A Brief Overview of Technology Impact Assessment

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https://rogerclarke.com/EC/TIAN.html
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Australia India Joint Impact Assessment of Critical Technologies for Peace and Stability
ANU – 7 February 2025

Assessment Categories by Focus

Compliance Focus

- Regulatory Compliance
  - Org'l Self-Regulation
  - Industry Self-Regulation
  - Co-Regulation
  - Formal Regulation
- Privacy Law Compliance
  - All Statutes, Delegated Legislation, Common Law
- Data Protection Law Compliance
  - An EU Directive, a Statute

Project or Proposal
Achievability of Objectives subject to Constraints

Social Impact
Impacts of an Activity on Social Asset(s) / Value(s)

Technology
Impacts of an Activity on Any / All Asset(s) / Value(s)

Assessment Techniques

Project or Proposal Focus

- Business Case Formation
- Security Impact, aka Threat Risk Assessment (TRA)

Social Impact Focus

- Data Privacy IA
- Privacy Impact Assessment
- Surveillance IA
- Human Rights IA
- Ethical IA

Technology Focus

- Technology Assessment

Technology Assessment

"A scientific, interactive and communicative process, which aims to contribute to the formation of public and political opinion on societal aspects of science and technology"
European Parliamentary Technology Assessment (EPTA) network
http://www.eptanetwork.org/

The Key Scoping Factors:

- The **Technologies** Considered
- The **Environment** Impacted
- The **Perspectives** Reflected
- The **Values** Impinged Upon

Stakeholder Theory

- Created as a counterpoint to 'Shareholders'
  Applied across many management contexts, incl.:
  - **Users** of information systems
  - **'Usees'** of information systems
    Those impacted by it even though not participants in it
- Attributes of **Power, Legitimacy, Urgency, Proximity**
- Sponsoring organisations tend to consider only the Stakeholders capable of affecting project success
- **Legitimate-but-not-Powerful Stakeholders are not even seen as constraints let alone objectives**

Freeman & Reed 1983, Mitchell et al. 1997,
Driscoll & Starik 2004, Laplume et al. 2008

Abstraction Levels of 'Stakeholder'

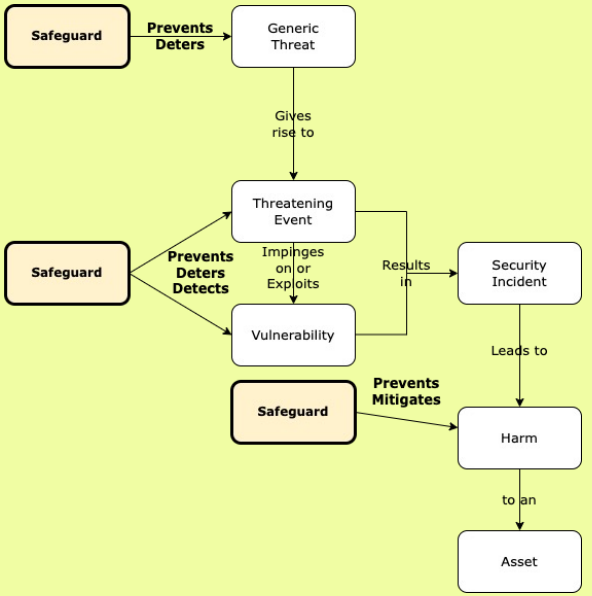
- Individual Entity
- Group
- Category / Segment
- Community
- Society
- Economy
- Polity
- Environment / Biosphere / Nature

Jacobs M. (2003) 'The Environment as Stakeholder'
Business Strategy Review 8,2 (February 2003) 25-28

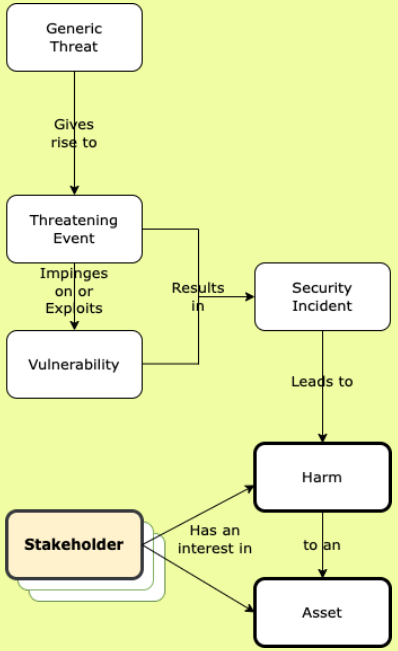
The Conventional Security Model

Clarke R. (2015)
'The Prospects of Easier Security for SMEs and Consumers'
Computer Law & Security Review 31,4 (August 2015) 538-552

The Conventional Security Model + Safeguards



The Conventional Security Model + Stakeholder



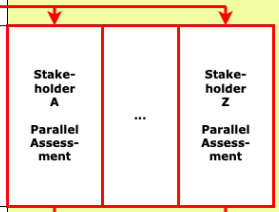
Risk Assessment & Risk Management

Enterprise-Level

1.	**PERFORM RISK ASSESSMENT (The Analysis Phase)**
1.1	Declare Objectives and Constraints
1.2	Identify the Stakeholders
1.3	Describe the Intended Intervention
1.4	Adapt Objectives and Constraints
1.5	Study Assets, Values, Harm
1.6	Study Threats, Vulnerabilities
1.7	Study Existing Safeguards
1.8	Evaluate Residual Risks
1.9	Summarise the Results
2.	**PREPARE RISK MANAGEMENT (The Design Phase)**
2.1	Consider Alternative Designs, Additional Safeguards and Mitigation Measures
2.2	Evaluate against Objectives and Constraints
2.3	Select / Adapt / Refine the Design
3.	**PERFORM RISK MANAGEMENT (The Implementation Phase)**
3.1	Plan the Implementation
3.2	Execute the Implementation
3.3	Review the Implementation

Multi-Stakeholder Risk Assessment & Risk Management

1.	**PERFORM RISK ASSESSMENT (The Analysis Phase)**
1.1	Declare Objectives and Constraints
1.2	Identify the Stakeholders
1.3	**Describe the Intervention**
1.4	Adapt Objectives and Constraints
1.5	Study Assets, Values, Harm
1.6	Study Threats, Vulnerabilities
1.7	Study Existing Safeguards
1.8	Evaluate Residual Risks
1.9	Summarise the Results
2.	**PREPARE RISK MANAGEMENT (The Design Phase)**
2.1	**Integrate into a Consolidated Report on the Overall Risks**
2.2	Consider Alternative Designs, Additional Safeguards and Mitigation Measures
2.3	Evaluate against **all Stakeholders' Objectives and Constraints**
2.4	Select / Adapt / Refine the Design
3.	**PERFORM RISK MANAGEMENT (The Implementation Phase)**
3.1	Plan the Implementation
3.2	Execute the Implementation
3.3	Review the Implementation



Stakeholder Participation

'Multi-Stakeholder Risk Assessment of Socio-Technical Systems Projects' https://rogerclarke.com/DV/MSRA-ACIS24-241011.pdf

Researcher Perspective Theory

A Researcher Perspective is a particular stakeholder perspective that is adopted by a researcher as **the, or a, viewpoint from which to observe phenomena during the conduct of a research project**

- 90% of Info Systems Research is **Single-Perspective**
  - In 90% of that 90%, the System Sponsor is in focus
  - Users and Usees are seldom the focal point
- **Dual-Perspective** Research can reflect both System-Sponsor and User views, and inter-relate them, to the benefit of both
- **Multi-Perspective** Research is challenging, and uncommon

Clarke R. & Davison R.M. (2020) 'Through Whose Eyes? The Critical Concept of Researcher Perspective' J. Assoc. Infor. Syst. 21,2 (March-April 2020) 483-501 PrePrint at http://rogerclarke.com/SOS/RP.html

Some Challenges in Technology Impact Assessment

- Stakeholder Richness and Levels of Abstraction
- **Level of Abstraction of the Technology**
- Anticipated, Recognised, Unforeseen Trajectories
- Domains of Use
- Enablement/Facilitation/Support & Regulation Nurturing Innovation / Progressive Protections
- **Cultural Diversity**

Addressing the Challenges Level of Abstraction of the Technology

- Careful **Definition of the Scope** of the technology
- Sufficiently deep **Understanding** of it
- **Segmentation** by Technology, App Domain, etc.
- **Generic Policy** based on principles
- **Policy Articulation** into operational controls through co-regulatory arrangements

Addressing the Challenges Hofstede/Minkov Dimensions of Culture

- Power distance index
- Individualism vs. collectivism
- Uncertainty avoidance
- Motivation towards Achievement and Success (cf. Masculinity and Femininity)
- Long-term vs. short-term orientation
- Indulgence vs. restraint

https://geerthofstede.com/culture-geert-hofstede-gert-jan-hofstede/6d-model-of-national-culture/

Minkov M. (2012) 'Cross-Cultural Analysis: The Science and Art of Comparing the World's Modern Societies and Their Cultures' Sage, 2012

Information Deliverables during a TIA Process

- The **Technology/ies**
- Past and possible future **Trajectories**
- Known and possible **Features**
- Likely, possible **Applications**
- **Stakeholders**, Proxies for them
- Relevant **Values** that may be impinged upon
- Relevant **Social-Political Criteria**
- Potential **Positive Impacts**, Likely Impediments
- Potential **Negative Impacts**, Implications, Risks

  Potential **Safeguards** and **Mitigation Measures**
- **Outcomes Equity**, Harm Avoidance, Mitigation
- **Policy Options**
- **Audience** Definition

Alternative TIA *Modus Operandi*

- **Authoritative** – with outreach or consultation.
  Performed by a team with competencies in TA methods.
  Input from relevant parties welcomed at some stages.
- **Coordinative / Collaborative** – with participation.
  The team is open-ended, or open at all stages to input from any interested party, particularly during the formative phases and again once a draft is in place.
- **Competitive/Dialectic** – with debate or dialogue.
  Thesis / antithesis / synthesis.
  Seeks emergence of consensus or compromise.
  Fallback is publication of evidence, reasoned argument re two or more alternative analyses and policy proposals.

Research Methods for Futures Studies

Conceptual Research

- Conventional Delphi Studies
- Visionary Depiction
  - Utopian
  - Dystopian
  - Balanced
- Critical Theory Research

Quasi-Empirical Research

- Grounded Delphi Studies
- Vignettes / Mini-Case-Studies
- Game-based / Role-Playing Studies
- Simulation Modelling
- Scenario Analysis

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OPTIONAL DRILL-DOWN SLIDES

Social Impact Assessment

- Rights IA — UDHR, ICCPR, ICESCR
- Ethical IA — Ethical Issues, Participative Design
- Surveillance IA — Many Values & Ind'ls/Groups/Society
- Privacy IA — All Dimensions of Privacy
- Data Privacy IA — Only the Data Privacy Dimension

The Dimensions of Privacy

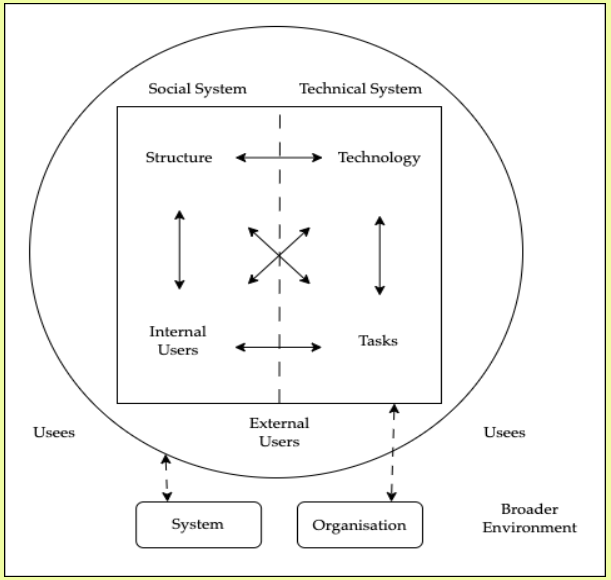
- *The Physical Person*
- *Personal Data*
- *Personal Communications*
- *Personal Behaviour*
- *Personal Experience*

http://www.rogerclarke.com/DV/Intro.html# Priv

A Rich Assortment of Definitions

- No consensual, unambiguous and selective definition of TA has yet been provided ... the most common collective designation of the **systematic methods** used to scientifically investigate the **conditions for and the consequences of technology and technicising** ... (Grunwald 2009)
- A form of **policy research** that examines **short- and long-term consequences** (for example, **societal, economic, ethical, legal**) of the application of technology ... to **provide policy makers** with information on **policy alternatives** (Banta 2009)
- A scientific, **interactive and communicative** process, which aims to **contribute to the formation of public and political opinion** on societal aspects of science and technology (EPTA 2017)
- Health Technology Assessment (HTA) is a **multidisciplinary** process that uses explicit methods to determine the **value** of a health technology at different points in its **lifecycle**. The purpose is to **inform decision-making** [re health systems] (O'Rourke et al. 2020)

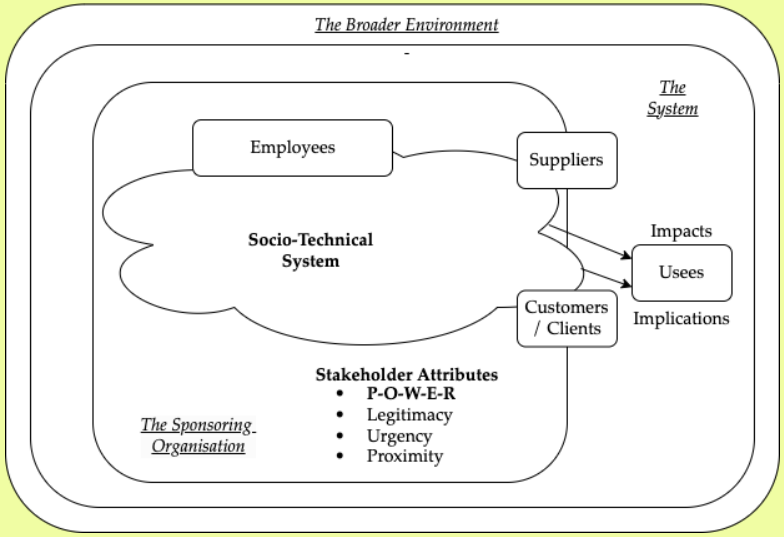
An Open Socio-Technical System



Enhancement to Bostrom & Heinen (1977)

Clarke, Michael & Abbas (2024) 'Robodebt: A Socio-Technical Case Study of Public Sector Information Systems Failure', at https://ajis.aaisnet.org/index.php/ajis/article/view/4681/1481

Stakeholders in a Social-Technical System



Driscoll C. & Starik M. (2004) 'The primordial stakeholder: Advancing the conceptual consideration of stakeholder status for the natural environment' Journal of Business Ethics 49 (2004) 55-73

The Two-Step Approach to Achieving a Meaningful Discussion about Security

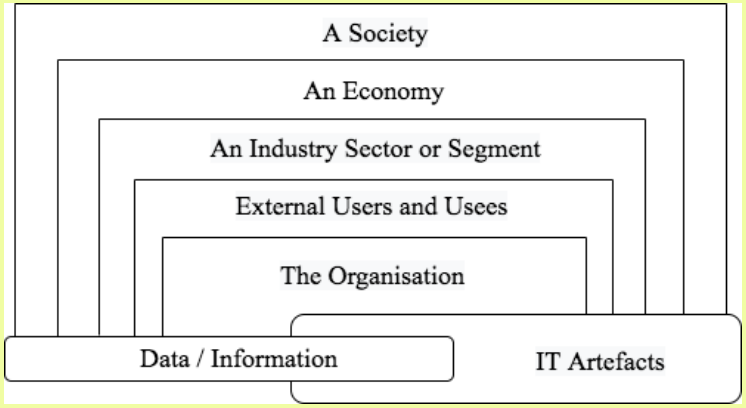
1. **Establish a Security definition**, e.g.

A condition in which an Entity
does not suffer Harm from Threatening Events

2. **Establish a Scope Definition**:

Security
Of What?
Against What?
For Whose Benefit?

Alternative Scope Definitions for Security Analysis



http://rogerclarke.com/EC/WS-1301.html

Attacks

By Whom?

Principals
- Opportunists
- Hacktivists
- Vigilantes
- Organised Crime
- Corporations
- Nation-States

Agents
- Mercenaries
- Private Military Corporations

Why?

Politics
- Protest against Action
- Retaliation / Revenge
- Espionage

Economics
- Financial Gain
- Financial Harm

Social/Cultural Factors
- Challenge
- Dispute
- Celebration