

## # Paper Summary

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Title: Big data and technology assessment: research topic or competitor?

Authors: Gernot Rieder, Judith Simon

DOI: <https://doi.org/10.1080/23299460.2017.1360718>

Year: 2017

Publication Type: Journal Article

Discipline/Domain: Science, Technology, and Society (STS) / Responsible Innovation

Subdomain/Topic: Big Data governance; Technology Assessment (TA); Responsible Research and Innovation

Eligibility: Eligible

Overall Relevance Score: 87

Operationalization Score: 75

Contains Definition of Actionability: Yes (implicit, as provision of actionable knowledge in TA and Big Data)

Contains Systematic Features/Dimensions: Yes (multiple features tied to actionability such as timeliness, transparency, and accountability)

Contains Explainability: Yes

Contains Interpretability: Partial (discussed via TA's reflexive practices and Big Data's opacity)

Contains Framework/Model: No formal named model, but structured comparative framework TA vs Big Data

Operationalization Present: Yes (discussion of methods, practices, and integration possibilities for achieving actionability)

Primary Methodology: Conceptual / Review

Study Context: Comparative analysis of TA and Big Data analytics as socio-technical practices

Geographic/Institutional Context: Europe-focused with international references (EU policy, US OTA, global trends)

Target Users/Stakeholders: Policymakers, TA practitioners, data scientists, civil society, industry stakeholders

Primary Contribution Type: Conceptual comparative analysis and recommendations

CL: Yes

CR: Yes

FE: Partial

TI: Yes

EX: Yes

GA: Partial

Reason if Not Eligible: N/A

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**\*\*Subdomain/Topic:\*\***

Big Data governance; Technology Assessment (TA); Responsible Research and Innovation (RRI)

**\*\*Contextual Background:\*\***

The paper examines Big Data not only as a socio-technical phenomenon of interest to TA but also as a p

**\*\*Geographic/Institutional Context:\*\***

Primarily European TA landscape, with references to US (OTA), OECD, and global Big Data policy initiati

**\*\*Target Users/Stakeholders:\*\***

Policy makers, TA practitioners, data scientists, industry actors, civil society organizations.

**\*\*Primary Methodology:\*\***

Conceptual / Review

**\*\*Primary Contribution Type:\*\***

Comparative conceptual framework and normative recommendations.

**## General Summary of the Paper**

The article explores the dual relationship between Big Data and Technology Assessment (TA): as a rese

**## Eligibility**

Eligible for inclusion: **\*\*Yes\*\***

**## How Actionability is Understood**

Actionability is framed as the provision of **\*\*reliable, relevant, and usable knowledge\*\*** to inform political d

> “Providing actionable knowledge and advice for democratic decision-making in cases where the stakes

> “Big Data’s key promise... the provision of actionable, future-oriented knowledge” (p. 235)

**## What Makes Something Actionable**

- Timely delivery of knowledge in decision-relevant windows.
- Contextual relevance to stakeholders' needs and policy environments.
- Reflexivity in anticipating future trajectories and their desirability.
- Inclusivity and deliberation to capture diverse perspectives.
- Ability to translate complex socio-technical dynamics into decision guidance.
- Feasibility and implementability of recommendations.
- Transparency/explainability to support trust and legitimacy.

### ## How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Not a named model, but comparative TA vs Big Data operational model
  - **Methods/Levers:** Multi-, inter-, and transdisciplinary research; participatory foresight; scenario exercises
  - **Operational Steps / Workflow:** Problem scoping, multidisciplinary synthesis, participatory engagement
  - **Data & Measures:** Combination of qualitative deliberation outputs, stakeholder inputs, and computational modeling
  - **Implementation Context:** Governance of emerging technologies, particularly Big Data, under RRI principles
- > “Participatory engagement can be considered a vital element for a more ‘anticipatory’ and ‘reflexive’ governance.”
- > “Big Data technologies estimate probable future trajectories... rendering the future knowable and its outcomes actionable.”

### ## Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – actionable advice must be clear and comprehensible to decision-makers.
  - > “Providing independent, high-quality knowledge about techno-scientific developments...” (p. 240)
- **CR (Contextual Relevance):** Yes – relevance to stakeholder needs is central in TA and challenged by Big Data
- **FE (Feasibility):** Partial – implied in TA's role of offering viable options, but less explicitly tied to feasibility
- **TI (Timeliness):** Yes – timely advice is critical in high-stakes contexts; Big Data's real-time capabilities
- **EX (Explainability):** Yes – TA's transparency vs Big Data's opacity (algorithmic black boxes) discussed
- **GA (Goal Alignment):** Partial – alignment with societal goals is implicit in RRI framing.
- **Other Dimensions Named by Authors:** Inclusivity, reflexivity, sustainability, public trust.

### ## Theoretical or Conceptual Foundations

- Responsible Research and Innovation (RRI) framework.
- Anticipatory governance (Guston 2014).
- Technology futures (Grunwald 2012).
- Post-normal science (Funtowicz & Ravetz 1993).

### ## Indicators or Metrics for Actionability

No formal quantitative indicators; emphasis on qualitative criteria such as inclusivity, reflexivity, contextual relevance.

### ## Barriers and Enablers to Actionability

- **Barriers:** Big Data opacity; overreliance on algorithmic objectivity; displacement of deliberative process
- **Enablers:** Integration of computational analytics into TA; multidisciplinary collaboration; genuine participation

## ## Relation to Existing Literature

Positions Big Data as a socio-technical phenomenon with both epistemic and political implications, extending beyond traditional boundaries of science and technology.

## ## Summary

This paper provides a conceptual comparison of TA and Big Data as providers of actionable, future-oriented knowledge.

## ## Scores

- **Overall Relevance Score:** 87 – Strong conceptualization of actionability (explicitly named, linked to TA)
- **Operationalization Score:** 75 – Detailed discussion of methods and integration pathways, though no explicit timeline

## ## Supporting Quotes from the Paper

- “Providing actionable knowledge and advice for democratic decision-making...” (p. 236)
- “Big Data’s key promise... the provision of actionable, future-oriented knowledge” (p. 235)
- “Participatory engagement... vital element for more ‘anticipatory’ and ‘reflexive’ governance...” (p. 237)
- “Big Data technologies... rendering the future knowable and its outcome optimizable” (p. 239)

## ## Actionability References to Other Papers

- Funtowicz & Ravetz (1993) – post-normal science.
- Guston (2014) – anticipatory governance.
- Grunwald (2012) – technology futures.
- Abelson et al. (2003) – public deliberation design.