Issues, Concepts and Methods Relating to the Identification of the Ethics of Emerging ICTs

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ABSTRACT

Ethical issues of information and communication technologies (ICTs) are important because they can have significant effects on human liberty, happiness, their ability to lead a good life. They are also of functional interest because they can determine whether technologies are used and whether their positive potential can unfold. For these reasons policy makers are interested in finding out what these issues are and how they can be addressed. The best way of creating ICT policy that is sensitive to ethical issues would be to be proactive and address such issues at early stages of the technology life cycle. The present paper uses this position as a starting point and discusses how knowledge of ethical aspects of emerging ICTs can be gained. It develops a methodology that goes beyond established futures methodologies to cater for the difficult nature of ethical issues. The paper goes on to outline some of the preliminary findings of a European research project that has applied this method.

INTRODUCTION

If we knew the consequences of novel technologies, then we would be in a better position to leverage or address them. Expected and unexpected positive results could be supported and strengthened while problems could be avoided or mitigated. An important aspect of the consequences of technologies is related to moral perceptions and ethical norms. In the area of information and communication technologies (ICTs), prominent examples of such issues are those of privacy, intellectual property, security and access. But how can we know these consequences?

This question is of central importance to policy makers who wish to be proactive in addressing moral and ethical issues. Despite its importance, it is an exceptionally difficult question to answer. The combination of uncertainty of the future, conceptual issues surrounding the very term **technology**, the potential infinity of issues and the problems of contextualising abstract issues combine to render ethics of emerging technologies all but intractable. And yet, giving up in the face of these problems is no viable solution either. Not exploring ethics of emerging technologies constitutes one possible choice in dealing with them. And this is arguably the worst possible choice.

This leaves scholars with an interest in ethics and emerging ICTs in the position of having to come up with workable solutions to finding out what possible issues may be, knowing full well that any result they produce may be more

than fallible. The present paper outlines a methodological approach that allows a robust, transparent and rigorous method of identifying the ethics of emerging ICTs. It starts out by describing how the technologies themselves can be identified. This includes a discussion of the different problems such future oriented research faces. On the basis of the exploration of these issues, the paper then presents the different steps of the suggested methodology. This leads to the question of the ethics analysis of the emerging ICTs. The conclusion will reflect on the limitations of this approach.

The paper presents and justifies the choices made by the consortium of the ETICA project, a European research project funded under the 7th Framework Programme. It explains the way in which the members of this project have come to a conclusion on these difficult problems. This does not imply that the solutions and methodological choices discussed here are the only ones possible. Despite the provenance from a particular research project, the paper addresses the general issue of methodology in ethics in technology and thereby makes an important contribution to the discourse on ethics in technology, specifically ICTs. It represents a contribution to epistemology and methodology in technoethics. It is important to note, however, that the epistemological and methodological problems discussed here are not merely theoretical but of primary importance of practice. Technology policy that wants to be informed by research needs to be able to rely on acceptable methodologies.

The paper is organised as follows. It begins by outlining the conceptual, epistemological and other problems faced by research into ethics of emerging ICTs. It then describes a possible methodology that is sensitive to these problems but nevertheless allows a transparent and justified view of such technologies. This leads to a brief outline of findings, which are then reflected on in the conclusion.

QUESTIONS IN THE IDENTIFICATION OF EMERGING ICTs

From an ethical perspective it is desirable to have an accurate description of the situation in which ethical issues are to be evaluated. This is true for most, if not all, ethical perspectives, including utilitarian consequentialism, Kantian deontology or Aristotelian virtue ethics but also for other approaches such as ethics of care or postmodern ethics. Much ethical debate is predicated by the assumption that all relevant aspects are known or at least could be known. In practice this is often not the case. The problem of uncertainty of ethical evaluation becomes inevitable when ethics is applied to something that is fundamentally uncertain. This is the case for future occurrences. The issue of uncertainty may be the most important reason why ethics is often weak when it is charged with evaluating future developments, including future developments in technology (Sollie, 2007). This section outlines the most important problems that research on ethics of emerging ICTs will face. These include conceptual issues, epistemological problems and the problem of ubiquity of ethical issues.

Conceptual Problems

All of the individual terms in "ethics of emerging information and communication technologies" can raise problems that need to be spelled out in order to ensure that the eventual methodology can be appropriate.

Emergence. The term **emergence** has a long history in philosophy and can be found in a number of other disciplines. Very briefly, it can be understood as a counterpoint to linear and predictable developments. Emergent phenomena are not easily predictable but develop from the interaction of components of a system.

Given this position, it is almost a contradiction in terms to do research to determine emerging technologies. They defy easy recognition by definition. There are, however, differences in certainty of knowledge about emerging issues that are related to the temporal frame in which they are investigated. We therefore concentrate on the time frame of 10 to 15 years. According to the European Commission's own view, funding for current research projects should lead to technologies on the market in approximately this time scale. Such technologies are currently being researched and developed and one can therefore say that they must be in a state of emergence that is relatively stable. This does not mean, however, that one can unambiguously describe them at present, which is partly caused by the nature of the concept of technology.

Technology. It is not the purpose of this paper to engage in the general philosophy of technology (Dusek, 2006; Olsen, Pedersen, & Hendricks, 2009). Characteristics of technology that one can typically find include a basis in structured thought, temporal stability and reproducibility, and a reflection in artefacts which may (but do not have to be) of a physical nature. Technologies are typically developed for specific ends. This raises the question of the relationship between technology and their application. It is easily conceivable that a particular technological artefact

can raise different ethical issues depending on their context and application of use but also on their conception and representation. This issue will be referred to again below.

An important issue related to the concept of technology is the question of interpretive flexibility. Interpretive flexibility denotes the property of technology of being constituted by use. It is a position that is opposed to technological determinism, which holds that technology has an observer-independent reality and will have clear and predetermined uses and applications. Proponents of interpretive flexibility argue that technology is not fixed but will develop during perception and use. The tenets of interpretive flexibility are widely recognised in science and technology studies where different positions such as social study of technology (SST) or the social construction of technology hold such views (Howcroft, Mitev, & Wilson, 2004; Bijker, 1997; Grint & Woolgar, 1997) and also in related fields such as Actor Network Theory (Latour, 2007; Law & Hassard, 1999). Some scholars distinguish between interpretive and interpretative flexibility with the former referring to the epistemological aspect of the social construction of technology and the latter being a stronger position that sees the construction as ontologically constitutive of technology (Cadili & Whitley, 2005).

Such questions are important for the overall theoretical background of the project because they rule out the possibility that there is one definitive answer to the question which are emerging technologies. There is a direct link between emergence and interpretive flexibility. Interpretive flexibility is a function of social interaction and pertains to particular discourses. That means that a technology may emerge in one context even though it may well be established elsewhere. It also means that the same underlying artefact can emerge into different technologies in terms of usage and application. Interpretive flexibility is connected to the social meaning of a technology, which requires researchers to avoid the technical determinist position and to consider the political and social framing of technological meaning.

From a methodological point of view it means that a plurality of viewpoints needs to be considered and that there is no guarantee that expert views are going to be the dominant or correct ones above all since expert discourses are framed by their field of expertise. This is relevant because in an initial step it will rely on published work on emerging technologies in order to identify and categorise these. It will thus draw on different discourses, many of which originate with authors considered **experts** in their domain but this expert status does not guarantee that the findings will be correct or complete.

ICT. This paper concentrates on information and communication technologies, mostly in order to limit the field of enquiry. There is, however, no clear and unambiguous definition of ICT. The terms **information** and **communication** are as complex as **technology**. Concentrating on ICT does rule out a substantial number of potential technologies but it leaves a large number. In addition, one can observe initiatives to realise the convergence of ICT with other technologies, notably biotechnology, nanotechnology, and cognitive technologies (also called NBIC technologies).[1]

Rather than attempting to provide a comprehensive definition, one can choose to be open to a range of views and technologies that project members or respondents perceive to be in the area of ICT. A pragmatic solution for a project that is funded by a European research programme is to define as ICT all those projects that are funded under the ICT calls. This does not rule out that there are technologies being funded elsewhere, including the FP that would fall under the definition of ICT.

Here the question is not only what ICTs are going to emerge but, more importantly, which ethical issues they raise. This requires a view of the concepts of ethics, and arguably of the closely related concept of morality.

Ethics and Morality. Moral philosophy has a long history and the range of possible meanings and theories are impressive. Again, there are diverse and long-standing discourses that the present paper needs to be aware of but that it will not bring to a conclusion. Ethics is related to questions of duty, justice, utility and many others. For Ricoeur, ethics is defined as the aim of a good life with and for the other, in just institutions (see glossary, **ethics** and (Ricoeur, 1990)). The problem arising from this multiplicity of definitions of the concept of ethics is that research the "ethics of emerging ICT applications" can mean a range of different things. Using Ricoeur's position, ethics of ICT could pertain to the question of the relationship between ICT and the good life, the impact of ICT on interpersonal relationships, or the question of the influence of ICT on justice and institutions.

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[1] The recent 2009 conference of the Society for Technology and Philosophy was dedicated to the topic of these converging technologies, see: http://www.utwente.nl/ceptes/spt2009/

Another way to address the question of how ethics and ICT may be related is to distinguish between **ethics** and **morality**. One possible way of defining the terms would be to say that ethics is a philosophical discipline that deals with morality, i.e., with implicit and/or explicit rules of moral human behaviour. Such rules deal with the respect/disrespect human owe to each other (broader: as well as to other (living) beings). This allows the distinction of the positive and observable fact of social morality from the justification and evaluation of morality. To put it differently, the distinction of ethics and morality allows a clearer view of another way of dividing up moral philosophy, namely as descriptive and normative ethics, which is often completed by adding meta-ethics.[2] Doing research on ethics of emerging ICT application could comprise all three of these aspects. It could be descriptive and try to capture moral perceptions, it could be normative in exploring theoretical questions and giving justifications of moral norms and values or it could engage in abstract theoretical considerations of ethical theories and addressing the condition of ethical issues determination and resolution. To some degree the XXX project will touch on all of these issues but it is important to note that they raise fundamentally different theoretical and methodological challenges. As a first approximation, one could say that:

1. Stage 1 (identification) is mostly descriptive
2. Stage 2 (evaluation) is normative in that it provides normative criteria for evaluating the outcomes from stage 1
3. Stage 3 (governance) is normative in that it analyses the condition required for ethical issue determination and resolution and provides recommendations concerning the condition that allow to determine and address ethical issues

The present paper will concentrate only on the methodology of the first two steps.

Epistemological Problems

There is no simple methodological algorithm to follow in order to achieve the aims of a foresight project, mostly because of the epistemological problem of understanding the future. The main question that needs to be asked of any method or approach is whether it contributes to the aim of providing a plausible account of possible futures.

Given the social nature of perceptions and uses of technology, one can say that the reliance on multiple methods, sources and approaches is desirable to overcome blind spots of any one method, source or approach. This includes a wide net of information sources that goes beyond conventional wisdom and includes what Callon, Lascoumes, and Barthe (2009) call **hybrid forums** by which he means local and non-authorised knowledge (or "experts in the wild") that supplements and in many cases exceeds official expertise. Support of this idea of the inclusion of non-expert and a wide range of stakeholders to understand technology and its development comes from other quarters as well. It is central to the idea of participative technology assessment (Joss & Belucci, 2002; Genus & Coles, 2005; Joss, 2002; Stephan, Wütscher, Decker, & Ladikas, 2004). From the perspective of the XXX project such a participative approach would have the advantage of being able to address not only issues of local knowledge and expertise but also of overcoming the question of what counts as **emerging** ICTs. Emergence could be observed in the interplay between different stakeholder groups.

The problem of a wide participative approach is that the scope of the project is too wide (ICTs in general) to allow a reasonable way of identifying all fields in which such technologies may emerge. Such participative research would also require large amounts of resources to undertake a generalised participative investigation of all emerging ICTs. Such a more general participative approach to ethical issues of emerging ICTs and appropriate policy and governance arrangements would be a desirable next step. There is also the problem of how to cover the entire range of European positions and views. Methods to achieve this aim are still very much at the experimental stage

It will nevertheless be important to allow a range of voices to be heard to complement the different sources used by the various work packages to validate the findings and to provide a **reality check** of the different aspects of the project.

Ubiquity of Ethical Issues

A further problem worth noting, a problem related to the epistemological uncertainty of the future, is that there is a potential infinity of ethical issues that arise from each technology. Each of the potentially infinite number of technologies can be used in a similarly infinite number of context and for an infinite number of applications. Each of those can easily lead to a large number of possible ethical problems. It seems fundamentally impossible to capture all of these and even more difficult to evaluate all of them.

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[2] See: http://www.moralphilosophy.info/metaethics.html

One possible way forward would be to try to become more concrete, by providing examples or applications of technologies which can then be evaluated. This is the approach used by scenario analysis. It would be interesting to do this but it is clearly impossible to do it for all emerging ICTs and all applications. Choosing a select number of examples to give an indication of ethical issues is likely to inject the researchers' bias into the further analysis.

Table 1 outlines the main problems scholars interested in the ethics of emerging ICTs face.

Problem	Description
Concept "ethics of emerging ICTs"	Lack of clarity of all constituent terms, i.e.: • Emergence • Information • Technology • Ethics and morality
Scientific justification of the methodology used to identify emerging ICTs	• Uncertainty of the future • Purpose of investigations of futures studies • Sources of knowledge about the future • Justification of chosen sources over others
Reproducible and scientifically acceptable link between emerging ICTs and ethical issues	• Potential infinity of ethical issues arising from technologies • Avoidance of bias in capturing ethical issues
Practical issues	• Workload • Delimitation and distribution of work • Knowing when to stop the identification and justification of such a decision

**Table 1: Core Problem Areas of Identifying and Evaluating Emerging ICTs**

THE METHODOLOGICAL APPROACH

Having now outlined the problems faced by scholars who wish to investigate ethical issues of emerging ICTs and the main aim of such an investigation, the current section discusses a way of achieving this aim.

Scope of the Investigation

The question of an appropriate methodology is closely linked to the truth claims that the researchers aim to generate from their research. It is therefore important to discuss the scope and limitations of the investigations. We need to underline that we do not claim to know the future and that we do not pretend to be able to achieve certainty about future developments. This then raises the question of what claims are raised and what the contribution of such work is.

In answering this question, we follow Cuhls (2003) who uses the term of **foresight** instead of **forecasting** in order to underline the difference between one-dimensional and multi-dimensional views of the future. In this sense, we describe here a foresight method that aims to provide a more detailed picture of ethical issues of emerging ICTs with a view to coming to a better understanding of what will be required of decision makers in order to ensure that future challenges are well met. The aim is not to describe the one and only real future but to come to an understanding of different possible futures. On the basis of a better understanding of possible futures, a selection is made of which one is either desirable or most important to consider for other reasons:
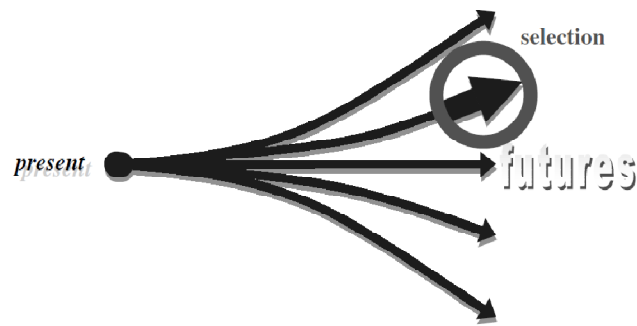
Figure 1: Selection of Future Option (Cuhls, 2003)

This understanding of possible futures and the development of means to determine which ones are in need of particular attention then allows concentrating on particular items and issues, which can be investigated in more depth. On the basis of this focus, governance arrangements and other policy advice can then be produced.

The aim of foresight activities is not to describe one true future but some or all of the following (Cuhls, 2003, p. 98):
- To enlarge the choice of opportunities, to set priorities and to assess impacts and chances
- To prospect for the impacts of current research and technology policy
- To ascertain new needs, new demands and new possibilities as well as new ideas
- To focus selectively on economic, technological, social and ecological areas as well as to start monitoring and detailed research in these fields
- To define desirable and undesirable futures and
- To start and stimulate continuous discussion processes.

This understanding of the aims of foresight fits well with the XXX project. It renders the entire project feasible because it underlines that there is no claim to a correct description of the future but only one to a plausible investigation of possible options and outcomes. This raises the question of how such a claim to a plausible description of possible futures can be validated: the question of methodology. However, before the methodology can be described in detail, some additional fundamental problems need to be addressed.

Identification of Emerging Technologies

The method described here is based on the idea that the closest one can come to identifying emerging ICTs is to capture the discourse (or probably better: discourses) on future ICTs that currently exist. This can be done in a bottom-up manner in the sense that the futures described in the literature are initially collected without much editorial control and are categorised according to criteria that are useful for the further development of the project (see section on analytical grid below). This approach is akin to the Grounded Theory approach in social sciences (Charmaz, 2007; Corbin & Strauss, 2008; Glaser & Strauss, 1999; Strauss & Corbin, 1997), which aims to refrain from an a priori theoretical framing of the research subject and concentrate on themes emerging from the data. While such a completely unprejudiced development of description of phenomena is probably impossible, the suggested method aims to follow this descriptive and bottom-up approach for the identification stage. Some of the major findings arising from this approach are quite predictable. However, the overall picture that emerges is less predictable and is also likely to underline details that may be as important or even more important than the headline technologies. The critical evaluation of this approach will then be undertaken in the two later stages. The following section provides more detailed description of how this approach will be implemented.

Choice of Data Sources

There is a rich literature on emerging technologies produced by futures researchers and foresight institutes. Such research, if of interest and relevant to the problem, has to contend with the difficulty that it is often driven by market interests and reproduces existing hype cycles. We therefore used this type of literature to compile a list of frequently named emerging ICTs as a benchmark but sought different sources of information to come to an understanding of emerging ICTs and their ethical issues.

It was decided to rely simultaneously on two interrelated but different discourses. One of these is the official governments' view of emerging ICTs as reflected by governmental research and funding strategies such as those of the European Commission and the National Science Foundation. These are contrasted with documents authored by established research institutions such as Ofcom and ISTAG as well as private organisations such as Microsoft or Siemens. Combining these two types of sources (see **Figure 2**) develops an understanding of expected futures by organizations that are in a position to substantially influence these developments.
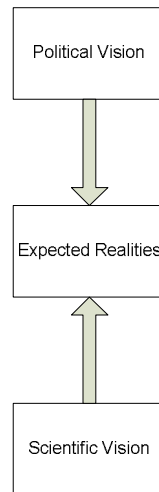
Figure 2: Sources of Analysis

The delimitation of data sources (suggested in **Figure 2**) justified by the fact it will give a good view of what is intended and envisaged by organisations that are in a position to enforce their view of the world. It should not be misunderstood as aiming at a true or verifiable prediction of the future. As with any future-oriented research, this project cannot offer such a prediction under any circumstance. What it can do is to aim to provide plausible possible futures to enrich discourses concerning desirable futures and possible ways to get there. In order to spawn such discourses, thought needs to be given to what aspects of the sources need to be analysed and in what way, so that the outcome of analysis is of relevance and produces novel insights.

After accepting the principal delimitation of sources to be analysed, a more detailed question is **which criteria documents must fulfill in order to be included in the data analysis**. The following criteria outline in our opinion the most important aspects of the source documents.
- Explicit attention to the core characteristics of technologies
  The "core characteristics" are those that allow the technology to have an influence on the way humans interact with the world.
- Length and breadth of vision
  Documents need to have the required temporal horizon (at least 10 to 15 years into the future) as well as a wide understanding of technology.
- Complementarity of sources
  The different sources need to complement each other in order to avoid blind spots. That means that sources from a range of national, disciplinary and other backgrounds need to be considered if they are available.[3]

Analytical Grid

The next step was to define the characteristics of technologies that are of interest for ethical analysis. Given the broad range of items described in the literature, ranging from large socio-technical systems that have the possibility of affecting almost everyone in most situations to very detailed ideas about particular items, it was decided to distinguish between technologies (high level socio-technical systems), application examples (the use of technologies for particular purposes) and artefacts (smaller scale technical items to be used for various purposes). This distinction proved useful but difficult to agree on in many instances, so that relationships between entities were added to the principles of analysis of the text.

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[3] An additional requirement is that the consortium has the language capacity required to analyse the source.

For all of these items (technologies, application examples and artefacts) certain characteristics were of interest. These include social impact, critical issues (i.e. ethical and legal questions), capabilities and constraints. **Figure 3** shows the principle of this data analysis.
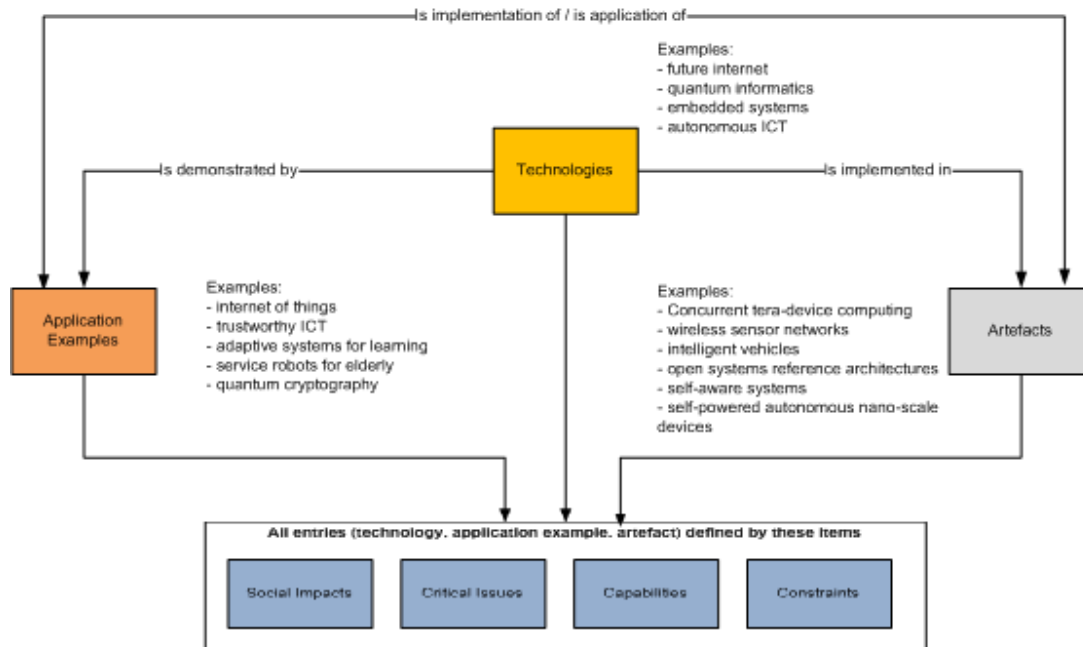
Figure 3: Categories of Data Analysis

During the data analysis it became clear that there was going to be a large number of technologies, application examples and artifacts that could be identified. In order to render these manageable and to facilitate ethical analysis and subsequent evaluation, it was decided to group the findings into general high level technologies. Given that an initial idea of the data analysis was to collect vignettes of technologies, i.e. illustrative examples for the purpose of rendering them less abstract, the name chosen for the high level description of the technologies was **meta-vignettes**. This is meant to illustrate the essence of a technology, the way in which it changes the way the technology affects the way humans interact with the world.

The analytical grid proved helpful in indicating which of the analyzed items were related and thereby pointing to the most pertinent ones. It provided the basis for the identification of top level technologies for which meta-vignettes were developed. For each of these top level technologies, the meta-vignette was constructed on the basis of the data derived from the analysis of discourses but also drawing on additional data. The structure of the meta-vignettes was:

- Technology Name
- History and Definitions (from discourse analysis and other sources)
- Defining Features (**essence** of technology, how does it change the way we interact with the world)
- Application Areas / Examples
- Relation to other Technologies
- Critical Issues (ethical, social, legal and related issues as described in the discourse)
- References

Validation of Findings

The method just described provides a transparent and justifiable way of identifying emerging ICTs for the purpose of foresight, as described earlier. It can nevertheless have blind spots because it relies on interrelated discourses by governments and research institutions. It was therefore decided to use several methods to ensure that the list of technologies was reasonable. These consisted of a set of focus groups with technology users, a survey of technology development project leaders, and a cross-check with an amalgamated list of technologies from current futures research.

CONCLUSION AND REFLECTION

The present paper gives an indication of the problems faced when undertaking research on the ethics of emerging ICTs and outlines a method that can be used to identify them. It thereby represents a foresight method that leads to a description of technologies that is suitable for further ethical evaluation. This ethical evaluation is one of several steps that will need to be undertaken. Each of the main technologies will be independently analyzed not only using traditional ethical analysis but also using cutting edge bibliographic techniques to explore possible ethical issues. This will be done using VOSviewer (http://www.vosviewer.com/) to analyze the discourses on ethics and ICT by looking at the most relevant recent publications.

In a subsequent step the list of technologies and ethical issues will then be explored from several angles including gender, law, and philosophy and technology assessment. This analysis aims to provide an evaluation and ranking of the most important technologies that policy makers need to be aware of. The final step of the project will then be an analysis of governance arrangements that are currently used to address ethics in ICT with a view to identifying suitable ways forward. On the basis of the earlier list of ethically significant technologies, the XXX project will explore how foreseeable issues can be addressed. This analysis will be used to inform policy advice to be given to policy makers on a European, national and industry level.

Following the steps outline here provides an academically justified way of doing research on ethics of emerging ICTs and providing policy advice to decision makers. We need to underline that we do not claim that this is the only way of achieving this aim. In fact, there are a number of alternative approaches to the same problem, some of them taken in related projects. We believe that exchange between these projects using different methods and approaches will contribute to a better understanding and thereby eventually to a better and hopefully more democratic way of dealing with emerging ICTs.

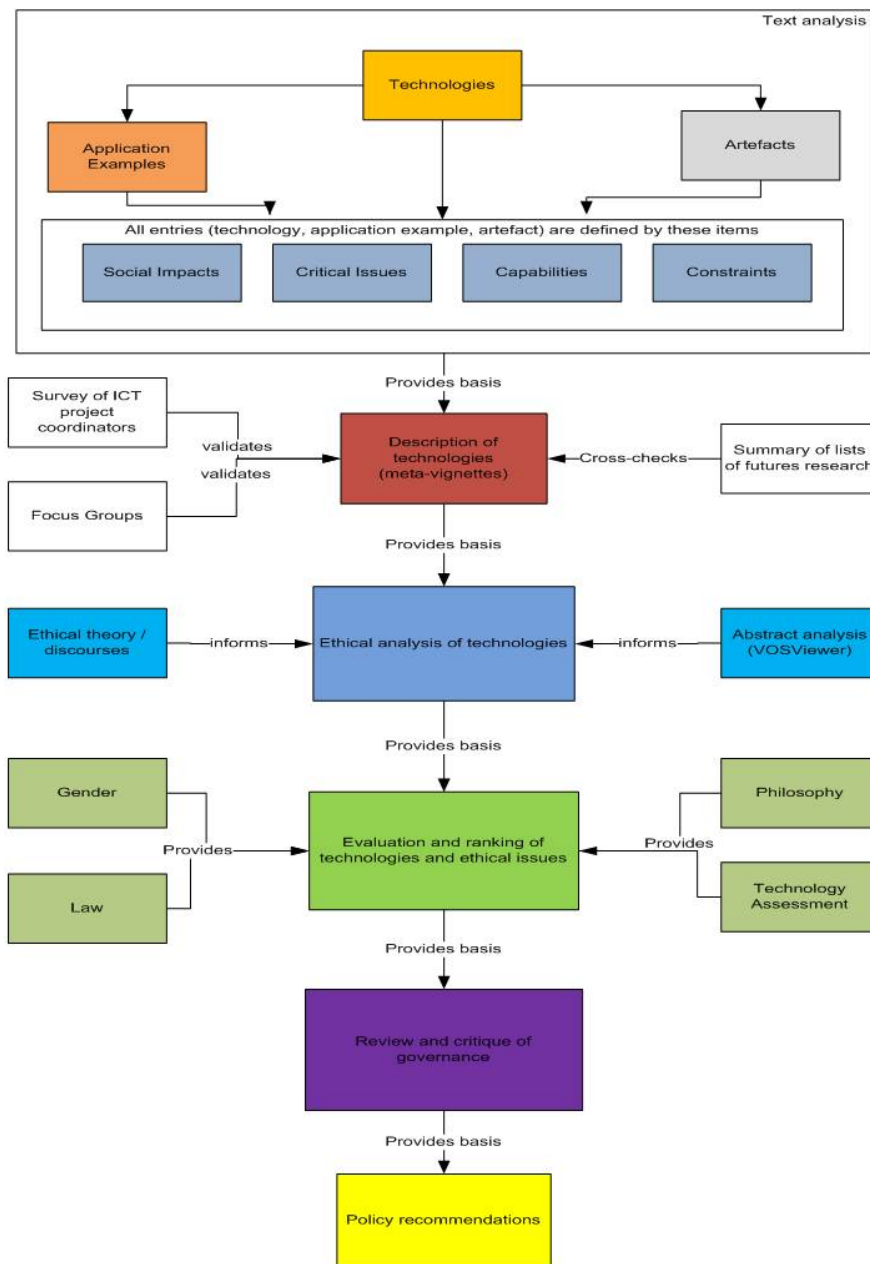**Figure 4** gives an outline of all steps to be taken in the project.

Figure 4: Graphical representation of all project steps.

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