

Transdisciplinary approach to the Emerging **CH**allenges of **NO**vel technologies: Lifeworld and **Im**aginaries in **Fo**resight and **E**thics (TECHNOLIFE)

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Social imaginaries and ethical issues in deliberative processes Introduction and Summary of Results

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voting (see [D3.1](#))¹. This work package (WP4) focusses on the interactions that took place, including the uses of audiovisual media to encourage discussion and debate.

Domains of innovation

Biometry has been central to an emerging discourse of *securitization*, and the assumption that the movement of persons across the borders of a safer Europe will be adequately managed with biometric identification, detection and discrimination into categories such as “trusted traveller”, “threat to public order” or “illegal immigrant” (European Commission, 2008). Industry leaders have pushed for these developments in recent years and governing bodies have signed on (Lodge, 2007; Joint Research Center, 2005). Geo-visual and geo-information systems have disclosed the terrain as a “playground” for tracking and monitoring the movements and whereabouts of objects, persons and natural phenomena—of managing farmlands, residential developments, natural resources, law enforcement and disasters (National Research Council, 2007). These technologies also reveal future terrains through predictive modelling, in terms of risk and security, and how to manage the futures made possible with such modelling. Body modification and enhancement technologies disclose a future world of more capable, healthier and longer lasting bodies and minds, even *super-soldiers* and *super-intelligence* (see e.g. Roco and Bainbridge, 2002). One can argue that science fiction has for a long time played a major role in cultivating these visions, but so do recent developments in the use of implants, “smart” prosthesis, and advances in reconstructive surgery—i.e., what these developments currently deliver, but also what they promise the future can look like.

These domains of innovation are widely discussed in academic and policy circles, but they are also relevant to the lives of citizens who are, in one way or another, affected by latest developments. But the ethically contentious or “hot” political issues are not necessarily all that clear. The Technolife forums were set up to address that challenge, initiating discussions by offering participants to first view a short provocative film.² Each film draws on previous work by members of the consortium, i.e., three scoping exercises that identify ethical issues of concern in reference to dominant trends in technology and policy development (see [D1.1](#)³; [D1.2](#)⁴; [D1.3](#)⁵). Focus topics were suggested as well, however, participants addressed a wide range of topics and concerns, suggestive of what mattered to them to mention and reflect on (figure 1). *People* was the term used most often, then *technology* and, at the next three levels of use-frequency we observe: 1) *world, biometrics, maps, information*; 2) *human, future, life style, society* and, 3) *social, body, mind, change, time, capitalism, system, and power*. Indeed, one of our main findings is that even if participants relate to discussions that address common lines of reasoning about the technology domains in question, such as how to manage information and data protection or what the implications of enhanced humans might be, broader concerns were repeatedly raised about the direction of our societies, our lifestyles, capitalism and power. In the following, we explain our analyses of forum data and our evaluation of the online setting. We summarize our results but detailed discourse analyses are provided individually: [D4.1-Biometrics-Mobility](#); [D4.2-Digital-Globes](#); [D4.3-Body-Mind-Enhancement](#).⁶

Limits and affordances of online discussion and debate

The KerTechno tool differs from typical online blogs or discussion forums in the particular

1 <http://neicts.lanacs.ac.uk/pdf/Technolife-D3-1-DocumentationOfKerDST.pdf>

2 The Technolife films are also available at <http://neicts.lanacs.ac.uk/old/technolife-wp4.htm>

3 <http://neicts.lanacs.ac.uk/pdf/Technolife-D1-1-Scoping-Bio.pdf>

4 <http://neicts.lanacs.ac.uk/pdf/Technolife-D1-2-Scoping-GIS.pdf>

5 <http://neicts.lanacs.ac.uk/pdf/Technolife-D1-3-Scoping-Body.pdf>

6 <http://neicts.lanacs.ac.uk/old/technolife-wp4.htm>

purposefulness built into its design. Each forum was designed to hone in on the topics, introduced on the opening page, along with a brief introductory text and a suggestion to view the embedded short film first, i.e., before entering the discussion space for the first time. Focus topics were:

1) Biometric technologies

Social justice - *Can biometrics promote freedom of movement, security and justice? Could new mechanisms of exclusion and discrimination be built into these systems?*

Surveillance and privacy - *What does “privacy” mean for you? Could biometrics improve privacy and security at the same time?*

Trust in technology and in government - *Can governments and operators be entrusted with keeping our personal and biometric information?*

2) Digital globes

Trust in maps and images - *How can we know that images circulated on the web are realistic? And how can we know that maps of the future can be relied upon?*

Surveillance and privacy - *High-resolution imagery and increased capacity for seeing comes along with increased opportunities for surveillance.*

Equality and power - *Access to valuable resources and critical information could be limited to only those with influence and money.*

2) Body and mind enhancement

The final words of the movie are: “To me, normal is a state of perfection.” What do you think about this?

Freedom of choice and social difference: *If some people can afford to choose their bodies and minds, how could that change society?*

Forever young: *Can new technologies make us live and stay beautiful longer, or even forever? Will humanity turn into super-humans or cyborgs? What do you think about this?*

As figure 2 from the forum on biometric technologies illustrates, there are links to extra resources with information about the relevant technologies, information about the Technolife project, and more, as well as a list of participants who are logged in on the left-hand side. A dedicated facilitator attended to participants by asking questions, encouraging further elaboration on particular issues and, more generally, by attempting to direct the contributions toward the suggested focus issues. At the end of the designated period of operation, a voting tool was introduced and participants encouraged to vote on a set of questions extrapolated from their contributions.

Whether or not the KerTechno prototype is useful in deliberation and decision-making processes, it invites comparison with some of the online venues built in conjunction with local governance. Such purpose-built forums are based on the assumption that they can support participatory or deliberative democracy, however, the benefits are subject to doubt (e.g. Dunne, 2010). They are not shown to support direct democracy and they have failed to reverse the growing trend of political disengagement, for example in the UK, where such forums are specifically set up to do that. However, they often accumulate considerable amount of information provided by active

participants who, by definition, are engaged. In other words, they can serve as tools for crowd-sourcing; to accumulate opinions, concerns, attitudes, and the like, which is also characteristic of online repositories of information and virtual objects such as Wikipedia, YouTube and Facebook. Indeed, one of the key purposes for which the Technolife forums were designed, was to elicit participants' imaginaries, relating to the three domains of innovation.

That said, developments in computerised communication technologies were met with great optimism in the early years of the Internet. For example, Giddens underscores their role in societal developments toward globalisation (Giddens, 2000)—that there is a structural connection between

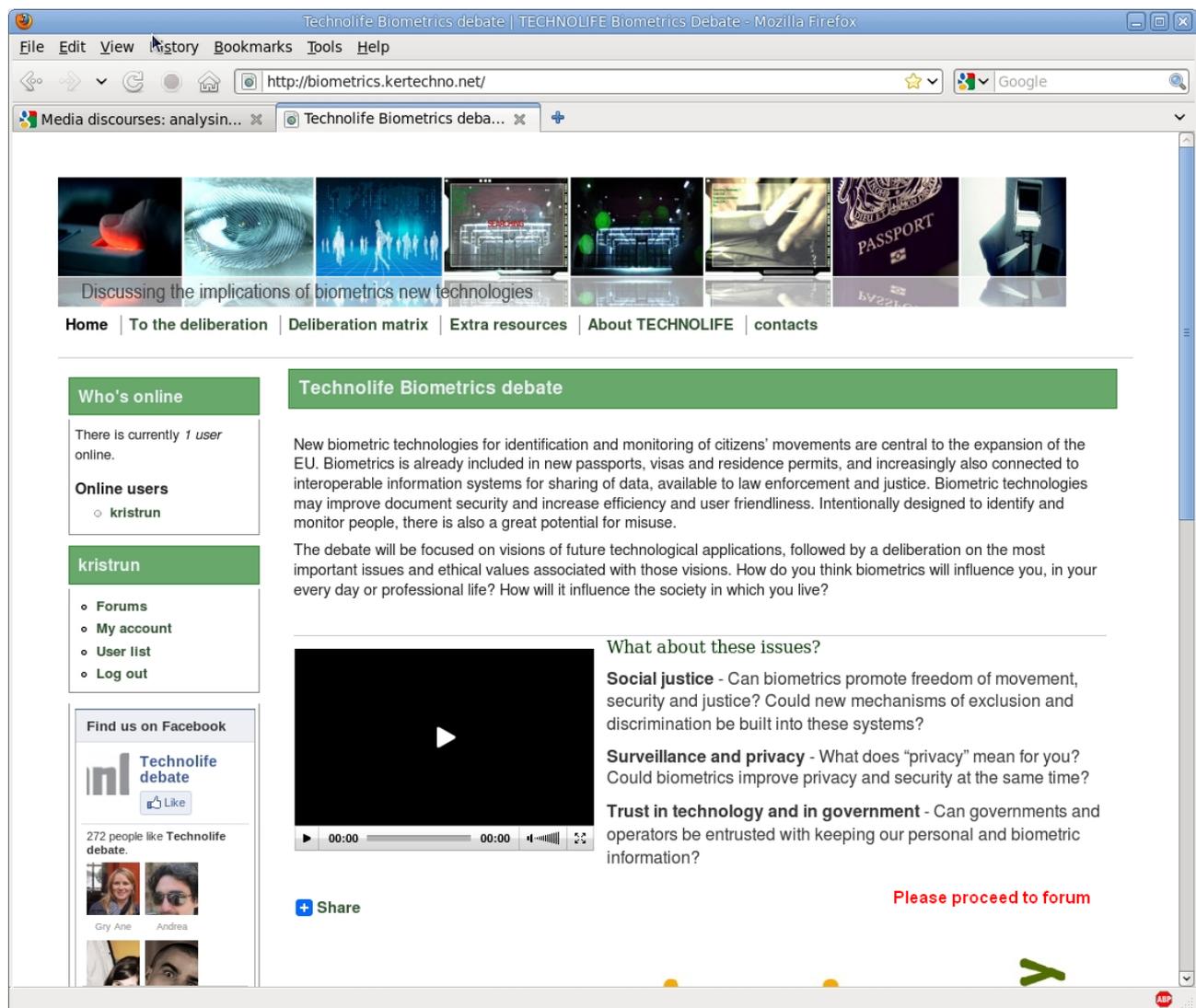


Figure 2: From the KerTechno “Biometric technologies” entry page.

the spread of a global information society and the expansion of parliamentary democracy across the world. He suggests that new resources are put to work by individuals and groups in the practices that can reproduce social systems, involving an assortment of institutional functions that comprise the apparatus of agenda setting and decision-making (also Giddens, 1986). Arguably, the mediations such technologies facilitate can be enabling of persons and groups, to restructure the world and ways to think about the future. They are promoted as avenues for discussion, for speaking to power, to mobilise political dissent, and so on, but they also reinforce stratifications and the isolation of certain demographic sections. Questions are raised about the extent to which new media and social media, or the technologisation of discursive practices more generally, can actually improve

democratic processes (Fairclough, 2003; Bauman, 2001; Castells, 2004). Current media trends involve the easy production, reproduction and dissemination of text, speech, sounds, music, images or video, but it is unclear how this proliferation of user-generated content sits with the optimistic view that people's interests, ideas, attitudes and concerns across the globe will find resonance and gain momentum. Anyone, in principle, can produce and disseminate media content, manifested for instance in the popularity of YouTube which demonstrates some new creative potential but also banality. Anyone can blog if they want to, set up a Facebook account to promote a cause, fight injustice, and so on. Arguably, one can ask then what the Technolife forums contribute to the plethora of existing forums and blogs.

Contributions were not restricted to a particular form, say, a 4-500 word narration or a particular set of media objects. Nor were contributions strictly anchored to predefined categories, tags and keywords, although suggestions were made to focus on specific issues. Rather, the data we analyse are an accumulation of free-form expression in text, some of which is associated with the focus issues or the contents of the short films, or they link up as “replies”, one to another, and thus form discussions or debates of a kind. We also we trawled the internet during the time period when the forums were in operation in order to address the question of what the Technolife forums contribute to online communication. Search filters were set up for each research line to capture references to key terms relating to the three innovation domains. This exercise was aimed at the blogosphere, to identify contributions that exchange information, express attitudes, concerns, and so forth. We examine the participation in the Technolife forums in relation to the wider online world, and explore the extent to which the Technolife focus issues find resonance.

Methods of analysis

We devise a *set of methods*, all of which fall under discourse analysis, however, with different emphasis on what to look for and different levels of granularity. We attend to argumentative strategies, categorisations and modalisation, as well as “event work”, i.e., the story-telling intended to capture a problematic of some activity or practice, and the emergence of macro-propositions. In part, we draw on a genre of discursive social psychology (e.g. Wetherell and Potter, 1988; Edwards and Potter, 1992; Potter and Wetherell, 1992; Billig, 1996). We draw on rhetorical discourse analysis, the work of Fairclough, 2003, on technologised/mediated discourse, Hodge and Kress, 1988, on the construction of facticity, Lakoff, 1987, on the practices of description, and Myers, 1998 and Myers, 1985 on knowledge claims, opinions and disagreement. We also draw on insights from studies in Ethnomethodology with which there is considerable overlap insofar as the forums can be treated as sites where coherence, reasoning, morality, values, or lack thereof, are locally achieved (Button, 1991; Garfinkel, 1967; Garfinkel and Sacks, 1970).

This approach allows us to explore the contents of each forum in great detail and to engage with our data in ways that can also shed light on the differences between the forums. For example, in the forum on Digital Globes, we attend to the evidence of participants consistently using casual “matter-of-fact” gestures to make their claims, to explain what they know and to project their visions. “Science is good”, “digital maps allow” for something and “children around Europe are logging their sightings”. Many of our participants have occupational associations with GIS-related technologies or they are scientists who can relate to the practice of map-making. In the forum on Body and Mind Enhancement, we attend to the evidence of participants producing macro-propositions, formulating incredible or impossible lifeworlds as well as doable and desirable ones. We learn that *perfection is untenable, an endless and flawed quest, and a lie to exploit consumer behaviours to market it*. We also learn that *body and mind enhancement is inevitable and will create previously unknown varieties so we should prepare for a widening range of human appearances and capabilities*. But in this forum, as well as in the forum on Biometrics and Mobility, our analytic

methods involve a detailed craft of attending to finely nuanced argumentative strategies, event work and the emergence of macro-propositions.

One can argue that examining discourse involves the abstract conceptualisation of the performative and constitutive roles of language-use, the historicity of which primarily points toward long-term power and knowledge relations. Closer look at localised and situated “talk” however—as for example in narrative analysis, critical or rhetorical analysis, conversation analysis, and related discourse-analytic trends—suggests that discourse is *action*, a practical and social activity. It does “things” and constructs “things” in the there-and-then of social activity. With respect to the Technolife forums, this “enactment of a discussion and debate” in the online forums is what we pay particular attention to, while we draw on a number of discourse-analytic traditions, in particular rhetorical discourse analysis. The reason for that lies in the ways in which “talk” (of all forms) is characterised by that tradition, as accounts embedded within a sphere of accountability. Accounts have a moral underpinning. They are oriented to others, can bridge between expectation and action, restore the estranged and repair the broken (e.g., Scott and Lyman, 1968).

The value of this analytic approach lies in addressing the key aims of drawing attention to 1) meaning-making and world-making efforts whereby matters of social and ethical relevance emerge and take shape, and 2) ordinary reasoning with which arguments, claims, doubt and questions acquire their legitimacy, authorship and authority. We also analyse some of the technologies of mediation. Much has been written on the different roles for online versus face-to-face deliberations in qualitative research (e.g. Schneider et al, 2002). There are obvious differences which turn on recruitment and participation, online and offline behaviours, and more. For example, online participants have time to deliberate their contributions which also means significant time lag between inputs to an exchange on some topic. Therefore, a sense of *having a discussion* or engaging in debate takes on a different experience from being face-to-face. Cultivating genuine interest in an online discussion can also be hard for a facilitator to manage in the absence of real-time eye contact, body language and other naturally-occurring methods that effectively engage people. But interactive media or so-called social media operate on the crossroads of physical, digital and virtual worlds. We were less concerned about the observed differences between online and face-to-face settings, than how to focus our analysis on the contributions we actually received and come to terms with the ways in which mediation contributes to our reading and evaluation of what we observe. Social media can be treated as a set of materially constricted interaction tools and, as such, they also draw attention to mediated performance or enactment which requires the same detailed attention to strategies of articulation, persuasion and control as would be required when analysing face-to-face settings (e.g. Buttny and Cohen, 2007; Myers, 1998; also Fairclough, 2003; Potter, 1996). In other words, participating in a Technolife forum (and observing it) invokes the performance of enacting just such an event. Finally, technologies of mediation are illustrated in the use of short films as a method to initiate response from participants. We have paid significant attention to their role by analysing their contents and exploring the contributions that are either a direct response to them or made in explicit reference.

With these considerations in mind, the analysis of forum data is crafted to address accountability in communication, argumentation and persuasion with thematic orientations drawn from topics that emerge in the ongoing exchange, albeit, they are anchored in the suggested focus topics. We acknowledge that the concepts of imagined communities and imaginaries of socio-technical development are central to the Technolife project, and with respect to the analysis of forum data, these concepts have a role insofar as such imaginaries or communities are recognisable in reference to matters addressed by participants themselves. There are questions of how communities or groups are articulated, explained or referred to by signification of belonging or imagined others. Strategies are used to depict futures with new and emerging technologies, communicate and debate them, some of which as for purpose and direction. There are considerations with respect to the very nature

of the socio-technical imaginary as being void of the frictions of socio-technical realities (see Jasanoff, 2003 on a similar issue).⁷ This becomes particularly evident in the forum on body and mind enhancement. Finally, there are methodological concerns to consider with respect to the socio-technical imaginaries depicted in the short films. The social semiotics depicted in the films, as well as their use in the forums, exemplify how meanings are made in the broadest sense, using text, speech, sounds, music, images or film, to co-construct and reconstruct the world and the future world (Kress and van Leeuwen, 2001; Wodak and Meyer, 2009). Methodological complications pertain to questions such as the extent to which the three films already presuppose particular attitudes, concerns and uses of technology, the extent to which they lead participants to more or less pre-given responses (similar to asking leading questions), or if they confine participants to a limited set of considerations. The Technolife team has stated that each short film was only meant to serve as an opening challenge (Rommetveit et al, 2013)⁸, and the films differ from the ordinary functions of common genres such as TV documentaries and science communication. They are composed to appeal directly to emotions and experience, rather than rationality and, in any event, there are significant limitations to measurable impact or prediction of perception, interpretation, use and re-use of this type of media.

Summary of findings

Although the Technolife forums address different innovation domains, there are a number of cross-cutting issues. Many of these issues relate directly to the forums themselves as venues for participation in discussion and debate. There are questions about Technolife as one among myriad of online venues, addressing same or similar issues. There are questions of participation as such, for example, why the forum on digital globes never really took off, while the other two accrued substantial amount of input. There are issues concerning the ways in which participants imagine “others” or signify belonging to a particular cause, a social group, etc., as well as lack of such signification. But, insofar as the focus issues are addressed, the key considerations pertain to reactions to the short films, how issues of ethical and social relevance take shape, and the breadth of disunity in reasoning and argumentation, as well as evidence of common ground. We divide our summary of findings into four sub-sections: “Technolife and the blogosphere”, “Summaries of participants' contributions”, “Issues of participation and belonging”, and “Ethics of imaginaries”.

Technolife and the blogosphere

Arguably, two of the Technolife forums represent a significant contribution to the English-speaking blogosphere: “Biometric technologies” and “Body and mind enhancement”. They reached comparable levels to the activity we searched for in the blogosphere during the same time period (see figure 3). Comparing the activity in these forums with the blogosphere puts the former into perspective in a number of ways but, mainly, it provides a background against which levels of activity can be assessed. The fact that two forums reach similar activity levels does not necessarily indicate that these forums had significant presence in the public sphere on the whole. It only shows that Technolife activity was neither more nor less than what was communicated in English elsewhere online on similar topics at the time. It is also evident from our analysis of the contents of online blogs, that similar concerns, opinions and attitudes are expressed in the Technolife forums, inclusive of a range of political and socio-economic dispositions. This finding is a good indication that the two forums hold a cross-section of free-flowing online communication among publics.

7 See also the Harvard hub (Sheila Jasanoff) for socio-technical imaginaries at <http://sts.hks.harvard.edu/research/platforms/imaginaries/>

8 Publication details added 2014.

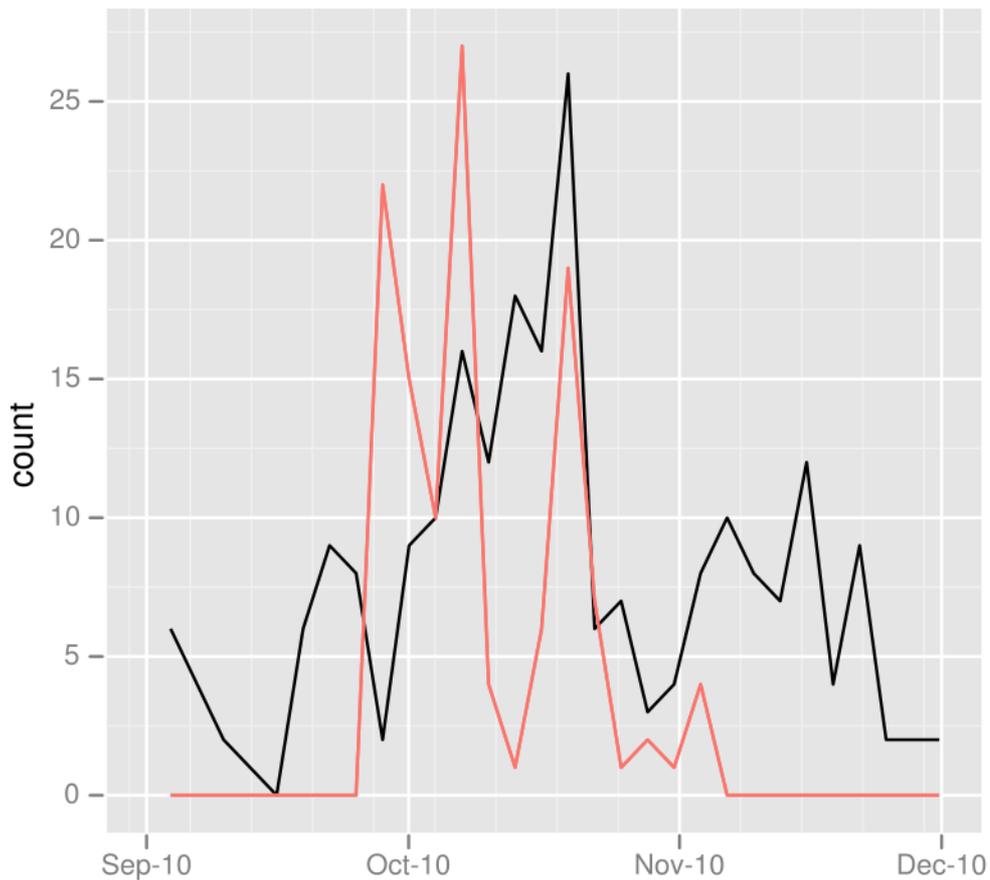


Figure 3: Contributions to the **Body and mind enhancement** forum (red) against the Blogosphere (black), accumulated via targeted search on BlogPulse and Google blogs

The forum on digital globes however, showed only a fraction of activity compared to the blogosphere (figure 4). There could be a number of reasons for this disparity. One reason is the fact that GIS applications are extensively communicated in the circles of experts who are involved in their development and use for a broad range of public sector and occupational purposes. It seems unrealistic, for example, to engage these experts in discussion about trusting maps. Their work is confined by regulations inscribed in transnational agreements on “best practice”, and they report extensively on progress, the use of particular software, methods, and so on. To ask them to question their scientific “turf” would not seem likely to encourage participation. Lay persons are also active communicators online about the creation of overlay files for Google Earth, for example, paths for hiking, cycling and other outdoor activities in remote terrains. We observe that there are concerns about the development of Google Street View and the ways in which maps of infrastructures and predictive modelling are used to promote particular actions. Also, the proliferation of mobile devices with access to global positioning is communicated to some extent online, i.e., the possibilities more than criticisms or resistance. But common discussion topics in the blogosphere are not well represented in the Technlife forum on digital globes. One reason for that could be the framing of the focus topics and the contents of the short film. The focus of the film is centred on the use of maps and predictive modelling in relation to global warming, floods, rising sea levels and volatile weathers. The focus issues centre on trust in maps and images, increased opportunities for surveillance, and the question of who has access to valuable resources and critical information. It appears that the focus of the film and the framing of focus topics did not attract many GIS experts, nor did it attract common lay interests in the creation and use of maps.

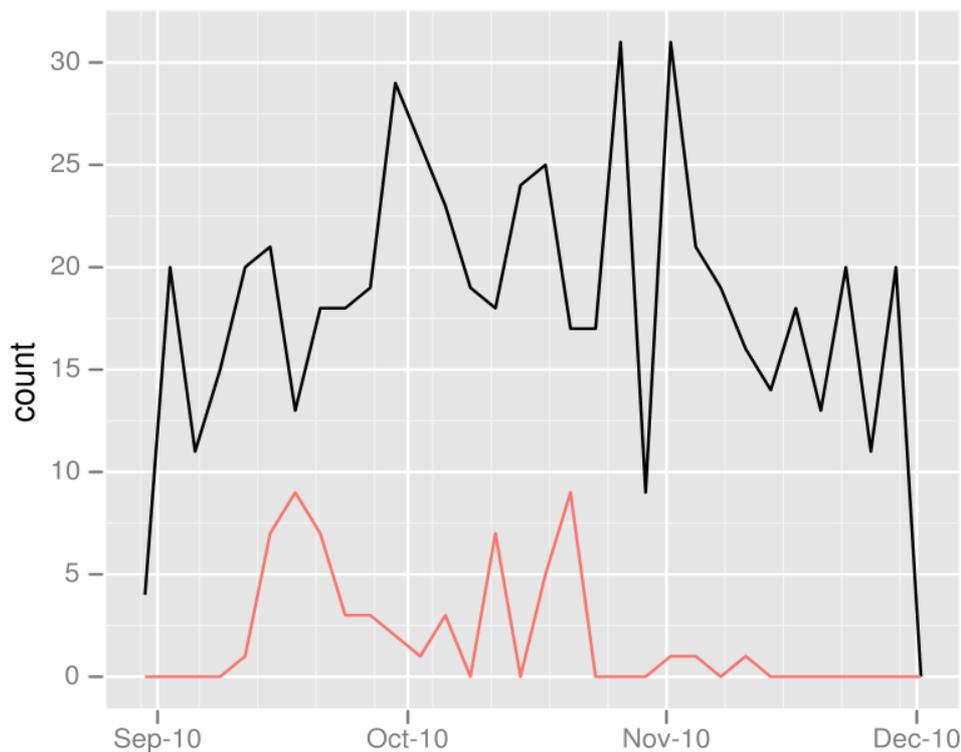


Figure 4: Contributions to the **Digital globes** forum (red) against the *Blogosphere* (black), accumulated via targeted search on BlogPulse and Google blogs.

Summary of participants' contributions

Responding to the short films: The ways in which participants respond to the short films varies significantly. In the forum on **Biometric technologies**, the film inspires considerably the discussions that follow. We observe how the film confirms to participants the assumption that biometric and other information technologies are necessary, that they are bound to occur because governments must be allowed to identify those who are a threat and ensure the continued safety and well-being of citizens. The uncertainties participants relate to, are primarily about who people are, the risks are associated with letting them pass through borders, the danger that someone wants to harm “us”, and the preferred means of control are to track individuals and collect information on them, including biometrics. Then we also observe how the film confirms to participants the assumption that biometric technologies are positive, interesting and good to have. However, these certainties about them are mitigated by casting doubt or asking questions. In particular, we see how new avenues are opened up for further enquiry because participants introduce – seek to foreground and confirm – assumptions which are perceived to be missing in the film: We need personal control over privacy. The technology is not safe. It can be abused or it still needs figuring out. EU law may not be adequately addressed, nor the EU objective of social inclusion. Uncertainties here are related to safety and decision-making in the operation of biometric systems. The risks are associated with potential identity theft and unfair exclusion. The danger is that potential problems in the use of biometry are not debated, and control is associated with the power to include and exclude, to control private information or someone else's identity. Finally, we observe how the film confirms to participants mistaken depictions of the world on the whole—depictions that do not adequately question computing systems, governance or the social and ethical costs we already pay in Western democracies for an obsolete socio-economic and political system. The critique here is that typical concerns about uncertainty, risk, danger and control never get at the “bigger”, the “right” and the

“real” questions of what the world needs, what people want, why technology is always central to solving problems, what meanings we actually attach to safety, a good life, and so on.

In the forum on **Digital globes**, the film does not invoke many direct responses and appears to be seen as somewhat unrelated to the focus issues. Only a handful of references are made to the film in participants' comments. We observe how the film supports the assumption that map-making can illustrate geographical, natural and cultural trends, in particular, with the contribution of citizens around the world, including children. The film also supports the assumption that science is good for prediction and to build rules and parameters to avoid the misuse of knowledge. Finally, we observe that the film confirms the assumption that there are conflicts over maps, land and environment, for example, when citizens use maps to push for or against developments around residential areas, even if they live nowhere near the site.

In the forum on **Body and mind enhancement**, we observe how the film is deemed unrealistic. In particular, the concept of “perfection” is repeatedly contested. One assumption we observe is that so-called “perfection” will bring humanity to boredom with no creativity or happiness, which then is challenged by the assumption that an unhappy creature is by definition imperfect. “Perfection” is also seen as a bad or ill-thought-out concept because we already modify ourselves for all sorts of reasons while the pursuit of perfection would be bound to fail. Offering “perfection” for sale is lying because there is always the more perfect among the “perfect”. Also, technology is not realistically depicted in the film according to some participants. The film confirms unprecedented technological optimism about body and mind enhancement. There are technologies around to help people with their eyesight, loss of limbs, etc., but the ways in which body and mind enhancement is portrayed in the film can only make people suspicious of technology. Then we observe that the film is deemed to be good and quite realistic about the near future. Wanting and seeking enhancement is not only normal but a real and obtainable objective. However, the film represents an underlying paranoia. The technologies spoken of have developed out of necessity: injuries, disease, and so on, and the film is wrong in its focus on the very narrow aspect of these developments which can be presented like the next gadget and from a pure marketing perspective. Enhancement is inevitable and fundamentally transformative of ourselves and society. It is pointless (or counter-productive) to turn the inevitable into an ethical or moral discussion. The real ethical questions pertain to good planning for future possibilities—to design a society that can accommodate a changing spectrum of human capabilities. For that we need to cultivate ethical reflection in the integration of enhanced humans, and governments should intervene primarily to hasten progress and ensure equal access. Finally, we observe that the film confirms that we need to ask how far technology should go to change the lives of citizens—living longer, fighting ageing-related conditions, and so on. It confirms the possibility of dangerous developments, a world where one might not want to live. It raises questions about freedom and choice versus social coercion to seek ideally enhanced bodies and minds. It confirms aggressive commercialism. An underlying paranoia is justified here, knowing that enhancement technologies will develop within the paradigm of a competitive market economy—a paradigm seeking mass-marketing potential which can only further exacerbate existing socio-economic divisions.

We observe that the short films encourage comments, i.e., the ones on biometrics and body/mind enhancement. They underpin a lot of the discussion and debate that follows, and some of the responses to the focus issues are on a continuum with responses to the films. As the focus issues take shape, participants also shift the aim of their contributions to address other questions they have, problems they see, concerns, and so on.

Biometric technologies: In relation to the three focus issues, we first see how questions of social justice are anchored in contributions which touch on issues of fairness, state abuse, technical system

errors, or the perceived necessity to apply biometric technologies to have control over dangerous individuals. Profiling and social sorting, detection of suspicious behaviours and terrorist threats, are some of the security measures that find expression in participants' statements. Best and worst case scenarios are weighted against each other to cast doubt on the effectiveness of the new security systems. More intrusive security is associated with high-risk individuals who need to be detected and controlled by governments. The power of the dangerous individual is seen to correlate with advancing technologies, and majority rule over minority to monitor everyone is recruited on the assumption that the majority really wants to be subjected to surveillance in order to be protected from a dangerous minority.

Questions of surveillance and privacy are anchored in concerns about respect for individuals, breach of privacy, having control or protection, trust, and the purpose of the technology, i.e., concerns which give “privacy” meaning and relevance. What counts as privacy appears notoriously difficult for participants to clarify except in reference to either breach or control—that persons have reasonable control over who can access them or information about them, what precisely is accessed and for what purposes. Having control however, appears to many participants to be void of meaning in a world in which most activities are easily intercepted, and any data that can be gathered is, in all likelihood, gathered by some agency, overtly or covertly, processed, disseminated, and so on. We also see that questions of surveillance and privacy are anchored in contributions that doubt if high degree of privacy is desirable. Who is a trusted traveller and who is a potential threat is recognised as a priority concern. Participants discuss briefly how to strike a balance between privacy and security, understanding the consequences of issuing personal/private information or being free to decide whether or not to give it away, having some protection, and distinguishing between different purposes for which the information is used (government, workplace, business). They raise questions about legality and confidentiality agreements, and discuss if private companies should be allowed to collect sensitive information, if one should give information away, simply if one is requested to do so, or if government agencies should be allowed to exchange the information.

The focus issue on trust in technology and in government overlaps with the other two focus issues, but it is more specifically anchored in concerns about the systematic sharing of information and knowledge which is achieved by organising and streamlining protocols, practices and connectivity for better synergy and data availability to various EU agencies and beyond. Participants discuss if this is the direction in which the use of databases is heading (including the use of biometry), and if data protection directives can actually protect citizens or if are they mainly smokescreens. Participants discuss if we can separate meaningful utilisation of biometrics systems from the centralisation of biometric data, and privacy-enhancing options came up, i.e., if data collection should be minimised or if the purposes for which data-use is permissible should be minimised. The issue of trusting governments draws attention to governing practices in relation to the individual, but also to the sorting of individuals into groups. Rather than perceiving strictly of governments as dangerous to individuals, participants point out the measures already in place (including the use of biometry) to sort people with implications for (in)equality, (un)fairness and (dis/in)crimination. Furthermore, participants discuss the risks when interest groups seek to further their purposes with respect to particular “types” of individuals, i.e., the “subsumption of individuals under certain groups [...] distinctions that are made more or less by random”.

Digital globes: In relation to the three focus issues, we first see how questions of trust in maps and images are anchored in standards of practice, scientific confidence of accuracy, as well as in subjective perceptions which can contribute to discussion/debate, education or to mobilise political action. For the GIS expert, there are requirements on collecting certain kinds of information. Data has to be extremely detailed and digital maps state data confidence values (not “truths”), on the basis of which “good” and “bad” maps can be judged. We see that the question is relevant, whether maps have ever been perfect. Primarily, they reflect perceptions and the skills of the actors involved

in map-making. As one participant put it, if one trusts the actors (their common standards of practice) one will trust their products. But, questions are also raised about what is being mapped, for example, antisocial behaviour and desirable neighbourhoods. Why not also desirable energy futures, social or technical (re)organisation or future collaborations? Furthermore, with the increase in crowd-sourcing to develop maps, the question of trust can be re-focussed to ask if we can possibly know what information to trust when there are so many contributors. The question is asked if the role of authorities, as certifiers of geo-referenced data, is challenged by increased crowd-sourcing and, if so, how is it challenged?

On the issue of surveillance and privacy, the main topic addressed in the forum pertains to Google Street View infringing on privacy. Also, visual analytics, based on the mining of mobility data, is brought up in the forum, a development which is under pressure to preserve the privacy of persons, however, one of its key potentials lies in building up profiles of mobile groups, of socially/culturally significant conditions and behaviour-related change. One perceived application is “smarter” traffic.

The issue of equality and power, is most widely addressed in the forum. Maps have been drawn to promote victories and glorify territorial triumph, and the question is asked if maps in the present can actually transcend colonialism and power struggles of the past. Participants discuss if digital maps can bring the world together, i.e., if they encourage cooperation on matters of development or the environment. But maps are also contributing to territorial and environmental conflict. For example, scientific and legal expertise can dominate the creation and use of maps on erosion in the planning of coastal development. Additional and more accurate data could be accessed by consulting families with residential histories but in coastal development, conflicts over maps are at the heart of debates on safety, liability, and so on. The map is a deliberation space for stakeholders, where the science-centric planning paradigm can be challenged, however, scientific and legal expertise tends to dominate. We also observe that, with geo-referenced data made available for free, participants see the social production of maps as enhancing of how we comprehend of territories, of social processes, of building up participatory projects and partaking in governance. The democratic nature of this development is important while participants also point out that user-generated content actually becomes the property of private enterprise. They also mentioned that neighbours can get into quarrels using Google as a public police station where they accuse each other of unacceptable construction, destroying heritage, etc..., or they use Google tools as a means to rally for the repair of deteriorated areas. Finally, freely available digital maps have implications for combating terrorism. In principle, one can get more accurate or inclusive maps by paying for them, while the freely available maps already have restrictions on freely available information.

Body and mind enhancement: In relation to the three focus issues, we first observe a lively debate reflecting on normal as a state of perfection. Participants discuss the uncertainties associated with “perfection”—objective perfection or socially-culturally defined perfection, in particular, what the implications of the latter could be. As one participant put it, this statement that normal is a state of perfection, “is so subjective as to lose all real meaning”. Participants discuss what “beautiful”, “happy” and “strong” can really mean to people when these are subjective qualities. Perhaps one needs to feel unhappy or weak to appreciate being happy or strong, and what does beauty stand for if no one is ugly? Participants also debated the idea of higher degree of conformity to certain body and mind types versus the belief that many people will not want the same for themselves as everyone else. The pressure to be special, unique and innovative is juxtaposed with pressures to conform—foregrounding the view there are always “counter cultures”.

The discussions touch on questions of haves and have-nots, visions of scarcity and post-scarcity, and the role of capitalism in creating the need (greed) and strive for perfection, superiority, and so

on, the “perfect” being an illusion that obscures the necessary comparison with the less perfect. One view is that crafting dystopian scenarios of haves and have-nots are artificially generated moral conversations, utilising new technologies to discuss ethics along economic class lines and in ways that seek to guarantee moral outrage at the ruling class. The discussions point out the unequal and unfair distribution of good and bad qualities already. The world is already unfair and enhancements can possibly turn that around, keep it much the same or exacerbate it. Finally, it is deemed misleading to phrase transhumanism in terms of “search for perfection” because it assumes that transhumanists are dissatisfied, i.e., persons defined by lack rather than what they have and are capable of. Enhancements should simply be obvious improvement options, possibilities which are hard to refuse.

On the issue of how freedom of choosing ones body and mind could change society, we observe a tension between the idea of having freedom to choose an enhancement or being under social pressure to do so. Social pressures can potentially result in less and less freedom to choose. But conditions in the environment also call for enhancements, for example, to traverse a particular terrain more easily, be able to use objects more effectively, and so on. The comparison with Second Life contributes significantly to this line of reasoning in the forum. One view is that enhancements are simply about widening ones capabilities, exceeding unchosen natural limitations to thinking, experiencing, physiology, etc., however, the options should preferably not be “one-size-fits-all”, whichever upgrade one has in mind. That could be dangerous, for example, in case of digital or biological attacks.

Participants begin to differentiate between therapy and enhancement in their discussions and raise the issue of sickness and death as naturally integral and essential to our existence. The view is also raised, that it is useless to deliberate the “goodness” of supreme health and enhanced intelligence. It is self-evidently good and the choices should be accessible to everybody. But we might have misconceived some of our ideas about perfecting imperfections like susceptibility to a range of common diseases which in fact are the consequence of environmental/societal problems. These imperfections would go away if everyone had clean air and water, enough space, naturally cultivated foods, access to basic medicine, and so on. Chances are that we choose enhancements that cannot change our societies, only deepen already entrenched societal and environmental problems.

We observe a lively debate on the question whether enhancement will only be for the rich, and to what extent we will see the trickle down effect. One view is that the enhancement of some does not make others obsolete, no more than giving one office worker a computer will make all other office workers obsolete. Eventually, all of them have computers to work with. Another view concerns the ethics of doctors and those who develop the technologies. Is “good health” first priority, are there minimum safety requirements, could the detriments be greater than the benefits, and how young is too young for enhancement? Enhancements could also raise dilemmas about the notion of “self”. But a common sentiment is that a freedom to choose ones body and mind will need to overcome intolerances, expand our perceptions or ideals of beauty, and embrace diversity, foregrounding the relationship between diversity and tolerance vs. homogeneity and intolerance. Participants express the view that regulation needs to focus on keeping enhancements from becoming a social necessity in the form of a product/market push. The distribution of benefits would be inherently flawed, although the argument goes, advancements will improve the health of all, prevent untimely deaths everywhere, and so on.

On the issue of whether living longer and staying beautiful will lead to super-humans or cyborgs, we first observe that participants consider the question of “normal” as gradually changing its meaning to connote, living as one pleases and looking which ever way one chooses. In other words, normal will become “variety”, possibly transcending conventional notions of beauty or perfection. Whether the future holds biological or digital varieties is left by participants as an open question.

We observe deliberations on developing digital personalities and going viral, as well as a future of regenerative medicine, molecular-scale tools, and the possibility of integrating artificial systems into the body. One view is that enhancement technologies are like any other assistive technologies. The boundaries of what counts as invasive are blurred or different technologies sit on a continuum, say, from eye glasses, to contact lenses, to laser corrective surgery, to the bionic eye. Another view is that distinctly invasive measures are disruptive in the sense that we will see permanent irreversible alterations of humans and socio-technical systems. There might also be too much anxiety about actually making and facing enhancement choices at the individual level. Developments would have to be carefully directed with rules, parameters and clear boundaries.

A substantial development in these discussions pertains to arguments which are highly critical of current dominant socio-economic and political conditions. Technological advancements are currently a proprietary business but the core of this critique seems to spur the idea that advancements will ultimately enable utopian conditions—a world in which there is no scarcity and only minimal if any cost of obtaining tools/devices or basic necessities. The model for this utopia is primarily taken from the success of open-source software, the changing computing capacity-price ratio over the years and the spread of mobile, smart, and personal computing to all corners of the world. Computing is also the reference point for high expectations of converging nano-bio-information-neuro-technologies, involving nano factories, self-replicating mechanisms and more. One of the consequences of this computing comparison is the perception that biotechnology will shift from generalised mass-marketable products, away from corporate enterprise, toward personalised technologies, open-to-all bio-recipes in a highly participation-based model, similar to how the open-source communities work. Such a development would counter the current “competitive edge” aspect of enhancement technologies. But another implication of this comparison with computing for the future of human bodies and minds, is that computing itself is seen to be on the brink of being internalised completely into our practices. It will eventually transcend all previous distinctions of groups and create an oracle which will be intelligent in its own right. One enhancement option is to be super-connected, another to be filled with cutting edge smart body and/or brain implants, still another to be “uploaded” into the super-connected system.

Although the pressure to go for enhancement is opposed by the argument that human and other biological systems could already be optimised, participants discuss the desire for immortality as an innate survival instinct. We will find new ways of pushing the envelope and no ethical values are both valid and, at the same time, big enough to hold back such advancements. Constant change is inevitable, however, through trial and error with some unintended consequences. Finally, participants suggest that we could have “natural” and “altered” sport realms. An “anything goes” category could do anything in order to create über-athletes—an “arms race” for the ultimate spectacle. The final verdict is that super humans and cyborgs will simply happen as the technologies become safe, the uncertainty still being whether we are actually ready for them.

Issues of participation and belonging

How participants respond to the social semiotics represented in the short films, and how they respond to the focus issues, reveals opinions, attitudes and concerns which are quite familiar in academic and policy circles. How much they respond, communicate and debate varies significantly, the forum on body and mind enhancements being by far the most used. Participants also appear to cover much of the existing spectrum of ethical reflection, in particular, in the forums on biometric technologies and body and mind enhancement. They debate and express disagreements, dissidence and resistance, and they seek a common ground. But the question remains if participants bring anything new to ethical debates associated with the innovation domains in question or if the forums as such contribute to the construction of an ethical framework for deliberation and decision-making

on matters of common interest. Participating in an online forum is social participation but it is unclear what such participation can contribute to political participation. We demonstrate the former in our detailed analysis reports, i.e., some of the obvious manifestations in the exchange between participants in which opinions or sentiments are formulated and issues of social and ethical relevance take shape.

The data we have that link the forums directly to the question of political participation appear, for example, in an exchange between the facilitator and a participant who asks what the purpose is of contributing to the forum on biometrics:

Ok, I salute your good will and effort to bring about some facts. But I am starting to doubt what is the point of all this discussion. To keep things simple: When can we expect to see their cards on table? Can you simply and honestly explain that from project financiers point of view? Are they just checking out pulse to launch something new or expect to maybe hear something new or just looking for a way to waste some more money in a grand scheme of buying social peace?

In a follow-up, the facilitator explains that Technolife is not representative of EU politics, that the purpose is to stimulate debate and identify ethical issues, all of which will be presented to policy makers at the European Commission: “[w]e are actually aiming at the widest range of ideas possible [...] also to get the opinions and “imaginaries” / narratives of people that are usually not considered expert...”. In other words, one objective of this exercise is to build up repositories of user-generated content. But the question of how these repositories, and the analyses of their contents, sit with official decision-making procedures is unclear. Public engagement such as focus groups, citizen panels, citizen surveys, etc., provide input to public debate. They pay service to the idea that decision-making on matters of common concern should be inclusive of wider publics, to communicate benefits and risks, and seek consensus on how to move forward. It is debatable however, to what extent such exercises can impact democratic decision-making protocol. For example, technology assessments lean consistently toward predefinitions of who the stakeholders are, and expert assessments on what the problems are, which issues need discussion and debate, and how to reach consensus. What the Technolife forums demonstrate however, is that publics can re-frame what the problems are, push forward their own agendas, and consensus is not the outcome. Rather, the forums demonstrate a struggle for meaning-making and world-making—in response to the films, in expressing opinions, beliefs and attitudes which are not fixed “out there”, but emerge in the exchange, tested and contested in communication with others.

The Technolife consortium made significant efforts to reach a broad spectrum of conceivable stakeholders, attempting to expand on conventional definitions of who should be included in a “public debate” (Rommetveit et al, 2013). Recruiting participants however, is a difficult task and the project did not succeed in achieving the ideal aggregate of participants for any of the forums. Participants are not statistically representative samples. The forum design is nevertheless a prototype for how an online discussion, debate and deliberation can be arranged and managed. It may be of some concern that who exactly the actual participants are is not entirely clear, i.e., which stakeholder group they belong to, which occupational group or political/social agenda. Indeed, one of the affordances of the Technolife forums is the choice to remain anonymous (more or less). Participants also avoid signifying whether they belong to a particular group or cause in their contributions, a prime example being the use of “we” and “our” in ways which would be hard to sustain in face-to-face settings.

On the basis of what we observe in the forum data, “we” is used as a referent for people or citizens in the most general terms: *we could get through the airport ... we are a 'good' citizen ... we all have to ... we currently live ... we should understand ... we are entangled ... we are a society*, and so on. These formulations ignore, for the sake of an argument, any shape of social sorting or differentiation, e.g., “[m]aybe the real question is **what we want**” or “the video and its topic

is **something we all have to relate to** in the future to come". Secondly, participants use "we" as a referent for a group of people or citizens in direct correspondence with expert or governance practices: *we are told ... we must allow ... we are constantly pushed ... we still don't know*, and so on. These formulations foreground negotiations (or lack thereof), the use of power and control (or resistance), trust (or lack thereof) and so on, e.g., "I do welcome this opportunity to easily identify people [...] **we must allow** the authorities to identify the people who are here illegally". Thirdly, participants use "we" when speaking with authority in ways resembling that of being a technical expert or a governance-related practitioner: *we will be able to ... how we changed ... we can focus ... if we avoid ... we know ... things we should do ... we first need to ... if we decide*, and so on. These formulations assume a position of authority, e.g., "**we will** [...] **be able to** analyse patterns of movement for criminal intent, and automatically more closely scrutinize those individuals" or "[w]e **know** that the potential for misuse is great".

These methods of reasoning are neither unusual nor unique. Most uses of "we" signify belonging indirectly and in ways which serve particular rhetorical and performative functions, steering clear of any obvious personal investment—a way of speaking "objectively" from a "neutral" standpoint. These uses of "we" are also illustrative of "significant others", for whom innovations are a success, a burden, risk, and so on. Then again, when beliefs, points of view, opinions, feelings and thoughts are articulated in first person, there is persistent lack of indication that those selfsame positions (or dispositions) belong to a particular named collective. As one participant put it, "[t]oday, too many common problems are experienced as 'my private problem'". It is somewhat surprising however, that these trends are not challenged. They go unquestioned for the most part, including the frequent use of the index "**they**" (or those, them).

Nevertheless, there are a few references to citizenship, e.g., "our" experience or practice (in a named country), singularity and post-scarcity as particular causes to speak on behalf of, scientist or GIS expert as a voice, and "*we*" the participants in the forum: *we agreed ... where we don't agree ... we're talking about ...* including responses to the use of "we" in the films and why "we" (the participants) are contributing to these forums in the first place. These last examples manifest the kind of social participation made possible online, of exchanging comments with other participants as well as with the facilitator. But the problem here is the way in which participation in the forums was conceived by the Technolife consortium. It suggested that members of various groups would contribute in the capacity of a group's shared concerns, or concerns arising in occupational and other capacities, i.e., voices emerging at the meso-level in society, rather than the sole voices of individuals in response to "private problems". Given how belonging is signified (or the lack thereof), this aim is not achieved. It also poses a problem for the question of legitimacy in a debate which would have impact on decision-making procedures. Innovators/industry leaders, policy-makers or politicians typically want to know who the individuals are who collectively co-construct a *centre of concern* which in this case are the Technolife forums on the development and uses of particular technologies. The fact that discussions stretched much further than the focus issues suggested, is an added value. However, leaving it undeclared who the authors are of particular contributions, or whom they represent, risks losing all relevance to policy debate. The counterargument would be that the forums, as spaces for anonymous "talk" and by virtue of their socio-material constrictions, afford participants unique freedoms. They afford political and policy professionals unique opportunities as well. Forum participants can address political and socio-economic issues which otherwise are marginalised, even radical views, all of which indicate the kinds of ideas and sentiments that are cultivated "out there", perhaps inadvertently and in part by long-term policy agendas. That, in and of itself, is a legitimate occasion to "listen" in and detect, in a cacophony of voices, new and emerging social-cultural trends, and what their implications might be for regulation and control.

Ethics of imaginaries

The analyses we have concluded in the individual reports, show that ordinary human reason is fully equipped with the building blocks and tool boxes needed to articulate, raise doubts, ask questions, and make substantiated claims about complex issues. Contributions acquire legitimacy, authorship and authority in their very construction, and in ways that are intuitively recognisable. Any so-called “faulty logic”, false claims or the fact that someone's views are always appalling or wrong in the eyes of someone else, is by no means more nor less obvious in these forums compared to other dialogical practices that depend on articulation and communication in writing.

Our participants, like all others, may not be aware of some fact, or they are not well versed in particular problem domains such as the ones addressed by the Technolife consortium. Relatively few are expert practitioners who hold in-depth knowledge. Lack of awareness and basic understanding can also be attributed to lack of transparency or poor communication on behalf of those who introduce and promote new innovations. As Wynne has pointed out (e.g. Wynne, 1992; Wynne, 1988), the framing of what the problems/issues are, and what should be debated by publics, is typically confined to the imaginations of scientific, technological, policy and institutional expertise. Media representations, popular culture, documentaries and other means of communication are not necessarily helpful either. They tend to lean toward hyperbolic expectations and/or depictions of threats on a relatively “narrow bandwidth”. They also foreground a divide between wishful thinking and what we actually know and what is actually possible. As one participant put it, hype is one of the biggest flaws of contemporary science and technology, and our participants ask where the progress is. In a number of areas, relevant to the Technolife forums, expectations have not been met in the past couple or so decades.

Nevertheless, both popular and expert representations of techno-science serve as screens upon which we collectively project depictions of our place in the world, our relationship with progress, for better or worse, where our societies are headed, and so on. This is well manifested in the Technolife forums. Firstly, it is a common sentiment that science and technology provide important solutions to societal, environmental and existential ills. For example, we can reflect upon our desire and strive for survival in a shared perception of enhancement technologies, even to a point where the only reasonable protest against them would be against some detrimental effect on the chance to survive. We can reflect on our right to political/environmental debate in a shared perception of digital globes as ideal spaces for such an activity. But there is also a common sentiment that an out-dated capitalist and scarcity-based socio-economic system is not the basis on which we should push for scientific and technological advancements. Advancements draw extensively on military technologies and commercial developments. The danger is that the dominant socio-economic model can never accommodate new innovations for maximum betterment and minimum detriment. If nothing else, ideology becomes the driver for advancement and the transformative purchase of innovations can all too easily get into the hands of governments, corporate enterprise or individuals with less than noble goals. For example, the question is raised if we seek to eliminate body and mind imperfections which are merely the symptoms of imperfect situations, namely, the radical product/consumer agendas of contemporary societies. The question is raised if Western democracies use biometrics to secure themselves from the enemies of democracy, whose grievances are merely the symptoms of “us” imposing on “them” oppressive non-democratic socio-economic regimes to support global capitalist and militarist agendas. So, the question is very relevant, to what extent there can be a widely shared vision of technology development that can benefit most people.

Notably, contributors to the forum on body and mind enhancement produced the largest amount of projections of this order in communicating the inevitability of progress through exponential growth in techno-scientific advancement, the role and viability of the dominant political and socio-

economic system, and the journey ahead toward a new world order which can accommodate super-bodies and super-intelligence. They produced numerous projections of how the betterment of ourselves or the world at large, can be improved with technology: enjoying life, understanding the world, helping humanity progress, and so on. Serious and tragic consequences were cast as exceptions, however, more research should be aimed at reducing them further. Contributors to the forum on biometric technologies produced numerous projections of futures in which governments fail to adequately control the impact of security technologies, fail to address the law and protect the rights and liberties of citizens. They also produce projections which are markers of social paranoia, depictions of dangerous minorities in an ever more dangerous world which draws attention to the viability (or sanity) of the current security rationale. Contributors to the forum on digital globes, produce projections of scientific standards, data confidence, open access and wide-spread cooperation. However, the viability of predictive modelling to reveal future terrains is subject to significant doubt, as well as the possibilities to maximize the democratic potential of GIS-related developments.

We also observe a pessimistic view overall, that more inclusion of lay knowledge in decision-making on techno-scientific advancements will not work, even if it is necessary to include all sorts of people either directly or indirectly in the development and deployment of new technologies. Democratic societies do not have mechanisms for all people to express their needs and concerns, or to have their insights included in the early stages of design and development. The emphases on productivity, profitability, image and performance also give rise to suspicion that there is no institution genuinely interested in improving lives. Dominant opinions are typically generated and cultivated among those with power and influence. As new and emerging technologies gradually penetrate every aspect of personal, occupational and public lives, policy-makers and governing bodies find new responsibilities in better communicating the innovations to the public. However, they are typically not interested in disunity among publics or a struggle for meaning-making and world-making which is very unlikely to lead to consensus, as we see happen in the Technolife forums. Understanding the risks and the benefits, and what to plan and regulate accordingly (and how) is the dominant orientation—and fully in accordance with deliberative democracy where public deliberation is central to legitimate decisions on what to regulate and how. Considering the innovation domains in question however, it is very difficult to “know” the risks and the benefits in the here-and-now—a condition that will continue to challenge the expectations of how these technologies can evolve over time and how their social and ethical implications can evolve. Our argument is that the ethics of imaginaries pertain precisely to the capture of the widest range of opinions and ideas possible—to capture the socio-technical imaginaries of people who are usually not considered expert, to capture their strive for coherence and world-making which is relevant to their own concerns. This can not be an one-off exercise. Rather, the ethical protocol dictates an ongoing practice that keeps coming back to publics on regular intervals. That said, we observe among our participants views with some currency that are ideological “no-go-zones”. They are likely to be ignored or played down in the foreseeable future, such as the considerable doubts about the desirability or even the legitimacy of Western socio-economic leadership, or the sanity of the dominant security rationale. It is thus questionable if consultation processes can result in motivated consensus at all or, otherwise, if majoritarian decisions are truly legitimate. Our view is that policy development will have to take on a much more innovative and evolutionary character than currently is the case, to meet the expectations of being an accountable democratic institution.

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