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SCIENCE AND TECHNOLOGY OPTIONS ASSESSMENT

Pathways towards responsible ICT Innovation

Policy Brief

Abstract

ICT has an immediate and broad impact on the lives of most individuals. Ethical scrutiny is not well established. Existing ethics review mechanisms are not suited for many of the ethical issues that ICT is likely to cause in the future. Europe has the unique opportunity to show international leadership by pointing the way to how human rights, ethical values and moral norms can be explicitly considered in technology development. The ETICA project (Ethical Issues of Emerging ICT Applications, GA 230318) provides the basis for a new enlightened approach to the development, governance and use of emerging ICT.

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The need for policy

Hardly a day goes by without news items relating to the misuse or ethically problematic application of Information and Communication Technologies (ICTs). Recent high-profile examples of ethical issues and controversies arising from novel or wide-spread use of ICTs include:

- Google Street View which has led to debate worldwide;
- Facebook, whose privacy and intellectual property policies have caused international concern;
- the UK identity card which caused considerable debate in the UK before being scrapped.

It would be desirable to have a better understanding of new and emerging ICTs and their possible ethical consequences. This would allow early reactions to ethical issues and thereby might prevent problems and scandals.

Understanding emerging ICTs and their ethical consequences

In order to facilitate a proactive approach to the ethics of novel ICTs, it is important to gain a sound understanding of which technologies are likely to be relevant and what their capabilities and constraints will be. While an exact knowledge of the future is elusive, one can study current work in research and development to gain a sound understanding of emerging technologies. This policy brief is based on the EU FP7 research ETICA (Ethical Issues of Emerging ICT Applications) which sought to develop a better understanding of emerging ICTs, the ethical issues they raise and the way these can be addressed.

The methodology employed to identify emerging ICTs was a structured discourse analysis of documents containing visions of future technologies. Two types of documents were analysed: 1) high level governmental and international policy and funding documents and 2) documents by research institutions.

The grid of analysis used to explore these documents is shown in the following figure:

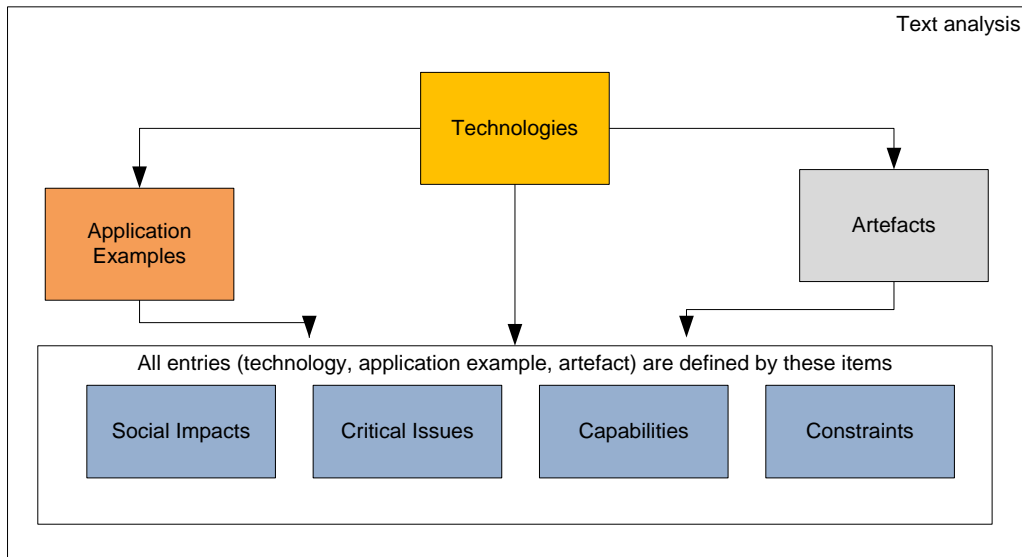


Figure 1: Grid of analysis for identification of emerging ICTs

During data analysis more than 100 technologies, 70 application examples and 40 artefacts were found. These were synthesised into the following list of emerging ICTs. The term "emerging ICT" is used for high-level socio-technical system that has the potential to significantly affect the way humans interact with the world. They are deemed to be emerging if they are likely to be socially and economically relevant in the coming 10 to 15 years. The ETICA project highlights the following 11 ICTs.

- Affective Computing
- Ambient Intelligence
- Artificial Intelligence
- Bioelectronics
- Cloud Computing
- Future Internet
- Human-machine symbiosis
- Neuroelectronics
- Quantum Computing
- Robotics
- Virtual / Augmented Reality

- power issues
- consequences of technology for our view of humans
- conceptual issues (e.g. notions of emotions, intelligence),
- link between and integration of ethics into law,
- culturally different perceptions of ethics.

This non-comprehensive list shows that there are numerous ethical issues we can expect to arise.

Evaluation

Evaluation of the emerging ICTs and their ethical issues was done from four different perspectives:

- **Law:**
The analysis was based on the principles of human dignity, equality and the rule of law. A review of 182 EU legal documents revealed that the legal implications of emerging technologies were not adequately reflected.
- **(Institutional) ethics:**
The earlier ethical analysis was complemented by looking at opinions and publications of European and national ethics panels or review bodies. The review furthermore covered the implied normative basis of technology ethics in the EU.
- **Gender:**
A review of the gender and technology literature showed that in the case of five technologies such gender implications had already been raised in the literature.
- **Technology assessment:**
This analysis asked how far developed the ICTs are and what their prospects of realisation are. The expected benefits and possible side effects were discussed as well as the likelihood of controversy arising from the different technologies.

The evaluation found that several of the technologies are so closely related that they should be treated in conjunction. Building on the criteria of likelihood of coming into existence and raising ethical debate, the following ranking was suggested:

1. Ambient Intelligence
2. Augmented and virtual reality
3. Future Internet
4. Robotics and Artificial Intelligence and Affective computing
5. Neuroelectronics and Bioelectronics and Human-Machine Symbiosis
6. Cloud Computing
7. Quantum Computing

This ranking will allow for the prioritisation of activities and policies.

Recommendations and governance

Current ways of dealing with ethics of technology, whether they are embedded in FP7 procedures such as the ethics review, or whether they are used outside of European funding, tend to be based on biomedical ethics. They have proven to be successful in many respects and they can guide action with regards to established ethical issues and legal requirements. However, the applicability of bio-medical ethics to ICT research can be questioned. It is not a priori clear that the aim of the technical development is justified. Bio-medical ethics is based on informed consent to research processes and it neglects the research product. Particularly within the EU Framework Programme, this approach has led to a tick-box attitude that sees ethics as a legal compliance issue, divorced from application context and broader societal discourses. This position contravenes much ethical thinking and ethical traditions. Our recommendations on governance and approaches therefore include recommendations to policy makers to provide a political framework conducive to a proactive engagement with ethics and to ICT researchers, organisations and the civil society concerned with the question of how to affect social reality.

Recommendations for policy makers

Policy makers have an important role in creating the regulatory framework and the infrastructure to allow ethics to be considered in ICT. If emerging ICTs are to be developed in a responsible manner that allows identifying and addressing the social and ethical problems outlined above, then a framework and infrastructure for the development of responsibility needs to be provided. Such a framework should cover at least the following three main areas of policy activity:

Provide regulatory framework which will support Ethical Impact Assessment for ICTs

- To raise awareness of the importance of ethics in new ICTs;
- To encourage ethical reflexivity within ICT research and development;
- To provide appropriate tools and methods to identify and address ethical issues;
- To address the wide range of current and new ethical issues arising from ICT, modelled along the lines of environmental, privacy or equality impact assessments;
- To allow ICT professionals to use their expertise in emerging ICTs to contribute to ethical solutions;
- To raise awareness of ethical issues regarding animals and environmental issues;
- To proactively consider legal solutions to foreseeable problems that will likely arise from the application of future and emerging technologies.

Overall, this set of recommendations addresses the institutional framework that will be required for further subjects to recognise responsibilities and develop mechanisms of discharging it. The idea of an "Ethical Impact Assessment for ICTs" was chosen because it provides precedent from areas of the environment, privacy, or equality. Such a framework is required to provide incentives to engage with issues of responsibility in innovation and emerging ICTs. It will thereby encourage discourses that will lead to the development of specific responsibility ascriptions.

Establish an ICT Ethics Observatory

- To collect and communicate the conceptual, methodological, procedural and substantive aspects of ICT ethics;
- To provide a community-owned publicly accessible repository and dissemination tool of research on ICT ethics;
- To give examples of approaches and governance structures that allow addressing ethical issues;
- To disseminate past and current research ethics and ICT including relevant work packages and deliverables and relevant National Ethics Committee opinions;
- To facilitate the Ethical Impact Assessment;
- To provide an early warning mechanism for issues that may require legislation.

While the first recommendation aimed at providing a procedural framework for identifying and addressing ethical issues in ICT, this set of recommendations aims to provide the content required for actual responsibility ascriptions. The work undertaken by the ETICA project, for example, provides important pointers towards possible ethical issues to be considered. Individuals involved in technical development are often not experts in these matters. A shared repository of ethics-related theories, practices, methodologies etc. is a necessary condition of the development of widely shared good practice.

Establish a forum for stakeholder involvement

- To allow and encourage civil society and its representations, industry, NGOs and other stakeholders to exchange ideas and express their views;
- To exchange experience between these stakeholders to develop ethical reflexivity in the discussion;
- To reach consensus concerning good practice in the area of ethics and ICT;
- To build a bridge between civil society and policy makers.

This final recommendation for policy makers points to the necessity of institutionalising important discourses that allow civil society and other stakeholders to engage on a content level with the policy as well as the technical community. Such a forum is required to ensure that responsible innovation covers not only specific technical interests and perspectives but is allowed to reflect broader societal concerns.

Recommendations for Industry and Researchers and CSOs

Industry, researchers and other individuals or organisations should adhere to the following recommendations in order to be proactive and allow innovation to be socially responsible. If the institutional framework, background, repository and societal discourses are there, then the conditions will be favourable for the incorporation of ethics and reflexivity into technical work and application usage.

Incorporate ethics into ICT research and development

- To make it explicit that ethical sensitivity is in the interest of ICT users and providers;
- To distinguish between law and ethics and see that following legal requirements is not always sufficient to address ethical issues;
- To engage in discussion of what constitutes ethical issues and be open to incorporation of gender, environmental and other issues.

The points of this recommendation aim to ensure that ethical reflexivity is realised within technical work. It furthermore aims to sensitise stakeholders to the difficulties of discharging their responsibilities

Facilitate ethical reflexivity in ICT projects and practice

- To realise that ethical issues are context-dependent and need specific attention of individuals with local knowledge and understanding;
- To simultaneously consider the identification of ethical issues and their resolutions;
- To be open about the description of the project and its ethical issues;
- To encourage broader stakeholder engagement in the identification and resolution of ethical questions.

This final set of suggestions aims to ensure that the different stakeholders realise that ethics is not a pre-determined and fixed structure. Ethical issues are context-dependent and need to be interpreted in the particular situation. Interpretive flexibility of technology requires the participants in a technology development project to engage collectively in the initial definition of ethical issues to consider, but also to review this initial definition continuously and engage with stakeholders involved in other stages of the technology development process.

Conclusion

This policy brief summarises the main findings and recommendations of the ETICA project. Implementing these recommendations will contribute to better and ethically more sensitive processes of technology development. By incorporating the views of all stakeholders the benefits of novel technologies will be maximised and ethical risks can be addressed early. ICT has now attained such a cross-cutting and central role in business, research and society at large that we can no longer afford to ignore its possible downsides. Following these recommendations will give the European Union the opportunity to show world-wide leadership and set positive standards based on its shared values.