CANDID

Checking Assumptions aND promoting responsibility In smart Development projects

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Introduction

These policy recommendations are aimed at policy makers, at European and national levels, involved in efforts to integrate Social Sciences and Humanities scholarship (SSH) into practices of smart ICT innovation projects. Specifically, our recommendations are of relevance for policy makers aiming to achieve and implement Responsible Research and Innovation (RRI) in smart technology projects, technologies and policy agendas, through the inclusion of SSH scholarship.

The CANDID project focussed on four main topics, each making up the task of a specific 'module': 1) the role of users in smart technologies, 2) efforts to safeguard privacy and data protection in data-driven smart environments, and 3) infrastructures that sense, and, perhaps, think and act, and 4) innovation policy development in these areas.

The main goal of CANDID was to understand better the conditions that could facilitate collaboration between different epistemic networks in interdisciplinary work, such as Social Science & Humanities (SSH) scholars and Information and Communication Technology (ICT) practitioners. In CANDID we have applied methods of discourse analysis[1] to the study of 'smart' technologies. These approaches have been supplemented by various quality checks on knowledge (cf. section 4), in which: firstly, a body of fairly established knowledge about smart ICT topics have been established; second, this body of knowledge has been communicated to networks of 'extended peer reviewers' (people possessing relevant professional or experiential knowledge), and, thirdly, written and oral (i.e. through interviews and workshops) feedbacks have been gathered from the peer networks and included into the initial analysis. We claim that this is a method that can be applied in different contexts and at various levels of institutionalisation and technological innovation.

[1] Our approach to discourses of 'smart', includes both content and rhetorical analysis, but also Discourse Analysis (DA) in the tradition of discursive social psychology and critical discourse analysis/studies (CDA/CDS). For us, these methods provide primarily very effective tools to deconstruct what is said/written in order to unravel built-in assumptions, expectations and normative orientations which then can be further communicated across disciplines and sectors.

General recommendations, cross-cutting all modules

1. 'Smart' as a concept. There is a need to clarify the concept of 'smart', especially when applied for projects aimed at some societal intervention and improvement. No single or unitary meaning can be applied to the concept of 'smart'. Certain elements can be singled out, such as pervasive digitalisation, empowerment of users, making of new services and a general orientation towards problem-solving and design. Yet, we may ask whether the primary role of the concept is strategic and feeding into political agendas, rather than technical.

2. Inclusion/exclusion. There should be more sustained attention to individuals, groups and communities left out of smart development projects, or are at risk from being left out. Certain groups are labelled as 'laggards', or as 'late adopters', or (sometimes) ignored altogether.

3. Role and quality of data. There is a need for critical scholarship on the many roles and uses made for data (kin various forms), and for ways of communicating such knowledge to policy makers. In several of our cases we see that even quite raw and inconclusive data are used by actors for strategic purposes. For instance: there is only inconclusive evidence that users actually change their behaviour from smart metering data, yet the meters have already been introduced; bureaucrats incorporate data in their decisions, yet the engineers may deem the data poor or inconclusive; citizens will use data for litigation purposes irrespective of their poor accuracy, and so on.

4. Conflations of citizens' roles in smart projects. There is a strong tendency for smart technologies and projects to be promoted as user-centric. Yet, in practice there is a parallel tendency to construct citizens as rather passive agents. This plays out also in the legal field, where users as holders of rights (or 'data subjects') are also inserted into the core of data protection policies and regulations. Yet, in practice, it is hard to see how they are represented or able to influence developments.

5. Interdisciplinarity. Whereas interdisciplinarity is highlighted as necessary for the implementation of smart projects and technologies as socially responsive, in practice such collaborations often do not live up to expectations. Special difficulties arise as social science scholars or lawyers are expected to collaborate with engineers and innovators. It is frequently argued that SSH (social sciences and humanities) scholars are too critical, and rather stay outside of processes than engage with them. On the other hand, SSH scholars and lawyers may also feel that their methods and unique approaches require some critical distance from the activities of engineers and innovators.

Our recommendations pertaining to interdisciplinarity are reflected in the following challenges:

5a. Peers working on smart technologies from different backgrounds may often be able to reproduce the discourse of other stakeholders, yet for instance a computer scientists' ability to reproduce common social scientific critique of smart cities developments does not necessarily change the way the actual technology is built in everyday practice.

5b. Developments are generally focused on the futures and promises of smart technologies, without much regard to long-term consequences, such as issues of maintenance and repair, urbanism or alternative technological trajectories or social exclusion.

5c. Social scientists tend to be inserted into the technological innovation processes at a late stage where their role is confined to evaluation rather than shaping the framing of potential new technologies -- which makes it hard for social scientific knowledge to be valorised in a constructive way.

Recommendations – Module 1: roles of users

Our main goal was to explore different understandings of 'smartness' especially in the areas of smart energy and smart care. We asked what kinds of systems are envisaged: entire homes to be automated or energy utilities that use 'smart' electricity grids for active network management; and who are the anticipated users, such as citizens, patients and vulnerable groups? By focusing on representations of users in smart technology and its design, CANDID researchers explored what 'smartness' and the increase in data implies for various types of provider and 'end user'.

Key findings & recommendations:

1. 'Smarter' design of energy and health technologies has many sometimes incompatible aims: modernizing infrastructures, day-to-day 'efficiency' improvements, increasing autonomy, and control by lay people.

Recommendation 1: *pursue greater clarity in the definition of smart agendas and policies. Where different goals are differently prioritised and valorised, be clear about the priorities as well as the justifications for them.*

2. The anticipated 'users' of these 'smart' technologies fall within a wide range, including many intermediaries between 'producers' and 'users'. 'Users' who benefit most directly are professionals; benefits to consumers for 'self-managing' energy/health are promised but are not yet facts.

Recommendation 2*: pursue greater clarity as to who are the intended beneficiaries of smart technologies. Be conscious about the different kinds of user involved in chains of innovation, ranging from public institutions, utilities and corporations, through various professional practices, to actual consumers, communities and citizens.*

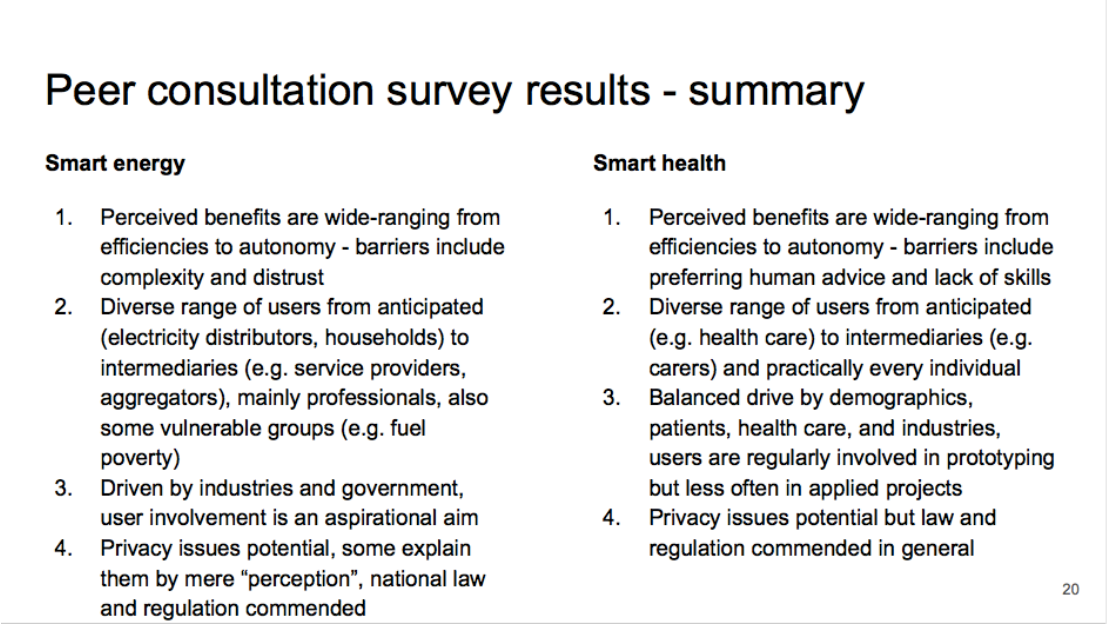
3. Citizen initiatives and movements may embrace 'smart' technology, differently from allegedly 'passive' lay users. Yet these experiences do not always generalise to the more sceptical and privacy-concerned population.

Recommendation 3: *provide resources for mapping, understanding and including the needs, interests and priorities of groups that frequently fall outside the scope of smart innovations: late adopters, vulnerable groups, minorities and poorer segments of populations. Such groups are likely have their own needs, different from those of early adopters.*

4. Privacy concerns are recognised by our peers - mainly addressed by national law and regulation, with a post-hoc focus, and the EU level is mostly overlooked.

Recommendation 4: *efforts are needed towards the creation of broader awareness, among general populations, of the privacy implications of smart ICT technologies. Such awareness can only to very limited extents depend on official awareness-raising campaigns, but must also rely on more bottom-up citizen movements and initiatives, including education in schools and universities. During the design of smart technologies, more proactive consideration of various societal actors and their privacy concerns are needed.*

The below slide shows some of the main findings from this module, split into the two thematic domains of health and energy:



Recommendations – Module 2: risks, rights and engineering

The main starting point for investigations in this module is the adoption of the EU General Data Protection Regulation (in May 2018) on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.The GDPR introduces two new procedures with potentially great implications for the nature and governance of data protection and privacy:

DPIAs - Data Protection Impact Assessments (art. 35)
DPbD - Data Protection by Design and by Default (art. 25)

Our main lines of inquiry focused on the following aspects: multidisciplinarity aspects in the development of Data Protection Impact Assessments (DPIAs) and Data Protection by Design and by Default (DPbD); how DPIAs and DPbD relate to the ways in which law operates and to notions such as rights and legal protections; the views of concerned publics and rights-holders on what constitutes their rights; how DPIAs and DPbD relate to each other.

Key findings and recommendations:

5. There are significant gaps and uncertainties about how to turn legal principles such as privacy and personal data protection into engineering goals and risk strategies

Recommendation 5**:** *there is a need to promote fundamental research and spaces and opportunities for exchanges of knowledge, experiences and ideas across the disciplinary and professional boundaries of engineers, lawyers, ethicists and social scientists involved in privacy engineering.*

6. There is a lack of organisational uptake of DPIA and DPbD in early stage design processes and by means of robust and mutual interdisciplinary checks where legal methodologies could have a more autonomous role; a 'cultural change' in engineering and management practices is required

Recommendation 6: *there is a need to foster greater understanding inside the organisations that are to implement DPIA and DPbD following the introduction of the GDPR. This should happen early enough in design processes and by means of interdisciplinary checks where legal methodologies could play a constitutive role of the multidisciplinary collaborations within which assessments of research and innovation take place. This is of utmost importance given the nature and sensitiveness of the fundamental rights and freedoms at stake, where breaches could have immaterial but equally detrimental consequences and go unnoticed. This recommendation is related to the previous ones.*

7. Both the risk-based and the design-based approaches are difficult to square with rights-based approaches used in legal practice, especially fundamental rights.

Recommendation 7: *In line with the above recommendations, there is a need to safeguard the role of law, legal methods, rationale and guarantees in the making of the risk-based and design-based approaches. This pertains to involvement of lawyers in privacy and data protection, but also extends more broadly to human rights lawyers and privacy activists, since they could play important roles in informing, strengthening and shaping these practices.*

8. We have found-out that it is very difficult to square engineering practices and languages with legal enunciations. We have reported on a significant degree of uncertainty about how to translate those that are polysemic concepts in law, ethics, morals, policy into concrete technical and mathematical language. Thus, the way rights become implemented, ultimately depends on discretionary decisions about ICT requirements. These, in turn, depend on a large variety of different engineering cultures. Translation of values related to fundamental rights and freedoms into technology seems to be possible only in presence of 'mediating concepts' from such cultures, bridging a gap between the legal and engineering spheres. Within Candid we have also noticed that considerations about ICT interoperability, multiple-purposes (policy, efficiency, market and societal) and functionality also intervene in such mediation.

Recommendation 8*: Opportunities are seen for a more autonomous role of law within techno-scientific innovation processes. Important lessons can be derived from case-law, pertaining to the crucial concepts to be assessed in Privacy or Data Protection Impact assessments like "risk", "probability", "harm", but also pertaining to the quality of the articulation processes itself. Other lessons could be drawn from fields like human rights impact assessment or environmental impact assessments, thus broadening the scope of privacy in relation to other human rights like data protection, discrimination and dignity on the one hand, and to sustainable technology development on the other. There is also a need for a firm embedding of design-based approaches to rights within "extended" ecologies of practice: a) with a co-producing role for SSH disciplines, right holders and publics and b) where checks and balances can be exercised: between different epistemic and normative commitments, between disciplines, and as provided for by robust legal guarantees.*

9. There is a tendency within both the risk-based and the design-based approaches to ignore the views, concerns and interests of data subjects and publics or to take them into account as an issue of consumer trust.

Recommendation 9: *greater policy efforts are needed to understand and include the views of data subjects, including in the assessments of potential harms to fundamental rights and freedoms such as privacy and personal data protection coming from major projects, policies and processing operations. Technological*

complexity should not be used as an argument for thwarting participation from the outset. Likewise, 'consumer trust' is poorly equipped to function as the sole or main organising notion for user involvement in technology development exercises that are likely to impact more broadly on fundamental rights. Whereas not everyone can be included in every decision, guardians, representatives and procedures can be included for more firm guarantees. Civil society organisations can play a role here, but cannot be the sole guardians. In addition, we would highlight an incisive role for contributions from SSH academics and practitioners, regulatory authorities (DPAs) and data subjects themselves.

10. It is not always clear which conception of the right (legal, ethical, public/social, ICT/security) is articulated in the design of the ICT technologies and who decides this.

Recommendation 10: *greater clarity is needed in defining the roles of the various actors involved in assessment and design-oriented activities to fundamental rights. Here, academic contributions, such as those provided by CANDID deliverables, have important roles to play*.

11. DPIA and DPbD are often crucially related to the issue of public trust and it is important that they do not evoke false expectations. This can happen if they are used with a very narrow scope, or as mere formal compliance checks. Here there is the danger that they might be used for "blue-washing" purposes, *i.e.* for painting a more positive privacy picture than is overall or actually the case.

Recommendation 11: *it is important to ensure that these tools are used in the right way, in the light of the justification for their introduction. This entails acknowledging the limits of what these tools can do, clarifying methodological as well as oversight requirements, and establishing a proper scope in terms of topic and benchmarks.*

12. Although the legal responsibility for harmful consequences to breaches of fundamental rights lies on data controllers, the decisions on how to integrate legal safeguards into technology, are often taken by actors other than data subjects (technology manufacturers, standardization fora, etc). In spite of this, the EU GDPR merely 'encourages' such actors to practice DPbD in product development rather than posing stringent obligations upon them[2].

Recommendation 12: *It is important to identify and attribute legal responsibilities beyond data controllers when actions undertaken by other actors in the technology and innovation chain can impact on the protection of fundamental rights and freedoms.*

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[2] Recital 78 of the GDPR states that "*producers* of the products, services and applications *should be encouraged* to take into account the right to data protection when developing and designing such products, services and applications and, with due regard to the state of the art, to make sure that controllers and processors are able to fulfill their data protection obligations."

Recommendations – Module 3: sensing infrastructures

The main goal of this module was to better understand the conditions that could facilitate collaboration between different epistemic networks in interdisciplinary work, specifically relating to Sensing infrastructures. Sensing infrastructures have the ability to record, encode and analyse physical attributes; that is, their sensations, by means of connected sensors, big data analytics, and the participation of citizens as codifiers or interpreters of this new source of *environmental pollution monitoring* and *disaster preparedness and management* within a context of smart cities. The module specifically highlighted the following topics:

1. Awareness: How sensing infrastructures change our understanding and approach to issues of common societal concern.

2. Participation: How citizens are empowered or put at a disadvantage through sensing infrastructures.

3. Fair machines: How ethical values are encoded in autonomous systems and who should be responsible for automatic decisions.

Key findings and recommendations

13. Our findings indicate that quite fundamental differences can be spotted inside the various professional and disciplinary fields involved in smart developments, most of which are nevertheless mainly focussed on science, engineering and management. SSH scholars tend to be more negative/critical than ICT practitioners. Whereas SSH scholars focus more on the present (realities), ICT practitioners focus more on the future (promises). Peers' consultation responses to our questioning often emphasise nuances, complexity, dilemmas: smart is an emerging field. Concerning collaborations between

Recommendation 13**:** *SSH scholars and research should continue to be included in smart ICT projects and developments, as a cross-cutting initiative in all parts of Horizon 2020 (and, we assume, in the coming FP9). The role of the SSH disciplines is mainly to provide better understandings of the contexts within which innovation occurs, including the nurturing and facilitation of more pro-active, reflexive and anticipatory practices. Further to this, SSH disciplines should also engage with technical innovators and actively reflect what innovation means in their development projects. Such understandings, and the societal and cultural meanings to which they point, are crucial if ICT innovations are to embed in societies in sustainable ways. There is, therefore, a greater need to safeguard the spaces for critical engagements and mutual learning to take place between SSH and ICT fields. For this purpose, the*

CANDID project has developed a primer on how to include SSH scholarship into the making and use of smart ICT technologies.