decision-making. That is, acknowledging the high-level value of privacy does not automatically explain what exactly privacy means in a given context or what it means for deciding whether or not a certain set of data should be published or not. It also does not help in cases where different values need to be balanced, e.g. for deciding which granularity of data is best suited to confirm to principle 2, without infringing the privacy rights of some affected agents.

Finally, OGD is a case in which the link between knowledge – or rather data - and power becomes rather obvious. OGD often is meant to promote *empowerment* of citizens or *bottom-up control*. However, it is not hard to see that this shift of power relations can lead to different types of conflicts between various stakeholders. It is not only the case in science, but also in the realm of politics and administration, that if data is made available, official claims can be

⁵¹ Cf. Piotrowski and Ryzin (note 41).

contested. Having access to data, allows new players to offer their interpretations of data, their own judgments which may or may not coincide with official statements and conclusions. This aspect becomes particularly controversial in the case of so-called “non-experts”. A related fear concerns questions of liability in case of incorrect data: who is to be held responsible for the (unforeseen) consequences of incorrect data sets? It should have become obvious that besides diverging financial interests (i.e. data that is made public it can hardly be sold any longer), various value and stakeholder conflicts, the link between data and power is yet another barrier to increased transparency.

If one conclusion should be drawn from this example it would be that the devil – as per usual – is in the detail. Not only are values always someone’s values and thus different stakeholders may judge the respective importance of a certain value differently. Even if there was a high-level agreement on the importance of a certain value or even the relative importance of different values, it would still be left open for discussion how this value should be accounted for and what “taking privacy concerns serious” means in a given context and for a particular decision. And finally, the principles of OGD already indicate that there are inherent value conflicts in the goals of OGD itself, because the value of transparency itself always needs to be balanced and weighed against other values such as privacy, security, secrecy, etc. Hence, *Value-Sensitive Design* with its emphasis on values, value conflicts and the role of different stakeholders seems to be particularly suited to analyze specific projects in the field of OGD.

VI. E-Voting – or how and why to (dis-)trust E-Voting?

Finally, I want to draw attention to the role of values as well as value conflicts in e-voting systems as yet another very specific type of e-democracy tools. In particular, I draw on Roberto Casati’s observations and arguments concerning the relationship between trust, secrecy and accuracy in voting systems.⁵² In this paper Casati argues against electronic voting systems from an epistemological perspective by emphasizing the problems that arise due to their lack of transparency.

According to Casati, secrecy and accuracy are desired in most voting systems. Indeed, accuracy is a desideratum of all voting systems, while secrecy requirements differ, e.g. secrecy is not needed in the case of polls where people simply raise their hands. Nonetheless, in many voting systems secrecy is required to avoid coercion. The problem is, that there is an inherent tension between accuracy and secrecy in voting systems: tracking votes in order to

⁵² Roberto Casati, Trust, secrecy and accuracy in voting systems: the case for transparency, *Mind and Society* 9, 2010, 19-23.

ensure accuracy often goes hand in hand with giving up secrecy, as is the case in raising one's hands. Disentangling the vote from the voter to ensure secrecy then involves *delegating* the counting process to a counting agent with the effect that the voter herself cannot overlook the process of counting votes anymore, but has to *trust* the agent to correctly account for her vote while keeping it secret at the same time. The result is a dilemma of trust: "On the one hand, reinforcing secrecy means delegating the implementation of accuracy. Trust in the secrecy of the system is accompanied in potential mistrust in its accuracy. On the other hand, trust in accuracy can be improved, but then secrecy will have in the norm to be given up".⁵³

Now, the problem with e-voting systems is that these trust issues are even more aggravated. If a voter submits her vote to an electronic voting system, she has to trust that both accuracy and secrecy are secured by the system. But *on which grounds* can she trust that secrecy and accuracy are secured? Or with Casati's words: "How can the individual voter know that her voting intention is not kept by the system in close association with her identity, or that her validly expressed intention is counted by the system?"⁵⁴ Here, in addition the values of secrecy, accuracy and trust, a fourth value comes into play: transparency.

Casati argues that while regular paper-based voting mechanisms are epistemically transparent to the regular voter, this is not the case in e-voting systems, where the mechanisms for ensuring both secrecy and accuracy are inaccessible to regular voters and require expert knowledge. In the case of paper ballot-voting, an implicit understanding of the physical properties of the urn in which the ballot is dropped (i.e. that it is normally not possible to figure out how someone has voted because the ballots are mixed in the urn) as well as the fact that the voter herself fills out the ballot and drops it into the urn, ensures the trust into the secrecy of this voting procedure. Accuracy by contrast has to be controlled by different means, such as the presence of representatives of different parties in the counting process or the possibility to recount the physical ballots in case of doubt. Yet, these mechanisms again are comprehensible to the average voter and ensure her trust into the accuracy of voting systems. "The key point here is not simply that the whole process guarantees, in principle, both accuracy and secrecy. It is rather that the factors that ensure accuracy and secrecy are perfectly transparent to anyone willing to reflect on them"⁵⁵.

This is not the case in e-voting systems, where the mechanisms to ensure secrecy and accuracy are not accessible to voters. Hence, *even if* secrecy and accuracy of e-voting systems can be secured – a big if, taking into account the difficulties of creating IT systems which are

⁵³ See Casati (note 52), 20.

⁵⁴ See Casati (note 52), 20.

⁵⁵ See Casati (note 52), 21.

not vulnerable to system attacks – e-voting systems would still have a major disadvantage as compared to regular paper-based voting systems: their lack of transparency. This transparency however, is needed because in the end “[r]epresentatives elected under opaque conditions would not be trustworthy”⁵⁶.

It is therefore on epistemological grounds that Casati argues against e-voting and concludes that „[t]he main reason for keeping manual voting is related to its intrinsic open structure, which can be checked simply and effectively at all crucial junctions by every voter, thereby enhancing trust. No matter what the benefits of electronic voting, these will never be enough to overcome the wide epistemological gap between them and the manual voting on the issue of trust”⁵⁷.

Casati’s argument has been portrayed in some detail to show the necessity of careful philosophical analyses of the values involved in e-voting systems. Clearly, these considerations would remain in the conceptual phase of a full VID-circle. However, as this example crucially shows, certain results of the conceptual analyses may bring this circle to a halt by showing the infeasibility of certain e-democracy tools. That is, conceptual analysis may lead to the insight that certain values or value combinations cannot be fulfilled in electronic systems in principle. A plausible conclusion could be that such systems should therefore not be used or developed further in the first place, because their disadvantages – or dangers – outplay the desired benefits.

VII. Conclusions

The goal of this paper has been to demonstrate the utility of VID, resp. VSD as guiding frameworks for critical analysis, design and development of e-democracy tools and projects. The role of values in the field of e-democracy is even more pronounced than in other areas of ICT design, because e-democracy tools are not only often meant to support or enable certain democratic values, such as transparency or freedom of information. Conflicts between different values, e.g. between transparency and privacy as well as conflicts between different stakeholders appear to be inherent in design of many e-democracy tools. The *Values in Design* perspective therefore can offer valuable insights and methodologies in this context by emphasizing several important issues. First, the existence of multiple and potentially conflicting values in e-democracy indicates the need to carefully assess the different values and stakeholders involved, including the often unthought-of affected others. Only carefully conceptual and empirical research enables designers to assess, balance and weight different

⁵⁶ See Casati (note 52), 23.

⁵⁷ See Casati (note 52), 22.

values against each other and to take the different stances of various stakeholders into account.

However, conceptual and empirical research are only two phases of the ideal VID-loop: for values to be effective in information technologies, they need to be translated into functional requirements for information systems design.⁵⁸ That is, abstract notions, such as transparency, trust, or privacy in the end need to be formalized into software code, a process which is not only highly complex, but also known to be easily subject to various types of bias.⁵⁹ These technicalities therefore also require careful VID-inspired assessment.

Moreover, as sociological and ethnographic research on technology design, usage and appropriation has shown, the mere intentions of designers by no means guarantee that a certain technological artifact will embed or even enforce certain values. Rather technologies are subject to complex processes of (re-) negotiation and appropriation through their users, especially if the users' values, practices and environments differ largely from those of the designers.⁶⁰ Hence, a crucial insight to keep in mind for the design of e-democracy tools consists in acknowledging that not only values differ between different (communities of) users, but also that even the most benevolent design intentions can be subverted through usage and (mis-) appropriation, as may be particularly obvious with respect to the danger of systems attacks in e-voting systems.

Besides demonstrating the utility of Values in Design in the realm of e-democracy, I also hope to have shown the following: That philosophical analyses of ICT in general and e-democracy tools in particular do not have to remain on the textual/linguistic or conceptual level, but that the material or technical level of e-democracy is also highly relevant for philosophical analysis and intervention.

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⁵⁸ Vermaas, P., Y.-H. Tan, et al., Designing for Trust: A Case of Value-Sensitive Design, *Knowledge, Technology & Policy* 23(3), 2010, 491-505.

⁵⁹ See Friedman and Nissenbaum (note 15).

⁶⁰ See Akrich (note 20).

⁶¹ <http://internetforschung.univie.ac.at/> [last date of access: 15.02.2012].

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