# Principles and Approaches in Ethics Assessment

## Ethical Impact Assessment and Conventional Impact Assessment

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June 2015

**Annex 1.a**

**Ethical Assessment of Research and Innovation: A Comparative Analysis of Practices and Institutions in the EU and selected other countries**

***Deliverable 1.1***

This deliverable and the work described in it is part of the project *Stakeholders Acting Together on the Ethical Impact Assessment of Research and Innovation - SATORI* - which received funding from the European Commission's Seventh Framework Programme *(FP7/2007-2013)* under grant agreement n° 612231

**Contents**

**ABSTRACT**

This report aims to make a conceptual comparison of assessment approaches of research and innovation that focus on impacts, with special attention to ethical approaches. The report discusses two ethical approaches that focus on impacts, Ethical Technology Assessment and Ethical Impact Assessment. These approaches will be compared and contrasted with approaches in the broader fields of technology assessment (TA) and impact assessment (IA), including environmental impact assessment (EIA) and social impact assessment (SIA). Having a better understanding of the place of the new concepts within the family of previously developed assessment forms will help to contextualize the concepts within the existing field of procedural innovations around science, technology and innovation (STI) policy.

## 1 INTRODUCTION

The objective of this report is to make a conceptual comparison of different assessment approaches of research and innovation that focus on impacts, with special attention to ethical assessment approaches. The report will discuss general approaches to the assessment of impacts of research and innovation that have been developed in the past forty years: technology assessment (TA) and impact assessment (IA), including environmental impact assessment (EIA) and social impact assessment (SIA). It will also discuss recent impact assessment and technology assessment approaches that focus on ethical aspects. Two of these will be discussed in detail; Ethical Technology Assessment (described by Palm and Hansson 2006) and Ethical Impact Assessment (described by Wright 2011 and Wright and Morrini 2012). A comparative analysis will then be made between the different types of impact-oriented assessment approaches.

Having a better understanding of the place of the new ethical approaches within the family of previously developed assessment forms will help to contextualize these approaches within the existing field of procedural innovations around science, technology and innovation (STI) policy. The report is based on literature study, website and documentary analysis.

The report starts with basic descriptions of the four approaches that are central in the report: ethical technology assessment, ethical impact assessment, technology assessment and impact assessment (section 2). It will then compare and contrast the aims of these assessment (section 3), objects and levels of assessment (section 4), the institutional structure within which they are practiced (section 5), the ethical values principles and issues that are central in them (section 6), the procedures, methods and tool used in them (section 7). In section 8, conclusions are drawn and some more recent, promising approaches are discussed, including the techno-ethical scenarios approach (Boenink, Swierstra and Stemerding, 2010) and the approach of anticipatory technology ethics (Brey, 2012a, b). Section 9, finally, contains a list of references.

## 2 FOUR IMPACT ASSESSMENT APPROACHES

Impact assessment (IA) is a structured process for considering the social, economic and environmental considerations of proposed actions, at a stage at which there is still an opportunity to modify or even abandon them. It is often applied to large infrastructural projects, but there are also methods for assessing new industrial products. It is therefore, to

an extent, used in the assessment of research and innovation. There are two major types of IA. *Environmental impact assessment* (EIA) is an important type of impact assessment that predicts the environmental consequences (positive or negative) of a plan, program, or project prior to a decision to move forward with it. *Social impact assessment* (SIA) is a second major category that is concerned with the analysis, monitoring and managing of intended and unintended social consequences, both positive and negative, of proposed actions. Social impacts may include impacts on people's way of life and quality of life, culture, health, rights, property, safety, community and political systems. EIAs and SIAs are mandatory activities within a host of different international and European conventions as well as international environmental law.

While IA can be applied to any kind of project, policy, or plan, *technology assessment* (TA) is a form of impact assessment that is specifically developed to assess impacts of a new technology. TA investigates the potential and actual effects of new technologies on industry, the environment and society, evaluates such effects and develops instruments to steer technology development in more desirable directions.[1] TA makes such assessments on the basis of known or potential applications of the technology. It pays special attention to consequences that are unintended, indirect or delayed.

IA and TA are decades old. In recent years, there have been attempts to have varieties of impact assessment and technology assessment that focus on ethical issues. Two of the most notable ones are ethical technology assessment (eTA) and ethical impact assessment (eIA). In what follows, these two novel approaches will be compared with the approaches of IA and TA.

### 2.1 Ethical Technology Assessment

Ethical Technology Assessment (eTA) is an approach that describes how ethicists might become involved in a systematic way in technology development throughout the entire life-cycle of development projects. The aim is that ethicists should act as dynamic sparring partners for technology developers and decision-makers in confronting ethical issues that arise at different stages. The authors distance the concept from 'full' technology assessment and from any 'crystal ball ambitions' of predicting future developments. The authors' ambition is to provide a low-cost alternative with a realistic focus on the ethical implications of what is already known about the technology under development (Palm and Hansson 2006, 550). The added value is to facilitate social shaping of new technology through interplay between social values and technology development. The concept employs a checklist approach listing ethical issues for reflection supplemented with stakeholder involvement to help define the moral framework relevant for each individual project.

### 2.2 Ethical Impact Assessment

Ethical Impact Assessment (eIA) is an approach for contextualized ethical assessment of technology development projects by developers and decision-makers involved in the project. The framework also involves a checklist and stakeholder involvement. But in comparison with the eTA appraoch, the eIA framework attempts to device means of looking beyond what

[1] Grunwald, A., "Technology Assessment: Concepts and Methods", in A. Meijers, *Philosophy of Technology and Engineering Sciences. Handbook of the Philosophy of Science vol. 9.* Amsterdam: Elsevier, Amsterdam, 2009; Tran, T. and T. Daim., "A taxonomic review of methods and tools applied in technology assessment", *Technological Forecasting and Social Change*, Vol. 75, No.9, 2008, pp. 1396-1405.

is immediately known about the technology. To be sure, the eIA frameworks also seeks to avoid naïve attempts at 'predicting' developments. But it goes beyond the eTA framework above in that it attempts to import a greater understanding of the role that specific contexts play in limiting our current understanding of technologies. With such an understanding, assessors should better be able to think beyond the immediately obvious applications of the technology and imagine "how it is used or might be used in the future, not only by itself but as a component in a larger technological framework" (Wright 2011: 204)

## 2.3 TECHNOLOGY ASSESSMENT

Technology Assessment (TA) is a broad field of scientific and professional endeavors united by the ambition to help decision-makers harvest the benefits of technological development while avoiding harmful consequences. Well-established subtypes of TA include: Expert TA; Health TA; Industrial TA; Participatory TA; and Constructive TA with many more tendencies and sub-divisions developed over the years. Although arguable motivated by a moral impulse, TA has typically strived for a value-neutral role in between science and society.

From the beginning, a core goal has been to supply 'comprehensive' assessments of new technology and its implications by including a broad range of analytical perspectives in the assessment (Coates 1982). In this way, TA is often seen as a domain for the trans-disciplinary gathering of different sub-forms of assessment such as cost-benefit analysis and risk assessment as well as contributions from other forms of social and scientific analysis of technology (e.g. Decker and Grunwald, 2001). However, there is no strict, universal protocol for TA (Grunwald 2009), and individual technology assessments often narrow down to focus on specific aspects of possible impacts. Such narrowing down may be the result of an explicit appraisal of the political context (Klüver 2004), or it may be driven by implicit factors such as research interests, institutional missions, or values (Palm and Hansson 2006).

Institutionally, TA can be found in national and transnational policy arenas (as Parliamentary TA or Policy-oriented TA, both shortened PTA), in the health sector (as Health TA, HTA) in the business sector and in labor unions, (where the objective is to assess the value-added of new technology), and in academic research (science and technology studies, philosophy of technology, and other disciplines).

## 2.4 IMPACT ASSESSMENT

Impact Assessment (IA) is a field of analytical activity aiming to identify the future consequences of current or proposed actions through impact prediction or forecasting and to assess the environmental and societal significance of those impacts. IA includes as important subsets environmental impact assessment (EIA) and Social Impact Assessment (SIA).

The "impact" (or "effect") is typically defined as the difference between what would happen with the action and what would happen without it. IA is a tool helping to make the best possible decision about the action using the best available information in a systematic and proper manner. One of the most important features of IA is that the assessment should be adaptive; therefore it should be included in the all steps of a project-cycle. An impact assessment may concern the effects of actions on environment, society, or more specifically on ecology, biodiversity, human rights, health, culture, gender, etc. There are therefore different types of impact assessment, where the most well-established are EIA and social impact assessment SIA. Professional standards and networks are established at international

and regional level, and EIA's and SIA's are mandatory activities within a host of different international and European conventions as well as international environmental law. Other sub-types of impact assessment include human rights impact assessment, health impact assessment, gender impact assessment, privacy impact assessment, and more.

Of the subtypes mentioned, SIA is most closely related to ethical assessment as it explicitly deals with societal values. The greatest advantage of SIA is seen to be its holistic approach, which goes beyond predicting potential harms. SIA encompasses also 'empowerment of local people; enhancement of the position of women, minority groups and other advantaged members of society; development of capacity building; alleviation of all forms of dependency; increase in equity; and focus on poverty reduction' (Vanclay, 2003)

# 3 AIMS OF THE FOUR APPROACHES

The concepts and fields compared here have many shared aims, but also include basic assumptions and historical experiences with the art of assessment that create differences of emphasis and divergent orientations. Schematically, these overlaps and differences can be roughly indicated as follows.

| | Predicting consequences | Avoiding harmful consequences | Facilitating participation | Addressing societal challenges | Social shaping of research and innovation |
|---|---|---|---|---|---|
| **eTA** | | | X | | X |
| **eIA** | X | X | X | X | X |
| **TA** | X | X | X | X | X |
| **IA** | X | X | X | | (X) |

## 3.1 PREDICTING CONSEQUENCES

At the beginning of TA and IA in the 1970's, both fields shared in the ambition of developing methods for forecasting to identify the consequences of societal developments. At the core of this ambition were strong assumptions about the predictability of societal development through scientific trend analysis. TA obviously had technological development as its primary object of analysis while IA emphasized political planning. These focus areas, however, led naturally to overlaps in areas such as infrastructural modernization and long-term investments in research and innovation.

Over the years, In both fields the strong concept of 'prediction' was gradually replaced by the softer concepts of forecasting and foresight as a growing realization of the complexity of social developments, including scientific and technological progress, became embedded in the frameworks of understanding guiding method development. In TA, a gradual division of labour developed in which TA proper became ever more concerned with shaping technology development through dialogue and reflection, while the foresight community separated to focus on further development of forecasting methodology. Still, scenario workshops and road-mapping remain key tools in policy-oriented TA. In IA, assessors focusing on the biophysical and economic effects of infrastructure and similar projects – such as EIA, health IA and life-cycle analysis - have retained a focus on methodology for anticipatory analysis of consequences, while those forms of assessment that focus on the 'softer' – such as SIA, gender impact assessment and others – have gradually come to emphasize more cultural and dialogical forms of assessment. Ardent promoters of participatory approaches even turn the tables on the question of prediction, rejecting the notion of development as an independent

variable in any form and replacing the ambition of prediction entirely with that of 'co-creation' of the future through 'shared learning' and 'strategic intelligence' (Lundvall B. 2007) Today, the friction between these two paradigms is a constant feature of both TA and IA. On the overall, though, the forecasting element remains stronger in SIA than in, for instance, participatory TA.

In the two concepts treated here (eTA and eIA), we can recognize this pattern very clearly. Both concepts make a point of disavowing prediction as an ambition, substitute participation in its place. But the rejection has different degrees. eTA would reject prediction entirely while eIA would seek to retain some elements of imagining possible futures through systematic reflection, mirroring the pattern in the broader fields.

### 3.2 AVOIDING HARMFUL CONSEQUENCES

Avoiding harmful consequences of developments in science, technology and innovation are central to all of the assessment concepts and fields compared here, but many different approaches are found.

In the original conceptions of TA and IA, the aim of avoiding harms from technology and infrastructural development was the real motivation behind attempts to predict the long-term consequences of these developments. But as described above, experience and methodological sophistication gradually limited the timeframe of prediction as well as the perspectives in which prediction was even attempted. Assessing risks of harmful influences remains central to biophysical risk assessment as well as legal impact assessment and economic risk-benefit analysis. But when it comes to the long term, predicting harmful consequences have proved difficult. These methodological realizations have led to an increased focus on on-going monitoring of impacts and towards interactive and iterative governance of technology. On the overall, TA emphasises interactive governance more than IA just as IA emphasises quantitative monitoring more than TA. From a policy point of view, the two approaches should most likely be seen as overlapping segments of a continuum of approaches.

The concept of eTA does not in itself include measures for biophysical risk assessment. On-going reflection on ethical issues is here seen as an activity aiming to supplement 'full' TA with low-cost adaptive issue identification. The concept does not describe in-depth the possible connections to the broader domains of TA and IA, but it would likely be possible to see eTA as a type of scouting activity, proactively identifying issues to be submitted to more thorough TA or IA analysis. In contrast, the eIA framework explicitly includes 'avoiding harm' as one of its four pillars of reflection, again mirroring the concept's slightly closer proximity to the field of IA over the field of TA.

### 3.3 FACILITATING PARTICIPATION

At the outset, TA was an expert undertaking aiming to provide political decision-makers with a broad picture of the potential developmental pathways, societal impacts and strategic value of broad programs of technology development. Societal tensions concerning the direction of such development, however, led to the emergence of so-called participatory TA. The difference is first and foremost in the emphasis on inclusion of citizens and other stakeholder. But this translates into a more open and creative exploration of alternative pathways beyond those proposed by scientists and innovators. There is a constant struggle in participatory TA to implement participation early, i.e. at those stages where public funding is being allocated

and political framings are being negotiated. Often, however, participation is pushed downstream towards the implementation stage. We can easily recognize this struggle in the upstream concept of eTA.

IA has undergone a similar 'participatory turn', but this has arguably been accompanied by an implicit division of labor between 'hard' IA (biophysical assessment) and 'soft' IA (assessing impacts on lifestyle, culture, community, quality of life, mental and social health, political systems, human rights, and more). Institutionalized versions of IA typically emphasize all aspects on paper, but do not systematically utilize participatory methods. Less institutionalized forms of especially SIA in contrast use community-based and consultation methods extensively. The struggle here is to have 'soft' aspects and analysis achieved through participation recognized on the same level as expert analysis of 'hard' impacts, e.g. through 'integrated' IA. In this regard, the eIA approach has a clear family resemblance with participatory versions of EIA and SIA.

### 3.4 ADDRESSING SOCIETAL CHALLENGES

The aim of addressing societal challenges through assessment is closely related to constructive TA (CTA). The concept of constructive (or innovative) TA, which has been under continual development since the 1980's, implies a shift in attention towards the core processes of technological innovation and how to steer these processes to ensure societal benefits. The end goal remains the same as in 'original' (or 'expert') TA, namely to harvest the benefits of technology while avoiding the potential harms stemming from it. But the means are different. Rather than reacting to initiatives taken by technology developers and assessing potential pitfalls, constructive TA seeks to develop practices that enable technology developers to orient their efforts directly towards societal goals and towards addressing societal challenges while being aware to avoid potential dangers. With the dwindling belief in the ability of assessors to predict external consequences in the long term, what comes into focus in CTA is the question of *responsible processes* as a guarantee of desirable impacts.

Both the eTA and eIA approaches are strongly influenced by this turn towards proactive, problem-oriented TA as both concepts seek to implement reflection directly in the innovation process as a self-governance function of development projects. The eIA approach, drawing on IA's remaining emphasis on impact prediction, does tend to weigh attempts at forecasting negative impacts. But ultimately, these forecasting elements are best understood as methods to ensure responsible procedures rather than actual attempts at 'true' prediction.

### 3.5 SOCIAL SHAPING OF RESEARCH AND INNOVATION

Ultimately, participatory TA, constructive TA, 'soft' EIA, SIA, cTA and cIA all share a common intention of facilitating the social shaping of research and innovation. Granted, research and innovation are seldom the specific objects of IA where they are seen as part of a broader set of factors affecting the impacts of planned action. Nevertheless, in the broader picture of science-in-society, IA is often coupled to strategic planning in which research and innovation play a key role. What they share is disillusion about the ability to predict long-term consequences and a turn to process, participation, upstream reflection, and governance over against expert judgment and one-off assessments. To understand more clearly the specific differences between these approaches, one important dimension to look at is that of objects and levels of assessment and their institutional structures.

# 4 OBJECTS AND LEVELS OF ASSESSMENT

| | Public sector planning | Technology trends | Infrastructural projects | Innovation projects | Concrete technologies |
|---|---|---|---|---|---|
| Expert TA | X | X | | | X |
| 'Hard' IA | X | | X | | |
| Part. TA | | X | | | |
| Constr. TA | | | | X | X |
| SIA | X | | X | X | |
| eTA | | | | X | |
| eIA | X | | | X | |

# 5 INSTITUTIONAL STRUCTURE

| | Governmental planning | Parliamentary oversight | Industry planning | Academic oversight | Project level |
|---|---|---|---|---|---|
| Expert TA | X | X | X | | |
| 'Hard' IA | X | | X | | |
| Part. TA | | X | | | |
| Constr. TA | | | X | | X |
| SIA | | | X | | |
| eTA | | | | | X |
| eIA | | | X | | X |

## 5.1 TECHNOLOGY ASSESSMENT

Institutionally, the two most clearly structured subsets of TA are Parliamentary Technology Assessment (PTA) and Health TA. Parliamentary TA is populated by institutions setup with some relation to parliaments. The establishment of these institutions began in 1972 with the U.S. Congress' Office of Technology Assessment (OTA), which inspired similar institutions in European countries from the late 1970's and onward (Vig and Paschen, 2000). Expert TA and participatory TA is found in different mixes in each of these institutions. The institutional domain of PTA is still expanding. On the one hand countries in Eastern Europe and Asia are developing their own PTA organizations (Ganzevles and van Est, 2012). On the other hand, the borders setup by the initial link between PTA and parliaments are weakening with PTA organizations taking on advisory functions in relation to governments and civil society and with other organizations emerging that cross over the domain with advisory functions very similar to PTA. Key actors in the PTA domain have therefore in recent years taken up the broader label of policy-oriented TA (still shortened to PTA) (Bütschi, 2014).

Health TA (HTA) is institutionally part and parcel of the movement towards evidence-based health care. Originally, health technology was one of the focus areas of the OTA, where the 'efficacy' of new health technologies was emphasized (Banta, 2003). HTA, however, remained somewhat scattered with regard to methodology and organization. But when the focus area of HTA was taken up beyond the field of TA by initiatives such as the Cochrane Collaboration, the general success of the evidence-based health care movement meant that HTA became much more established in many countries. Different nations have very different ways of organizing HTA. In some countries, HTA is carried out by private organizations within the health care field while other countries have national HTA centers (ibid.)

TA in the industrial sector is carried out by many different types of actors including industry associations, labor unions, consultancies, certified technology services, and individual large corporations. Here the objective is more narrowly to assess the role of new technology in the value-chain of investment, production and consumption.

Academic groups carry out technology assessment of different varieties. Some pursue the pathway of early-stage interaction with researchers and innovators paved by constructive TA. For such research groups, academia-industry partnerships can serve as a way of gaining institutional stability while partnerships or other forms of collaboration with public research funding agencies also may be an option. In any case, ad hoc organization on a project-by-project basis remains typical. Others have a more critical approach, insisting on "opening up" decision-making processes in the interface between science, technology and society. Such research groups are typically more closely aligned with advocacy organizations and aim to influence public debate and political processes in parliaments and international decision-making fora.

### 5.2 IMPACT ASSESSMENT

EIA is the most developed planning instrument backed by the legal framework including regulation on the international, regional and national level.

As was mentioned above, the first environmental impact statements (EIS) adopting the EIA as a legally based decision-support instrument was the National Environmental Policy Act (NEPA) in the USA, enacted in 1970 (The Senate and House of Representatives, 1969). The EIS was 'an enforcing mechanism, to show how Federal agencies were implementing environmental policy within their major project development activities' (IAIA, 2014). NEPA lighted the fuse for EIA regulation in several other countries, especially Canada, Australia and New Zealand. Since then, the approach has become internationally recognised and gradually adopted by an increasing number of countries (IAIA, 2014). One of the most significant developments in EIA history was the UN Conference on Environment and Development 1992 (UNCED) (UN General Assembly, 1992). The Conference resulted in the Final Declaration (*1992 Rio Declaration on Environment and Development*), which Principle 17 is a statement of EIA:

> Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority (UN General Assembly, 1992).

Some commentators interpret this principle as a requirement to apply EIA at the national level (criticism emphasized to limited scope of the principle) as a principle of customary international law. Notwithstanding, 'within the environmental policy field of numerous states, EIA is certainly established and it has been even commented that EIA as such might be regarded as a general principle of law' (IAIA Wiki, 2014). The UNCED resulted also in a significant consequences regarding UN, as all UN agencies dealing with people and environment in various ways 'adopted impact assessment as a central tool to support decision-making' (IAIA, 2014).

National and international development assistance institutions (including the Organization for Economic Co-operation and Development (OECD)) have integrated the IA into development cooperation to address environmental and social issues, as well as public participation and

good governance (IAIA, 2014). Not only countries and international organisations but also the major funding banks endorsed the IA regulations and guidelines. Most multi-lateral development banks have developed EIA systems, including the World Bank. As far as financing sector is concerned, there has been growing pressure on private sector banks to develop and implement impact assessment requirements. The Equator Principles (2011) have been developed as a set of guidelines that apply to the social and environmental scrutiny of proposed development projects involving private financial institutions (IAIA, 2014). Currently, 79 Equator Principles Financial Institutions (EPFIs) in 35 countries, including many commercial banks, with operations in over 100 countries have adopted The Equator Principles (The Equator Principles, 2011). The Principles became a standard for addressing environmental and social issues in global project finance.

Environmental impact assessment has become part of hard law. Furthermore, the practice of supranational courts and mostly national courts reflects this recognition. Particularly, the USA court decisions have played a decisive role in the development and the implementation of the National Environmental Policy Act (NEPA) (IAIA Wiki, 2014). In the European context, the European Court of Justice mentions EIA in its judgements as a result of the EIA Directive.

The EIA is the most developed and regulated framework for assessing environmental impacts. It is therefore increasingly being used to assess social and economic impacts also. Proliferation of different types of impact assessments has led to the situation where environmental, social, economic etc., analysis are conducted in their separate realms (Slootweg et al. 2003). There is therefore a growing attempt to construct a conceptual framework providing a harmonized and integrated approach combining different (but also overlapping?) consequences of actions.

### 5.3 SIA

As far as SIA is concerned, there can be recognised two different approaches to SIA represented by two documents elaborated in the International Principles for Social Impact Assessment (2003) (International Principles) and the Principles and Guidelines for Social Impact Assessment in the USA (US Principles and Guidelines) (Impact Assessment and Project Appraisal, 2003). Both of these documents were developed under the auspices of the International Association for Impact Assessment and published in 2003. The US Principles and Guidelines represent rather positivist and technocratic approach, while the International Principles represent more democratic, participatory and constructivist approach (Vanclay, 2006). Many transnational, international and regional organisations, countries, industry branches, and individual companies have developed their own guidelines and principles on SIA. In the European context it is worth mentioning the European Commission Guidelines giving general guidance to the Commission services for assessing potential impacts of different policy options (European Commission, 2014).

## 6 ETHICAL VALUES, PRINCIPLES AND ISSUES

TA and IA have traditionally weighed scientific and processual quality criteria over ethical values as guiding principles for assessment. SIA is an exception in this regard in that it explicitly includes and uses a broad range of politically recognized ethical principles aimed at ensuring social justice and sustainability. eTA and eIA are both reactions to precisely this lack of explication of values in TA and IA. The guiding principles in SIA, eTA and eIA are listed below.

### 6.1 SIA

The SIA practitioners are expected to uphold to such principles as sustainability, scientific integrity, openness, accountability, fairness, equity, and defend human rights (European Commission, 2014). The SIA paradigm is represented by the explication of the value system of SIA practitioners. According to the Vanclay (2003:5-6) this system includes many internationally recognised principles such as:

- Intergenerational Equity
- Internationalisation of Costs
- Intragenerational Equity
- Precautionary Principle
- Recognition and Preservation of Diversity
- The Polluter Pays Principle
- The Prevention Principle
- The Principle of Multisectoral Integration
- The Principle of Subsidiary
- The Protection and Promotion of Health and Safety
- Uncertainty Principle

### 6.2 ETA

The authors argue for theory independence with regard to normative theory, agreeing with Grunwald (2000) that "the moral framework has to be developed hand in hand with technology development – it is exactly the task of ethics to reflect and support this development" (Palm and Hansson, 2006: 550). The approach instead lists 'issues' to serve as core focus points for reflection.

The issues listed are:

1. Dissemination and use of information
2. Control, influence and power
3. Impact on social contact patterns
4. Privacy
5. Sustainability
6. Human reproduction
7. Gender, minorities and justice
8. International relations
9. Impact on human values.

### 6.3 EIA

The EIA framework is built around four principles stipulated by Beauchamp and Childress, which serve to group values and issues for reflection. The issues are specifically applicable to ICT, but may according to the author(s) also possibly be applied in other technology sectors. The framework also includes specific privacy aspects. The four principles and the values/issues grouped with them are:

Respect for autonomy (right to liberty)

- Dignity
- Informed consent

Nonmaleficience (avoiding harm)

- Safety
- Social solidarity, inclusion and exclusion
- Isolation and substitution of human contact

Beneficience

- Universal service
- Accessibility
- Value sensitive design
- Sustainability

Justice

- Equality and fairness (social justice)

# 7 PROCEDURES AND TOOLS

## 7.1 TA

Given the complexity of the field, it should be clear that no one protocol adequately captures the many different kinds of methods deployed under the heading of "technology assessment". Illustratively, a few examples mainly taken from the TAMI final report (Decker and Ladikas, 2004) are listed below with a few supplements from various TA organizations' websites.

*Expert methods*

- Delphi method, expert interviews
- Expert discussions, transdisciplinary working groups
- Modeling, simulation, systems analysis, risk analysis, material flow analysis
- Trend extrapolation, simulation, scenario technique
- Discourse analysis, value research, ethics, value tree analysis

*Interactive methods*

- Consensus conference
- Expert hearing, parliamentary hearing, citizen hearing
- Focus groups
- Citizens jury, Planning cell
- Café seminars, Charette
- Future search conference
- Participative assessment
- Scenario workshops, perspective workshops
- World Wide Views

### 7.2 EIA

According to Barrow (1997) the methods and tools being used in EIA include:

- Checklist methods
- Overlay Methods
- Geographical Information Systems (GIS)
- Matrix
- Multi-attribute Utility Theory-Based Methods
- Network Diagrams, Steeped Matrices, Systems Diagrams, Linear Graphs and Networks
- Event Trees
- Computer Systems and Expert Systems
- Quantitative Methods: Scaling, Weighting, Indices
- Modelling Methods
- Guidelines and Manuals.

### 7.3 SIA

Only a few SIA-specific techniques have been developed. SIA methods and tools are mostly based on the range of social sciences methods. Some of them are:

| | |
|---|---|
| **Analytical tools** | Stakeholder Analysis<br>Gender Analysis<br>Secondary Data Review |
| **Community-based methods** | Participatory Rural Appraisal (PRA)<br>SARAR (five attributes: self-esteem; associative strength; resourcefulness; action planning and responsibility for follow-through that are important for achieving a participatory approach to development) |
| **Consultation methods** | Beneficiary Assessment (BA) |
| **Observation and interview tools** | Participant Observation<br>Semi-structured Interviews<br>Focus Group Meetings<br>Village Meetings |
| **Participatory methods** | Role Playing<br>Wealth Ranking<br>Access to Resources<br>Analysis of Tasks<br>Mapping<br>Needs Assessment<br>Pocket Charts<br>Tree Diagrams |
| **Workshop-based methods** | Objectives-Oriented Project Planning<br>TeamUP |

# 8 CONCLUSION

eIA and eTA are approaches that portray themselves as complementary to traditional IA and TA. eIA is different from IA in that it is only concerned with impacts that have ethical relevance or that raise ethical issues. These are impacts that concern or affect rights and responsibilities, benefits and harms, justice and fairness, well-being and the social good. Moreover eIA does not merely observe or describe impacts, but also ethically evaluates them. For example, it would not just observe that a new technology has a disproportionately negative effect on the health and well-being of women or minorities, but would also assess the ethical acceptability of these impacts through the application of principles of justice and non-discrimination. Similarly, eTA has a focus on ethical aspects that traditional TA lacks, and promises to take these aspects into consideration in the development of new technology.

In spite of these differences, eIA stills overlap with other types of impact assessment. First, ETIA often relies on other, more traditional types of assessment for identifying impacts. Second, some types of impact assessment incorporate ethical concerns. Particularly, contemporary values and principles of social impact assessment, as specified in the *International Principles for Social Impact Assessment* of the International Association for Impact Assessment (IAIA) that were established in 2003,[2] prescribe that both the SIA and the assessed project should contribute to the empowerment of vulnerable groups in communities, include considerations of gender, and be guided by respect for human rights. The IAIA framework includes rather explicit reference to ethical principles like human rights, equity, justice, democratization, and accountability.

So, contemporary social impact assessment is driven by moral concerns and goes beyond merely describing impacts to include measures for monitoring and managing these impacts in order to promote positive outcomes. Also, recent other impact assessment approaches serve to further blur the distinction between eIA and traditional forms of impact assessment. These include *human rights impact assessment* (HRIA)[3] and *privacy impact assessment* (PIA).[4]

In addition, there are other recent approaches that combine IA or TA with ethical analysis. The *techno-ethical scenarios approach* of Boenink, Swierstra and Stemerding (2010) aims at ethical assessments of emerging technologies that are intended to help policy makers to anticipate ethical controversies regarding emerging technologies. It relies on *scenario analysis*, which involves the construction of possible future scenarios for the development, application and impacts of new technology. A unique feature of the approach is that it aims to anticipate the mutual interaction between technology and morality, and changes in morality that may result from this interaction. Boenink et al. argue that technology may change the way we interpret moral values and may also affect the relative important of particular moral principles. For example, privacy may become a less important principle in an information society where personal information is ubiquitous, and the concept of human responsibility may change in a society in which human decision-making is supported by expert systems.

[2] Vanclay, Frank, "International Principles For Social Impact Assessment", *International Association for Impact Assessment*. http://www.iaia.org/publicdocuments/sections/sia/IAIA-SIA-International-Principles.pdf

[3] Wright, D. and P. De Hert (eds), *Privacy Impact Assessment*, Springer, 2012; Office of the Australian Information Commissioner, "Guide to undertaking privacy impact assessments". http://www.oaic.gov.au/images/documents/privacy/privacy-resources/privacy-guides/guide-to-undertaking-pias.pdf

[4] The World Bank, *Human Rights Impact Assessments*. http://siteresources.worldbank.org/PROJECTS/Resources/40940-1331068268558/HRIA_Web.pdf

They want to take such changes into account when ethically assessing new technologies, so that new technologies are not evaluated from within a moral system that may not have the same validity by the time an emerging technology has become entrenched in society.

Philip Brey's *Anticipatory Technology Ethics* (ATE) approach (Brey, 2012a, b) aims to do broad ethical assessments of emerging technologies and their projected applications and impacts. It belongs in the larger family of eIA approaches, but differs from eIA as developed by Wright et al. in that it allows for broader and earlier assessment at a stage where there are still more uncertainties about future applications and impacts. Wright et al.'s approach seems to be more focused on concrete design projects in which design specifications already exist and the context of use is already known. Also, ATE contains a more extensive methodology for the anticipation of future applications and impacts that is based on futures studies and technology assessment. The approach distinguishes three levels of analysis, the technology, artifact and application levels, and anticipates and analyzes ethical issues at all three levels. After ethical analysis, there are optional stages at which the analysis is used to improve design, improve governance, or assign responsibilities to different actors.

Ethical approaches to IA and TA are still fully in development. The future will tell whether there will be a distinct need for eIA and eTA, or whether such approaches will be incorporated somehow into regular IA and TA analyses.

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